CASE 2945: Application of SHELL OIL CO. for creation of new Devonian Gas Pool and for special pool rules.

CASE NO. 2945

Application,
Transcripts,
Small Exhibits
ETC.

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
December 4,1963

EXAMINER HEARING

IN THE MATTER OF:
Application of Shell Oil Company for the creation of a Devonian Gas Pool and for special pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the creation of a new Devonian gas pool for its Harris-Federal Well No. 1 located in Section 27, Township 23 South, Range 34 East, Lea County, New Mexico, said pool to comprise all of Sections 27, 28, 33 and 34, Township 23 South, Range 34 East, and all of Sections 3 and 4, Township 24 South, Range 34 East.

Case No. 2945

BEFORE: Elvis A. Utz, Examiner

TRANSCRIPT OF HEARING

NEW MEXICO OIL CONSERVATION COMMISSION

EXAMINER HEARING

SANTA FE, NEW MEXICO

REGISTER

HEARING DATE DECEMBER 4, 1963 TIME: 9 A.M.

NAME:	REPRESENTING:	LOCATION:
D. D. Stokes	Shell Oil Co	Roswell, N M
R. D. Vassar	SHELL	Roswell
L. E. Thomas	Amerada	Hobbs
L. Rogers	AMERADA	TULSA, OKLA.
THOMAS W. LYNCH	"	" "
W. W. STEWART	"	HOBBS, N.M.
R. M. Richardson	Independent	Roswell, N.M.
Paul J. Bower	Sunray D-X	Midland Tex.
G. T. Hallman	Sunray DX	Roswell, N.M.
EUGENE HERBECK	ATLANTIC	DENVER, COLO
E. M. PRINGLE	Atlantic	Denver, Colo.
R. S. Morris	Seth, Montgomery, Federal & Yates	Santa Fe
Shoger	U.S.G.S.	Roswell
Howe	"	"
F. C. MORGAN	PHILLIPS PET. CO.	HOBBS
W. G. DUTTON	HUMBLE	MIDLAND, TEXAS
Paul F. Kenny	Amerada	Roswell

NEW MEXICO OIL CONSERVATION COMMISSION

EXAMINER HEARING

SANTA FE, NEW MEXICO

REGISTER

HEARING DATE DECEMBER 4, 1963 TIME: 9 A.M.

NAME:	REPRESENTING:	LOCATION:
R. A. Mo[illegible]	self	Hobbs
Charles B. Read	"	Roswell
Jason Kellahin	Kellahin & Fox	Santa Fe
E. V. Stine	Sunray DX	Midland
E. A. Riley	Ambassador Oil	Ft. Worth, Tex
L. C. White	G W & G	Santa Fe

MR. UTZ: The hearing will come to order, please. The first case on the docket will be Case 2945.

MR. DURRETT: Application of Shell Oil Company for the creation of a Devonian Gas Pool and for special pool rules, Lea County, New Mexico.

MR. MORRIS: If the Examiner please, I'm Richard Morris of Seth, Montgomery, Federici, and Andrews, Santa Fe, appearing on behalf of the Applicant, Shell Oil Company. We will have one witness, Mr. Dana Stokes.

(Witness sworn.)

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

(Whereupon, Applicant's Exhibits Nos. 1 through 6 marked for identification.)

D. D. STOKES

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

DIRECT EXAMINATION

BY MR. MORRIS:

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

A D. D. Stokes, Staff Reservoir Engineer for Shell Oil Company, Roswell, New Mexico.

Q Mr. Stokes, have you previously testified before the Oil Conservation Commission or one of its examiners?

A Yes, I have.

Q Are you familiar with the application of Shell Oil

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Company in Case 2945?

A Yes, sir.

Q What is the purpose of Shell's application in this case, Mr. Stokes?

A We're making application for the establishment of a Devonian Gas Pool to be called the Antelope Ridge Devonian Gas Pool, and for special field rules for production from this pool. We're also requesting establishment of horizontal limits for the pool which are to consist of Sections 27, 28, 33, and 34 of Township 23 South, Range 34 East, and Sections 3 and 4, Township 24 South, Range 34 East.

Q What are the pertinent features, briefly, of the special rules that you intend to request, Mr. Stokes?

A Well, we intend to ask for 640-acre spacing and for well locations no nearer than 660 feet to the outer boundary of the interior quarter quarter sections. This, in effect, in a standard section would be no closer than 1980 feet to the outer boundaries of the section.

Q Do you have a plat of the area of the proposed pool?

A Yes. Exhibit 1 is a plat of the area. It shows the Antelope Ridge Unit outlined in red. We have two wells completed in the unit, the 1, th[illegible]is Federal No. 1 Devonian completion located in S[illegible]ction 27. In Section 4 we have the Federal BE No. 1, which is a Morrow completion. This well is drilled to the Ellenburger and subsequently completed to the Morrow. We do

have a commercial zone in the Devonian but have not as yet completed the well in the Devonian. Both of these wells are shut in at the present time for lack of market.

Q Does this plat also show your structural interpretation of the Devonian formation in this area?

A Yes. The contours shown on the plat are on the top of the Devonian, and the data here is based on the well control furnished by the two wells, on seismic data, and on dipmeter data in Harris Federal No. 1. These data show the dip to the south, north, east, and west, with a gas-water contact at 11,450 feet subsea defining the productive limits of the pool on the north, east and south flanks, and a fault indicated by seismic data along the west edge of the unit boundary. Our water level has been proved by production and drill stem test data in the Federal BE No. 1. We recovered both gas and water on drill stem test from an interval that overlapped this 11,450 subsea.

We feel that our seismic fault on the west side of the structure is confirmed by differences in pressures and fluid content in wells in the Bell Lake Unit to the west. The pressure in the Bell Lake Unit at the time of our completion of Harris Federal No. 1 was approximately 6100 pounds, while the pressure in the Harris Federal No. 1 was 6360 pounds.

The Bell Lake Unit wells produced dry gas while both wells in the Antelope Ridge Unit have produced condensate of more than twenty barrels per million.

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Q Now the Bell Lake Unit that you've referred to, does that adjoin the Antelope Ridge Unit immediately on the west?

A Yes. It's a common boundary between the Antelope Ridge Unit and the Bell Lake Unit along the west boundary of the Antelope Ridge Unit.

Q You feel from the information that you have that there is geological separation between those two areas?

A Yes, seismic data indicate the fault to be present and that this is to a large extent confirmed by the difference in fluid content of the gas produced from the two reservoirs.

Q Refer now, Mr. Stokes, to what has been marked as Exhibit No. 2, and state what it is and what it shows.

A Exhibit 2 is a cross section along the crest of the Antelope Ridge structure trending from southwest to northeast. It shows our interpretation of the Devonian gas column with a dip indicated by seismic and dipmeter data to the northeast and southwest.

Q This is along the line A-A' as shown on Exhibit No. 1?

A That is correct. This cross section also has the drill stem test and production data on the two wells that have penetrated the Devonian to date. The test data shown on the Federal BE No. 1, drill stem test No. 4, which overlapped the gas-water contact, recovered both gas and water, while production test which is labeled No. 11, with the top perforations just below the gas-water contact, recovered only water.

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This Federal BE No. 1 is presently completed on the interval noted 12 on this cross section, which is a Morrow formation. We intend to dual this well in the Devonian. However, the pressure in the Morrow is so much higher than the Devonian pressure that we feel that we can't complete it until we have depleted the Morrow zone and the pressures are more nearly equivalent.

Q Do you have a tabulation showing the well tests and reservoir data for the Devonian formation in these two wells that have been completed so far in this unit?

A Yes, sir, I have a completion test on the Harris-Federal No. 1 and drill stem test of the Devonian interval on the Federal BE No. 1. On the Harris-Federal No. 1 we had a calculated open flow potential from the Devonian of 41 million cubic feet per day after treatment with 2,000 gallons of acid. Prior to the treatment we had a drill stem test on this same interval which showed calculated open flow potential of 10 million cubic feet per day.

On the Federal BE No. 1, we have a drill stem test with a CAOF of 11 million cubic feet per day without treatment. We're confident with a small acid treatment on the completion of Federal BE No. 1, we'll have a potential at least equal to that of Harris-Federal No. 1.

You'll see that the condensate recovery was 1.5 million barrels cubic feet of gas more in the Harris-Federal than the Federal BE No. 1. Condensate and gas gravities are comparable.

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We also have tabulated on this exhibit the reservoir properties, which have been determined from log analysis and bottom hole pressure measurements. From log analysis we have determined an average porosity of 5.0 per cent, water saturation of 35 per cent, average net pay of 100 feet. From bottom hole pressure data we have found an original reservoir pressure of 6375 pounds per square inch absolute, and have calculated the permeability of 4.5 millidarcies from the slope of the pressure build-up curve.

Q This information that you have been giving is reflected on what has been marked as Exhibit No. 3 in this case?

A That's correct.

Q Referring now to what has been marked as Exhibit No. 4, is that the pressure build-up curve that you just referred to?

A Yes. This is a graphical presentation of the pressure build-up data with the pressures plotted versus dimensionless shut-in time, which would be "t" over "delta t" plus 1, where "t" is your producing time and "delta t" is your incremental shut-in time. Each of the pressure points is plotted in a straight line portion of the curve, is then extrapolated to infinite shut-in time which is equivalent to "t" over "delta t" plus 1 over 1. This gives the pressure to which the reservoir would build if you were able to leave the well shut-in for an infinite length of time. The slope of the build-up curve is also related to permeability through the equation shown below the curve on Exhibit 4. From the production data during the flowing period prior to shut-in, and the slope of

the build-up curve, we've calculated 331 millidarcy feet of permeability; and using the 74 feet of pay which we find in the Harris-Federal No. 1, gives an average permeability of 4.5 millidarcies.

Q What conclusions can you draw from the mere fact that you believe you have 4.5 millidarcies of permeability in this reservoir, Mr. Stokes?

A We feel that this permeability is adequate for gas production to drain more than 640 acres, particularly where you have a large section of pay. We feel that while this indicates the well can drain more than 640 acres, we have no production data to back this up. For that reason we are requesting temporary field rules at the present time. We feel that we can prove drainage when we have sufficient production data to base our calculations on.

Q Refer now to what has been marked Exhibit No. 5, Mr. Stokes, which appears to be an economic analysis on 160, 320, and 640-acre spacing in this pool.

A Item No. 1 on Exhibit 5 shows the cost and income data. We expect an income after royalty and taxes of $186.50 per million cubic feet of gas. This includes the condensate income. We show a well cost of $750,000. This well cost is the minimum that we anticipate. We've drilled two wells, one of which cost around $750,000, the other one cost $1,200,000. I believe the experience with the Devonian in this general area has been that the average well cost runs more than a million dollars.

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The next three items, 2, 3, and 4, show the economics on 160, 320, and 640-acre spacing. On the 160 it shows reserves of 5.5 billion cubic feet, a life of 20 years based on our gas sales contract which would yield an income over life of $1,030,000. Our direct operating costs and overhead and amortization of a gas sweetening plant would amount to $103,000 over the life. The Federal income tax is $73,000, leaving a profit of $104,000 or profit to investment ratio of .14 and a rate of return of approximately one percent.

On 320-acre spacing the picture is improved somewhat. We have a profit to investment ratio of .96 and a rate of return of 7 percent, neither or which are satisfactory in a risk venture of this type.

On 640-acre spacing we show a profit to investment ratio of 2.6 and a rate of return of 17 percent. These are approaching more satisfactory factors. However, 17 percent rate of return on a risk venture is still not outstanding when you consider that the average for all manufacturing industries is around 16 percent and these industries have no risk.

Q Would you care to draw some conclusions from the exhibits and the data that you've presented to this point, Mr. Stokes?

A It's my opinion that the data presented show that the permeability in this formation is sufficient to effectively drain 640 acres, and that development on 160 or 320 is not economically feasible. I also believe that the well control, the seismic and

dipmeter data provide sufficient information for us to establish initial pool limits as proposed. I would recommend that the Commission formulate field rules for the Antelope Ridge Devonian Gas Pool along the lines of those suggested in Exhibit 6.

Q Referring to Exhibit 6 that you have just mentioned, are these the proposed field rules that Shell requests be adopted in this pool?

A Yes, these are the rules that we propose. These rules are based primarily on the rules for prorated gas pools in Southeastern New Mexico, which were set forth in Order R-1670. We have set them up on this basis so that in the event of future prorationing in this field, the rules would be fairly well in line with the standard rules. They're also quite similar to rules that have been adopted temporarily for the Lusk-Morrow Gas Pool in Order No. R-2373.

Q Would you go through these rules and hit the high point of each rule?

A Rule 1 is a standard provision that each well completed or recompleted in the Devonian formation within one mile of the boundary of this pool will be drilled, spaced, and produced in accordance with the rules hereinafter set forth.

Rule 2 provides that each well shall be located in a standard proration unit of 640 acres, and provides that 632 through 648 acres would constitute a standard unit. Rule 2 also provides for administrative approval of smaller units, providing there's

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no objection from offset operators. Another provision of Rule 2 is that the acreage factor assigned to any such nonstandard unit shall bear the same ratio to the standard acreage factor in the Antelope Ridge Devonian Gas Pool as the acreage in such non-standard unit bears to 640 acres.

Rule 3 provides for the well location, provides that any well drilled or recompleted in the Antelope Ridge Devonian Gas Pool shall be located within and not closer than 660 feet to the outer boundary of the Southwest Quarter of the Northeast Quarter, the Northwest Quarter of the Southeast Quarter, Northeast Quarter of the Southwest Quarter, or Southeast Quarter of the Northwest Quarter of the section.

Q Does that language, Mr. Stokes, come pretty directly from the order in the Lusk-Morrow Pool?

A Yes, it does. I believe the Lusk Morrow Pool provides 330 feet and we've asked for 660. In a standard section that would mean that you could not drain closer than 1980 feet from the outer boundary. This section also provides that any well drilling to or which has penetrated the Devonian formation on the date of this order is hereby granted an exception.

Section (b) of Rule 3 provides for the acreage that may be assigned to any well which is not drilled within the standard location provided, or which has not been granted an exception by the provisions of Rule 3 (a). It provides that a location 660 and 660 from the section be given only a maximum of 680 acres, and a

well drilled 660 and 1980 would be given a maximum of 320 acres.

Q This follows pretty near in line with the R-1670 for the prorated gas pools?

A Yes, taken directly from that. It also provides that the acreage factor assigned to such well shall bear the same ratio to the standard acreage factor as the acreage assigned bears to 640 acres.

Rule 4 provides that in the event of subsequent prorationing of the Antelope Ridge Devonian Gas Pool, the allowable assigned to a nonmarginal well shall be in the same ratio that its acreage factor bears to the total of the acreage factors for all nonmarginal wells in the pool.

Rule 5 provides that the vertical limits of the Antelope Ridge Devonian Gas Pool shall be the Devonian formation.

Q You stated earlier in your testimony that you were only seeking temporary rules at this time because you had no production data from the two wells in this pool. What would be your suggestion as to the duration of these temporary rules?

A We request that temporary rules be granted for a period of two years. Our reason for that, we are not at the present time selling gas, and we expect to start selling around the first of the year. However, the take at that time will be very small. According to the terms of our contract, we should go on full production at 1-1-65, so the two-year term on these temporary rules would give us one year of full production under our gas contract.

Q Would you care to make any final conclusions or give any final opinions concerning Shell's application in this case?

A Well, we feel that the request for temporary field rules is justified, that the permeability indicated by our pressure build-up test shows that a well should drain 640 acres. We feel that production tests will confirm this. We think that the wider spacing is necessary in this case because of the high risk and costs associated with deep drilling in the Delaware Basin. On our Harris-Federal No. 1, we had two blowouts and two fishing jobs. I believe several of the wells in the general vicinity have lost rigs and costs have been excessive.

Q Do you have anything further to add to your testimony?

A No, that's all.

Q Were Exhibits 1 through 6 prepared by you or under your direction?

A Yes, sir.

MR. MORRIS: We offer Shell's Exhibits 1 through 6, and that completes the direct examination of Mr. Stokes.

MR. UTZ: Without objection the Exhibits 1 through 6 will be entered into the record of this case.

(Whereupon, Applicant's Exhibits Nos. 1 through 6 received in evidence.)

CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Stokes, what is the pay of the Devonian in each of

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your wells?

A In our Harris Federal No. 1, we have 74 feet of net pay. In the Federal BE No. 1, 173 feet. Our seismic isopac over the structure when planimetered yields an average pay thickness of 100 feet.

Q You also have a Morrow pay in this area?

A Yes.

Q Are there any other pays that you know of at this time?

A There's another pay within the Morrow in the Federal BE No. 1 which has not been perforated. We have drill stem test data on this pay. It would be within the Morrow section, though, and I think if we were to apply for field designation on this we would include it in the total Morrow interval.

Q Your economics that you have on your Exhibit No. 5 include only Devonian economics and do not consider any other pays in the area?

A Yes, that is correct.

Q This would be an economic consideration for one well bore, would it not?

A Yes, sir, that's correct.

Q So actually your Exhibit No. 5 shows the picture somewhat worse than it actually is, considering other pays?

A Well, in our Harris-Federal No. 1, we had no pays that we considered commercial except the Devonian. We cannot dual that well. In the Federal BE No. 1, the pressure in the Morrow is

nearly 9,000 pounds and the pressure in the Devonian is only 6400 pounds, and with this higher pressure on top we can't possibly dual this well at the present time. Whether or not we'll be able to subsequently we can't say, but we certainly can't take into account an economic value for it until we are able to complete it.

Q There's no question in your mind but what you will complete wells in the Morrow and produce them?

A Yes, but they may not be in the same well bore as a Devonian well.

Q I see. What is the location of your BE No. 1?

A It's 660 from the North line and 1650 from the East line of the section.

Q Do you or your company anticipate 640-acre spacing in this unit when you drill these wells?

A At the depth that we expect to find production here, we would also consider a request for 640-acre spacing.

Q Then I'm wondering why you didn't drill a little further inside the section lines.

A Well, we drilled Harris-Federal No. 1 as the discovery well in this field. We drilled it at what we thought to be the best structural position. Following the completion of that well, we ran other seismic lines which indicated some shift of the structure to the south. Federal BE No. 1 was drilled on this same basis, to further prove the direction of the axis of this structure. We felt that during the proving and confirmation phase, you might

say, of development of this field, that we should drill our wells at the optimum structural position. I think we found the optimum in these two wells.

Q And you are asking for six sections in this pool, are you not?

A Yes, sir.

Q Does that coincide with the boundaries of the Antelope Unit?

A Yes, sir, they are the same.

Q You would have six standard units, and we already have two wells and two nonstandard locations?

A Yes, sir.

Q In your opinion, do you think all six sections are proved to be productive of gas in the Devonian reservoir?

A Yes, sir.

Q Your Exhibit No. 1 would indicate that Section 28 and part of Section 33 would be outside the fault line.

A Yes, a small part of Section 28 and an even smaller part of Section 33. However, if we were -- or when we drill in either of these sections, our well locations will be such that I believe the productive area of the section will be proved. Any subsequent wells we drill will be covered by these field rules and in order to obtain 640-acre allocation, we would have to drill them within the interior quarter-quarter section.

Q In other words, if you drill Section 29, you'll drill

1980 from the South and East lines, will you not?

A Yes.

Q Actually your water-oil contact as you have it now, or water-gas contact, cuts right through the middle of Section 28, does it not?

A Yes.

Q You might have a productive well but in your opinion would you have 640 acres productive in your Section 28?

A Not on the basis of the information we have available at present, no, sir.

Q In the event of prorationing then you'd be, if you assign 640 acres to the well, you'd be receiving an allowable in excess of the reserves under the tract, would you not?

A If we can be that confident of our exact location of all these things, yes. I think that's the purpose of requiring that the well be drilled close to the center of the section is to prove the maximum amount of acreage in the section.

Q Would you say that your anticipated location of the gas-water contact now is pessimistic or optimistic?

A I think it's as realistic as we can make it, and I don't believe it's shaded in either direction. The location on this north flank is confirmed by seismic and dipmeter run in the Federal No. 1. Both of these indicated the same amount of dip to the north and east.

Q What is the advantage of requesting six full sections

for the pool at the present time on the basis of two wells?

A Well, this would make the pool limits conform with our request to the U.S.G.S. for participating in the area in these six sections. I think that the data we have available show that these sections are productive.

Q You expect to include all six sections in the participating area then?

A Yes, sir.

Q On your Exhibit No. 6 in Rule 4, you have presented no reserve data here except in the form of economics on your Exhibit No. 5 on which to base an equitable proration formula, have you?

A No, sir, other than the fact that under Order 1670, I believe it is, the standard for prorated fields in Southeastern New Mexico is straight acreage. This would fall right in line with straight acreage allocation.

Q You are aware of the Jalmat decision, are you not?

A The latest one that I was aware of put it back on straight acreage.

Q Would you have any objection to the deletion of Rule 4 until such time as we had reserve data on which to base a formula?

A Well, of course, from our interpretation it would be much to our advantage for allocation of production to be based on reserves, since the thickest part of the pool lies within our acreage.

MR. MORRIS: If I might interrupt, Mr. Examiner, we're not suggesting at the present time that the pool be prorated, and I believe Mr. Stokes' comments are possibly a little premature in that these are matters that would not be considered until such time as the pool was to be prorated.

MR. UTZ: Well, but you are suggesting a proration formula.

MR. MORRIS: I think he is indicating his preliminary thinking in this regard.

Q (By Mr. Utz) Do you believe that this is a water drive?

A There's a good chance that it's a potential water drive. However, the wells in the Bell Lake Unit adjacent have shown pressure drop with the limited amount of production they have, so that the water movement in the Devonian here certainly is as extensive as it is in the pools to the north. We would expect some water movement; however, certainly not 100 percent effective water drive.

Q Do you then believe that the rate of production per well would be important in producing this pool?

A If the well were completed with perforations close to the gas-water contact, I believe that rate could have an effect; otherwise, I don't believe so.

MR. UTZ: Are there other questions of the witness?

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

MR. UTZ: Mr. Durrett.

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MR. DURRETT: The first question I would like to ask Mr. Morris. Your client would not necessarily have any objection to the Commission's not adopting this proposed Rule 4 if it should feel that it would be more proper to take up this matter at a later date of prorating the pool, if it's prorated?

MR. MORRIS: I wouldn't think so. However, I would have to check with my client to be sure.

MR. DURRETT: Would you check with them and ask them if they feel that they have to adopt the Rule 4, that that wouldn't mean if we don't feel so that we should deny the application or that we should consider Rule 4, if we feel it should be undertaken at this time.

MR. MORRIS: I might say that the Commission is certainly within its rights in adopting whatever pool rules it deems appropriate in this pool. Shell has made its suggestions, but I'm sure that they wouldn't stand upon any particular provision of it. In that regard, if the Commission felt that Rule 4 should be deleted, we would suggest that it be deleted.

MR. DURRETT: Thank you.

BY MR. DURRETT:

Q Now, Mr. Stokes, will you give me the permeability again that you testified to on direct examination that you feel is in this area?

A 4.5 millidarcies.

Q And I believe you stated that that in your opinion

would be sufficient to establish that you could drain 640 acres with one well?

A Yes, sir, particularly where the thickness of the pay is sufficient to maintain a commercial rate with that permeability; the two go together.

Q What would you feel would be the minimum thickness of pay and permeability that could drain 640 acres, as an engineer?

A I don't believe I could give you that figure directly. I would have to make some calculations and I don't have the data available to make them. I would say that when you fall below a tenth of a millidarcy, a rock, we discard any rock below that as being pay. The depth would enter into it, the amount of pressure available and so on.

Q Let me ask this question. I'm not looking for a real specific answer, I'm looking for a more general answer. From your professional standpoint, do you feel that 4.5 millidarcies is approaching the minimum, or do you feel that that fairly well establishes that you can drain 640, or do you think it definitely establishes it from what you know at this time?

A Well, I have seen reservoirs with equivalent pay and equivalent porosity and permeability which have drained more than 640 acres, so I would say it's within the range of satisfactory drainage.

Q Have you seen reservoirs with equivalent permeability and thickness of pay that would not drain 640 acres?

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A No, sir.

Q Not in your experience as of this date?

A That's correct.

Q Referring to your Exhibit No. 5, which is your economics, I'm interested a little bit in the Federal income taxes that you have in your various explanations of the spacing.

A Yes.

Q In computing this or these tax figures, did you consider your deduction for amortization of this gasoline plant?

A Yes.

Q Was the normal depletion allowance computed and figured on that?

A Either depletion or fifty percent of net, whichever fit the case for the particular year.

Q Depletion or fifty percent of the net?

A Yes, sir.

Q Do I understand correctly that neither of these wells is connected at the moment?

A That's correct.

Q Then would you have any objection to this proposition? I believe you stated on direct that you would like two-year rules because you felt it would take you about a year to get a connection?

A No, sir, we expect to have our connection by the first of this coming year. However, our contract calls for a very low

rate during this first year. We won't go on the full production rate until 1-1-65, so that I believe we'll be producing around five million a day during 1964 and then our rate of production increases at 1-1-65. We feel that we need more sustained production than five million a day would give us in order to prove drainage of more than 640 acres.

Q I missed you a little bit on the first. When do you say that you are going to get your connection?

A We expect by the first of 1964.

Q First of this coming year?

A Yes, sir.

Q And you don't think that the one-year period of time from that date would be adequate?

A No, sir, because of the reduced rate during that period.

Q Would it be possible to come up with any reservoir information within a one-year period of time?

A No, sir. We have one other problem here. The Devonian gas is sour and requires treating before it can be sold. We don't have our treating plant in operation yet. So during the first portion of our gas sales out there, we'll be selling only from the Morrow and the information obtained from the Morrow certainly would be of no help.

Q Well, we are arriving at this situation that if the Commission cannot issue a two-year order that it should not issue 640. In other words, if you feel it is of no avail to issue

a one-year order and the Commission would not issue a two-year order, it would seem to me that the alternative would be to issue no order.

A If we are not given an order, I don't think we could prove, when the rehearing is held, that we could drain 640 acres. We would have to ask for a year's extension in order to gain enough production history to provide the production data.

MR. DURRETT: That's all I have.

BY MR. UTZ:

Q The initial production out of this unit will be from the Morrow?

A Yes.

Q And you won't produce the Devonian until such time as you get a treating plant installed?

A Yes.

Q When do you anticipate that to be?

A They're working on it now; I would say probably the plant should be completed by March or April.

Q Even after the treating plant is in, you don't feel a year's production from the Devonian would be enough to show anything?

A No, sir, if we allocate the production evenly between these two wells, that would be two and a half million a day for three-fourths of a year. I believe from a reservoir this large we would require more production than that in order to drop the

pressure a sufficient amount to show drainage.

Q Who is your contract with?

A Southern Union.

Q Southern Union Gas?

A Yes, sir.

MR. UTZ: Are there other questions?

MR. MORRIS: Might I make one comment, Mr. Examiner? We have referred here today to the order that was entered in the Lusk-Morrow Gas Pool. That order is an eighteen-month temporary order. If the Commission should not see fit to grant a two-year temporary order in this case but if it should see fit to grant an eighteen-month order, I'm sure that Shell would take a close look at all of the production history that it would have at that point and attempt to make the best showing possible.

It might be, as Mr. Stokes has pointed out, that we would just have to say that we needed a little more time in order to have something definite, but at least at the end of the eighteen-month period we would, I am sure, be more than willing to evaluate the situation at that point to see what production history we've had and what it might show.

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

(Witness excused.)

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

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 Hearing 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 11th day of December, 1963.

Ada Dearnley
NOTARY PUBLIC

My Commission Expires:

June 19, 1967.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2945, heard by me on Dec. 4, 1963.

Examiner
New Mexico Oil Conservation Commission

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
EXHIBIT NO.
CASE NO.

DEARNLEY, MEIER, WILKINS and CROWNOVER
General Court Reporting Service
Suite 1120 Simms Building Albuquerque, New Mexico Phone 243-6691

DRAFT
JMD/esr

(1)

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

CF Subj. _____

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE No. 2945

Order No. R- 2623-A

APPLICATION OF SHELL OIL COMPANY
FOR THE CREATION OF A DEVONIAN GAS
POOL AND FOR SPECIAL POOL RULES,
LEA COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on January 5, 1966, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this ____ day of January, 1966, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That by Order No. R-2623, dated December 19, 1963, temporary Special Rules and Regulations were promulgated for the Antelope Ridge-Devonian Gas Pool, Lea County, New Mexico, establishing 640-acre spacing units for a period of two years.

(3) That pursuant to the provisions of Order No. R-2623, this case was reopened to allow the operators in the subject pool to appear and show cause why the Antelope Ridge-Devonian Gas Pool should not be developed on 160-acre spacing units.

(4) That the evidence establishes that one well in the Antelope Ridge-Devonian Gas Pool can efficiently and economically drain and develop 640 acres.

(5) That the Special Rules and Regulations promulgated by Order No. R-2623 have afforded and will afford to the owner of each property in the pool the opportunity to produce his just and equitable share of the gas in the pool.

(6) That to prevent the economic loss caused by the drilling of unnecessary wells, to avoid the augmentation of risk arising from the drilling of an excessive number of wells, to prevent reduced recovery which might result from the drilling of too few wells, and to otherwise prevent waste and protect correlative rights, the Special Rules and Regulations promulgated by Order No. R-2623 should be continued in full force and effect until further order of the Commission.

IT IS THEREFORE ORDERED:

(1) That the Special Rules and Regulations governing the Antelope Ridge-Devonian Gas Pool promulgated by Order No. R-2623 are hereby continued in full force and effect until further order of the Commission.

(2) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

DRAFT
JMD/esr

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE No. 2945

Order No. R- 2623

APPLICATION OF SHELL OIL COMPANY
FOR THE CREATION OF A DEVONIAN GAS
POOL AND FOR SPECIAL POOL RULES,
LEA COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on December 4, 1963, at Santa Fe, New Mexico, before Elvis A. Utz, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this _____ day of December, 1963, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Elvis A. Utz, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Shell Oil Company, seeks the creation of a new gas pool for Devonian production and the promulgation of temporary special rules and regulations governing said pool, including provisions for 640-acre spacing units and limited well locations.

(3) That a new gas pool for Devonian production should be created and designated the Antelope Ridge-Devonian Gas Pool; that said pool was discovered by the Shell Oil Company Harris-Federal Well No. 1, located in Unit N of Section 27, Township 23 South, Range 34 East, NMPM, Lea County, New Mexico.

(4) That in order to prevent the economic loss caused by the drilling of unnecessary wells, to avoid the augmentation of risk arising from the drilling of an excessive number of wells, to prevent reduced recovery which might result from the drilling of too few wells, and to otherwise prevent waste and protect correlative rights, temporary special rules and regulations providing for 640-acre spacing units should be promulgated for the Antelope Ridge-Devonian Gas Pool.

(5) That the temporary special rules and regulations should provide for limited well locations in order to assure orderly development of the pool and protect correlative rights.

(6) That the temporary special rules and regulations should be established for a two-year period in order to allow the operators in the subject pool to gather reservoir information to establish the area that can be efficiently and economically drained and developed by one well.

(7) That this case should be reopened at an examiner hearing in January, 1966, at which time the operators in the subject pool should be prepared to appear and show cause why the Antelope Ridge-Devonian Gas Pool should not be developed on 160-acre spacing units.

IT IS THEREFORE ORDERED:

(1) That a new pool in Lea County, New Mexico, classified as a gas pool for Devonian production is hereby created and designated the Antelope Ridge-Devonian Gas Pool consisting of the following-described area:

TOWNSHIP 23 SOUTH, RANGE 34 EAST, NMPM
Section 27: All
Section 33: E/2, E/2 W/2
Section 34: All

TOWNSHIP 24 SOUTH, RANGE 34 EAST, NMPM
Section 4: All

(2) That Special Rules and Regulations for the Antelope Ridge-Devonian Gas Pool are hereby promulgated as follows, effective January 1, 1964.

SPECIAL RULES AND REGULATIONS
FOR THE
ANTELOPE RIDGE-DEVONIAN GAS POOL

RULE 1. Each well completed or recompleted in the Antelope Ridge-Devonian Gas Pool or in the Devonian formation within one mile of the Antelope Ridge-Devonian Gas Pool, and not nearer to or within the limits of another designated Devonian Gas pool, shall be spaced, drilled, operated, and produced in accordance with the Special Rules and Regulations hereinafter set forth.

RULE 2. Each well completed or recompleted in the Antelope Ridge-Devonian Gas Pool shall be located on a standard unit containing 640 acres, more or less, consisting of a single governmental section.

RULE 3. The Secretary-Director of the Commission may grant an exception to the requirements of Rule 2 without notice and hearing when an application has been filed for a non-standard unit and the unorthodox size or shape of the unit is necessitated by a variation in the legal subdivision of the United States Public Lands Survey, or the following facts exist and the following provisions are complied with:

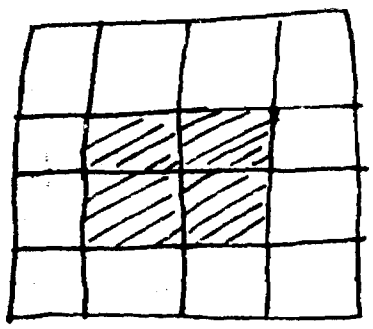
(a) The non-standard unit consists of quarter-quarter sections or lots that are contiguous by a common bordering side.

(b) The non-standard unit lies wholly within a single governmental section and contains less acreage than a standard unit.

(c) The applicant presents written consent in the form of waivers from all offset operators and from all operators owning interests in the section in which the non-standard unit is situated and which acreage is not included in said non-standard unit.

(d) In lieu of paragraph (c) of this rule, the applicant may furnish proof of the fact that all of the aforesaid operators were notified by registered or certified mail of his intent to form such non-standard unit. The Secretary-Director may approve the application if no such operator has entered an objection to the formation of such non-standard unit within 30 days after the Secretary-Director has received the application.

150
12
1800
750
9000



Rule 4 Each well completed or recompleted in the Antelope Ridge - Devonian Gas Pool shall be located in the SW/4 NE/4, NW/4 SE/4, NE/4 SW/4, or SE/4 NW/4 of a governmental section and no nearer than 330 feet to any governmental quarter-quarter section line.

RULE 5. The Secretary-Director may grant an exception to the footage requirements of Rule 4 without notice and hearing when an application has been filed for an unorthodox location necessitated by topographical conditions or the recompletion of a well previously drilled to another horizon, provided the well will be located no nearer than 330 feet to the outer boundary of the unit. All operators offsetting the proposed unorthodox location shall be notified of the application by registered or certified mail, and the application shall state that such notice has been furnished. The Secretary-Director may approve the application upon receipt of written waivers from all offset operators or if no offset operator has entered an objection to the unorthodox location within 20 days after the Secretary-Director has received the application.

It is further ordered:

1) That any well presently drilling to or completed in the Antelope Ridge - Devonian Gas Pool that ~~will not comply~~ does not comply with the well location requirements of Rule 4 is hereby granted an exception to said rule. The operator of any such well shall notify the ~~Casper~~ District Office of the Commission in writing of the name and location of the well on or before January 1, 1964.

(3)(2) That this case shall be reopened at an examiner hearing in ~~November~~, 1966, at which time the operators in the subject pool may appear and show cause why the ~~Antelope Ridge-Devonian~~ gas pool should not be developed on ~~40~~ 160 acre spacing units.

(4)(3) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

JACK M. CAMPBELL, Chairman

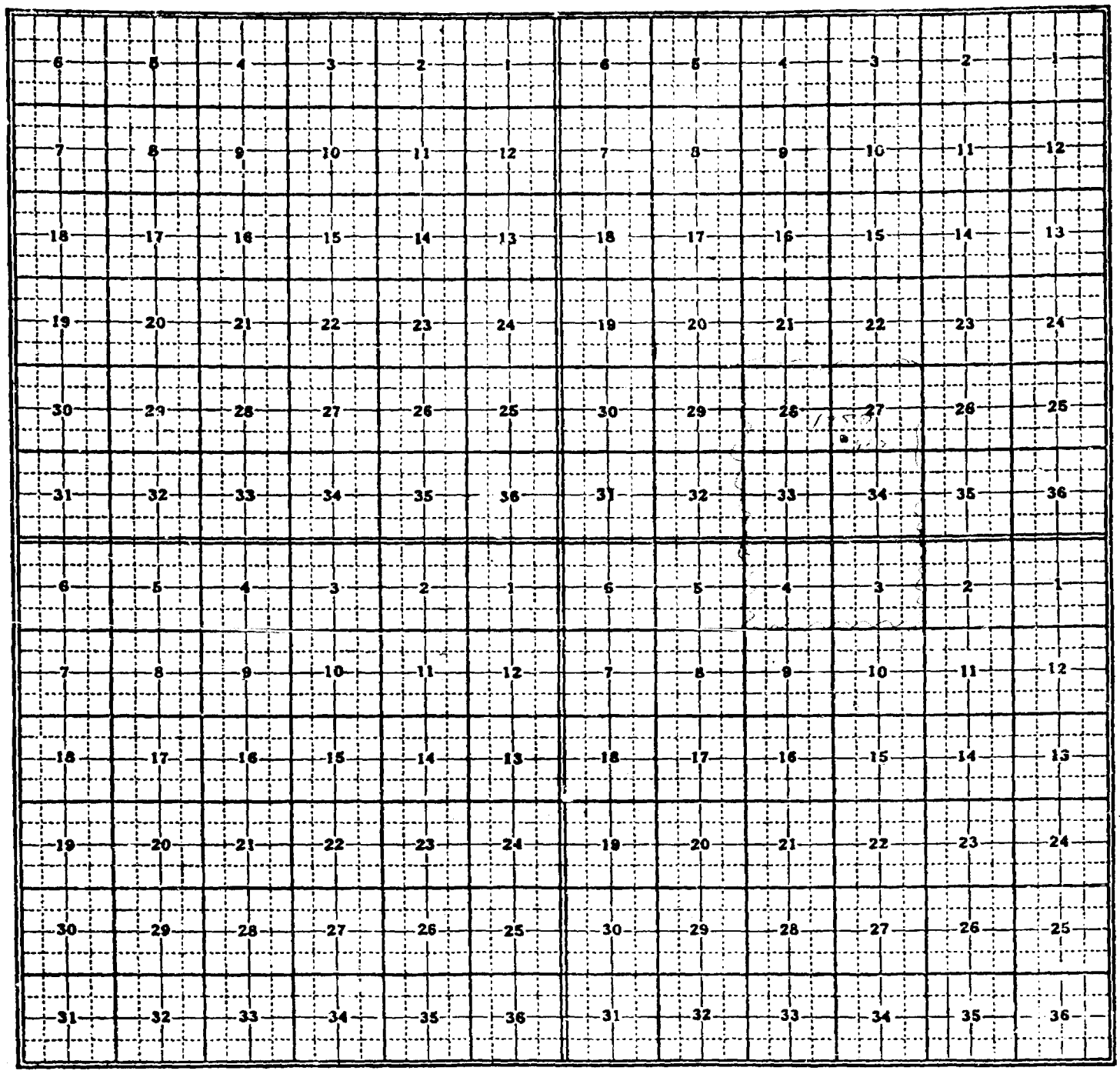
2) That any operator desiring to dedicate 640 acres to a well presently drilling to or completed in the Antelope Ridge - Devonian Gas Pool shall file a new Form C-128 with the Commission on or before January 1, 1964.

_____ County, _____

Township_____ Range_____ Township_____ Range_____

Township_____ Range_____ Township_____ Range_____

Form 104—(Four on Township)



J. O. SETH (1883-1963)

A. K. MONTGOMERY
WM. FEDERICI
FRANK ANDREWS
FRED C. HANNAHS
GEORGE A. GRAHAM, JR.
RICHARD S. MORRIS

SETH, MONTGOMERY, FEDERICI & ANDREWS
ATTORNEYS AND COUNSELORS AT LAW
301 DON GASPAR AVENUE
SANTA FE, NEW MEXICO 87501

POST OFFICE BOX 828
AREA CODE 505
TELEPHONE 983-7315

1963 NOV 5 AM 8

November 4, 1963

The New Mexico Oil
Conservation Commission
P. O. Box 871
Santa Fe, New Mexico

Gentlemen:

Please accept the enclosed Application of Shell Oil Company for the establishment of Special Rules and Regulations in the Antelope Ridge-Devonian Gas Pool, Lea County, New Mexico.

We would appreciate this matter being set for hearing before an examiner at an early date.

Yours very truly,

Richard S. Morris

RSM;jc
Enclosures

DOCKET MAILED
Date 11-25-63

BEFORE THE OIL CONSERVATION COMMISSION OF NEW MEXICO

Application of Shell Oil Company for the Establishment of Special Rules and Regulations in the Antelope Ridge-Devonian Gas Pool, Lea County, New Mexico) Case No. 3995

A P P L I C A T I O N

COMES NOW Shell Oil Company, as unit operator of the Antelope Ridge Unit, and applies to the Oil Conservation Commission of New Mexico for the establishment of special rules and regulations in the Antelope Ridge-Devonian Gas Pool, and in support of its application, states:

1. Shell Oil Company is the unit operator of the Antelope Ridge Unit, Lea County, New Mexico.

2. The Harris-Federal Well No. 1, located in Section 27, Township 23 South, Range 34 East, Lea County, New Mexico, recently has been completed as a gas well in the Devonian formation; the location of this well is within the horizontal limits of the Antelope Ridge Unit area, and a new gas pool, designated the Antelope Ridge-Devonian Gas Pool, has been created based upon this well.

3. Applicant asks the establishment of special rules and regulations in said pool, including a provision for 640-acre spacing units, and including a provision fixing the location of wells in said pool no closer than 1980 feet from the boundary line of each spacing unit.

4. Six hundred forty (640)-acre spacing units are proper in said pool, such being the area that can be efficiently and economically drilled and developed by one well completed therein.

5. The granting of the subject application will prevent waste and protect correlative rights.

In addition to its Application for Special Rules and Regulations, Applicant further seeks the establishment of horizontal limits for the Antelope Ridge-Devonian Gas Pool, consisting of Sections 27, 28, 33 and 34, Township 23 South, Range 34 East; and Sections 3 and 4, Township 24 South, Range 34 East, all in Lea County, New Mexico.

WHEREFORE, applicant requests that this application be set down for hearing before the Commission or one of its examiners, and that the Commission enter its Order establishing special rules and regulations in the Antelope Ridge-Devonian Gas Pool, as requested by this application.

SETH, MONTGOMERY, FEDERICI & ANDREWS

By Richard S. Morris

Santa Fe, New Mexico

Attorneys for Shell Oil Company

Note: There will be no EXAMINER HEARING in the Second Half of December

DOCKET NO. 35-63

DOCKET: EXAMINER HEARING - WEDNESDAY - DECEMBER 4, 1963

9:00 A.M. - OIL CONSERVATION COMMISSION CONFERENCE ROOM, STATE LAND OFFICE BUILDING - SANTA FE, NEW MEXICO

The following cases will be heard before Elvis A. Utz, Examiner, or Daniel S. Nutter, Alternate Examiner:

CASE 2945: Application of Shell Oil Company for the creation of a Devonian Gas Pool and for special pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the creation of a new Devonian gas pool for its Harris-Federal Well No. 1 located in Section 27, Township 23 South, Range 34 East, Lea County, New Mexico, said pool to comprise all of Sections 27, 28, 33 and 34, Township 23 South, Range 34 East, and all of Sections 3 and 4, Township 24 South, Range 34 East. Applicant further seeks the establishment of special pool rules, including a provision for 640-acre spacing units and for fixed well locations.

CASE 2946: Application of Shell Oil Company for a dual completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the dual completion (conventional) of its State V Well No. 5 located in Unit I of Section 27, Township 17 South, Range 35 East, Lea County, New Mexico, to produce oil from the Vacuum-Yates and Vacuum-Paddock Pools through parallel strings of tubing.

CASE 2947: Application of Charles B. Read for an unorthodox location, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks approval of the unorthodox location of his Bates Well No. 1 located 660 feet from the North line and 330 feet from the East line of Section 21, Township 8 South, Range 36 East, South Prairie-Pennsylvanian Pool, Roosevelt County, New Mexico.

CASE 2948: Application of the Atlantic Refining Company for a pressure maintenance project, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks the approval of a cooperative pressure maintenance project for the injection of water into the Gallup (Tocito) formation, Many Rocks-Gallup Oil Pool, San Juan County, New Mexico, by the injection of water through 13 wells located in Sections 6, 7, 8, 17 and 18, Township 31 North, Range 16 West. Applicant further seeks the designation of a project area comprising approximately 1,480 acres in the aforesaid five sections and the adoption of appropriate project rules therefor.

CASE 2949: Application of Phillips Petroleum Company for an exception to Rule 309-A, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to produce up to a maximum of 24 proration units into its Santa Fe Battery No. 14, Santa Fe Lease, Vacuum Abo Reef Pool, Lea County, New Mexico.

CASE 2950: Application of Amerada Petroleum Corporation for the creation of a new gas pool and for the contraction of the vertical limits of an existing pool. Applicant, in the above-styled cause, seeks the creation of a Morrow-Pennsylvanian Gas Pool, Lea County, New Mexico. Said pool was discovered by applicant's S. E. Anderson "A" Well No. 1 located in Unit P of Section 19, Township 9 South, Range 35 East, and would comprise the SE/4 of Section 19, SW/4 of Section 20, NW/4 of Section 29 and the NE/4

CASE 2950 continued from page 1

of Section 30 in the aforesaid township. Applicant further seeks the contraction of the vertical limits of the South Bough-Pennsylvanian Pool to include the Bough "C" zone of the Pennsylvanian formation only.

CASE 2951: Application of Sunray DX Oil Company for a unit agreement, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Hope Unit Area comprising 3822.96 acres, more or less, of State land in Township 18 South, Range 23 East, Eddy County, New Mexico.

CASE 2952: Application of Sunray DX Oil Company for a unit agreement, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of the South Hope Unit Area comprising 3778.27 acres, more or less, of State land in Township 18 South, Ranges 21 and 23 East, and Township 19 South, Range 23 East, Eddy County, New Mexico.

CASE 2953: Application of Curtis R. Inman for a unit agreement, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Walt Canyon Unit Area comprising 11, 100.63 acres, more or less, of State, Federal and fee lands in Townships 21 and 22 South, Range 24 East, and Township 22 South, Range 25 East, Eddy County, New Mexico.

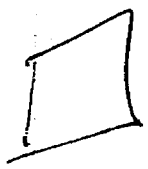
CASE 2954: Application of Ambassador Oil Corporation for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Langlie Mattix-Penrose Sand Unit Area comprising 3,920 acres, more or less, of State, Federal and Fee lands in Township 22 South, Range 37 East, Lea County, New Mexico.

CASE 2955: Application of Ambassador Oil Corporation for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the expansion of the existing Langlie Mattix Waterflood Project in Section 34, Township 22 South, Range 37 East, Lea County, New Mexico, by the conversion to water injection of 5 wells located in Sections 27, 33 and 34 of said township. Applicant further seeks the establishment of special rules governing further expansion and operation of the waterflood project in the Langlie Mattix-Penrose Sand Unit Area, including a provision for capacity allowables for wells in said project.

Case 2945
Heard 12-4-63
Rec. 12-6-63

1. Grant Shell 640 Acre temporary 2 yr. order as noted on attached order R-2373.

1980
660
2640



BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE No. 2691
Order No. R-2373

APPLICATION OF EL PASO NATURAL GAS
COMPANY FOR THE CREATION OF A NEW
GAS POOL AND ESTABLISHMENT OF SPECIAL
RULES AND REGULATIONS, LEA COUNTY,
NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on November 8, 1962, at Santa Fe, New Mexico, before Daniel S. Nutter, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this 21st day of November, 1962, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Daniel S. Nutter, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That a new gas pool for Morrow production should be created and designated the ~~Lusk-Morrow~~ Antelope Ridge-Morrow Gas Pool.

(3) That since March, 1961, the date of the first completion in the Morrow formation in the proposed pool, several wells have subsequently been completed in the Morrow formation and are capable of producing gas therefrom.

(4) That El Paso Natural Gas Company seeks the promulgation of temporary special rules and regulations for the Lusk-Morrow Gas Pool to provide for 640-acre gas proration units and the allocation of allowables to non-marginal wells in the proportion that each well's acreage factor bears to the total of the acreage factors for all non-marginal wells in the subject pool.

(5) That the evidence presented concerning the economic loss that will occur as a result of drilling of unnecessary wells

justifies the establishment of 640-acre gas proration units in the subject pool for a temporary period of ~~18 months~~ 2 yrs.

(6) That during the ~~18-month~~ 2 yr. period in which this order will be in effect, ~~all~~ operators in the subject pool should gather all available information relative to drainage and recoverable reserves in said pool.

(7) That this case should be reopened at an examiner hearing in ~~May, 1964~~ June 1966, at which time the operators in the subject pool should be prepared to appear and show cause why the ~~Lusk-Morrow~~ Am. Ridge Gas Pool should not be developed on 160-acre gas proration units.

IT IS THEREFORE ORDERED:

(1) That a new pool in Lea County, New Mexico, classified as a gas pool for ~~Morrow~~ Strat. production is hereby created and designated as the ~~Lusk-Morrow~~ A. R. Gas Pool consisting of the following-described area:

TOWNSHIP ~~19~~ 23 SOUTH, RANGE ~~32~~ 34 EAST, NMPM

Section ~~18: All~~ 27 - All
Section ~~19: All~~ 33 - E/2, E/2 W/2.
~~Section 20: All~~
~~Section 29: All~~ 34 - All

T 24 S — 34 E → sec 4 - All. A. R. Flex.

(2) That Special Rules and Regulations for the ~~Lusk-Morrow~~ Gas Pool are hereby promulgated as follows:

SPECIAL RULES AND REGULATIONS
FOR THE
~~LUSK-MORROW~~ GAS POOL
Antelope Ridge - Flex.

RULE 1. Each well completed or recompleted in the ~~Lusk-Morrow~~ Gas Pool or in the Morrow formation within one mile of the Lusk-Morrow Gas Pool, and not nearer to or within the limits of another designated Morrow pool, shall be spaced, drilled, operated, and produced in accordance with the Special Rules and Regulations hereinafter set forth.

RULE 2. Each well completed or recompleted in the Lusk-Morrow Gas Pool shall be located on a standard proration unit consisting of approximately 640 contiguous surface acres substantially in the form of a square which is a legal section of the United States Public Lands Survey. For purposes of these rules, a unit containing 632 through 648 acres shall be considered a standard unit.

RULE 3. Each well completed or recompleted in said pool shall be located not closer than 330 feet to the outer boundary

of the SW/4 NE/4, NW/4 SE/4, NE/4 SW/4, or SE/4 NW/4 of the section. Any well drilling to or completed in the Strawn or Morrow formations on the date of this order is hereby granted an exception to the well location requirements of this rule.

RULE 4. For good cause shown, the Secretary-Director of the Commission may grant an exception to the requirements of Rule 2 without notice and hearing when the application is for a non-standard unit comprising less than 640 acres. All operators offsetting the proposed non-standard unit shall be notified of the application by registered or certified mail, and the application shall state that such notice has been furnished. The Secretary-Director of the Commission may approve the application if, after a period of 30 days, no offset operator has entered an objection to the formation of such non-standard unit.

The acreage factor assigned to any such non-standard unit shall bear the same ratio to a standard acreage factor in the ~~Lusk-Morrow~~ Gas Pool as the acreage in such non-standard unit bears to 640 acres.

~~RULE 5.~~ In the event of subsequent ~~prorationing of the~~ Lusk-Morrow Gas Pool, ~~the allowable assigned~~ to a non-marginal well shall be in the ~~same ratio~~ that its ~~acreage factor~~ bears to the total ~~of the~~ acreage factors for all non-marginal wells ~~in the~~ pool.

A. R. Flem.

RULE 6. The vertical limits of the ~~Lusk-Morrow~~ Gas Pool shall be the ~~Morrow~~ formation.

Devonian.

Jan. (3) That this case shall be reopened at an examiner hearing in ~~May, 1962~~, 1966 at which time the operators in the subject pool may appear and show cause why the ~~Lusk-Morrow~~ Gas Pool should not be developed on 160-acre gas proration units.

(4) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE ~~at~~ Santa Fe, New Mexico, on the day and year ~~herein-~~above designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

EDWIN L. MECHEM, Chairman

S E A L

E. S. WALKER, Member

esr/

A. L. PORTER, Jr., Member & Secretary

GOVERNOR
JACK M. CAMPBELL
CHAIRMAN

State of New Mexico
Oil Conservation Commission

LAND COMMISSIONER
E. S. JOHNNY WALKER
MEMBER

P. O. BOX 871
SANTA FE

STATE GEOLOGIST
A. L. PORTER, JR.
SECRETARY - DIRECTOR

December 19, 1963

Re: Case No. 2945 (2946)
Order No. R-2623 & R-2624
Applicant:
SHELL OIL COMPANY

Mr. Richard Morris
Seth, Montgomery, Federici & Andrews
Attorneys at Law
Post Office Box 828
Santa Fe, New Mexico

Dear Sir:

Enclosed herewith are two copies of the above-referenced Commission order recently entered in the subject case.

Very truly yours,

A. L. Porter, Jr.

A. L. PORTER, Jr.
Secretary-Director

ir/

Carbon copy of order also sent to:

Hobbs OCC x
Artesia OCC
Aztec OCC
OTHER (R-2623 to Mrs. Rhea)

DOCKET MAILED

Date

Docket No. 1-66

DOCKET: EXAMINER HEARING - WEDNESDAY - JANUARY 5, 1966

9 A.M. - OIL CONSERVATION COMMISSION CONFERENCE ROOM, STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

The following cases will be heard before Daniel S. Nutter, Examiner, or Elvis A. Utz, Alternate Examiner:

CASE 3358: Application of General American Oil Company of Texas for a waterflood expansion, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to expand its Burch-Keely Waterflood Project, authorized by Order No. R-2327 in the Grayburg-Jackson Pool, by the conversion to water injection, in stages, of from 10 to 15 wells in Sections 23 and 26, Township 17 South, Range 29 East, Eddy County, New Mexico.

CASE 3359: Application of Sinclair Oil & Gas Company for a dual completion, non-standard location, non-standard gas proration unit, and an exception to Rule 104 C I, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of the dual completion (conventional) of its Fren Oil Company Well No. 21 to produce oil from the Cedar Lake-Abo Pool and to produce gas from an undesignated Morrow gas pool through parallel strings of tubing. Applicant further seeks approval of a 200-acre non-standard gas proration unit for said well comprising the E/2 SW/4, SW/4 SE/4, and E/2 SE/4 of Section 19, Township 17 South, Range 31 East, for said well which is located at an unorthodox gas well location 560 feet from the South line and 3350 feet from the East line of said Section 19. Applicant further seeks an exception to Commission Rule 104 C I for said well which is located closer than 660 feet to another well producing from the Abo formation on the same 40-acre tract.

CASE 3360: Application of L. R. French, Jr. for a dual completion, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dually complete his Aztec Uncle Well No. 1 located in Unit C of Section 28, Township 18 South, Range 33 East, Lea County, New Mexico, to produce oil from the Strawn formation through the casing-tubing annulus and to produce gas from the Morrow formation through tubing. In the alternative, applicant seeks authority to dually complete the well with a single string of tubing and to commingle the Strawn oil and Morrow gas in the wellbore by means of a dual-flow choke-assembly.

CASE 3152 (Reopened)

In the matter of Case No. 3152 being reopened pursuant to the provisions of Order No. R-2821, which order established 80-acre spacing units for the Osudo-Wolfcamp Pool, Lea County, New Mexico, for a period of one year. All interested parties may appear and show cause why said pool should not be developed on 40-acre spacing units.

CASE 3153 (Reopened)

In the matter of Case No. 3153 being reopened pursuant to the provisions of Order No. R-2822, which order established 80-acre spacing units for the Osudo-Strawn Pool, Lea County, New Mexico,

for a period of one year. All interested parties may appear and show cause why said pool should not be developed on 40-acre spacing units.

CASE 3246 (Reopened)

In the matter of Case No. 3246 being reopened pursuant to the provisions of Order No. R-2935, which order established special rules for the Mesa-Queen Pool, Lea County, New Mexico, for production of oil and gas wells in said pool, including classification of oil wells and gas wells, spacing units for oil wells and gas wells, and the establishment of a gas-liquid ratio limitation of 5,000 cubic feet of gas per barrel of oil. All interested parties may appear and show cause why the special rules should be continued in effect.

CASE 2720 (Reopened)

In the matter of Case No. 2720 being reopened pursuant to the provisions of Order No. R-2397-B which continued the original order for an additional year, establishing special rules governing the production of oil and gas wells in the Double-X Delaware Pool, Lea County, New Mexico, including classification of wells as gas wells when the gas-liquid hydrocarbon ratio exceeds 30,000 to one.

CASE 3361: Application of Tidewater Oil Company for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water in its A. B. Coates "C" Well No. 15 located in Unit O of Section 24, Township 25 South, Range 37 East, Justis Field, Lea County, New Mexico, through a perforated interval below 8,000 feet.

CASE 3353: Application of Tesoro Petroleum Corporation to amend Order No. R-2807, McKinley County, New Mexico. Applicant, in the above-styled cause, seeks an amendment to Order No. R-2807, which authorized a waterflood project in the Hospah Unit Area, to permit the production of oil from previously designated water injection wells, to approve unorthodox locations for additional producing wells, and to authorize additional injection wells, all in Section 36, Township 18 North, Range 9 West, McKinley County, New Mexico.

CASE 2945 (Reopened)

In the matter of Case No. 2945 being reopened pursuant to the provisions of Order No. R-2623, which order established 640-acre spacing units for the Antelope Ridge-Devonian Gas Pool, Lea County, New Mexico, for a period of two years. All interested parties may appear and show cause why said pool should not be developed on 160-acre or 320-acre spacing units.

CASE 3350 (Continued and readvertised)

Application of International Oil & Gas Corporation for the creation of two new oil pools and for special pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new oil pool for Bone Spring production and a new oil pool for Wolfcamp production in Section 21, Township 18 South, Range 32 East, Lea County, New Mexico, and for the establishment of special rules for each of said pools including provision for 80-acre proration units.

CASE 3362: Application of Carter Foundation Production Company for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project by the injection of water into the Queen formation through five wells located at unorthodox locations in Sections 34 and 35, Township 23 South, Range 37 East, Langlie-Mattix Pool, Lea County, New Mexico.

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WESTERN UNION
TELEGRAM

1201 (4-60)

W. P. MARSHALL, PRESIDENT

SYMBOLS
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NEW MEXICO OIL CONSERVATION COMMISSION=
SANTA FE NMEX=

REFERENCE CASE 2945 CONCERNING SPECIAL POOL RULES FOR ANTELOPE RIDGE DEVONIAN GAS POOL CONTINENTAL OIL IS A WORKING INTEREST OWNER IN THE ANTELOPE RIDGE UNIT AND CONCURS IN THE REQUEST OF SHELL OIL COMPANY THAT THE SPECIAL POOL RULES CONTAINED IN ORDER #R2623 ESTABLISHING 640 ACRE PRORATION UNITS BE ADOPTED ON A PERMANENT BASIS=

L P THOMPSON CONTINENTAL O L CO HOBBS NMEX=

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE No. 2945
Order No. R-2623
NOMENCLATURE

APPLICATION OF SHELL OIL COMPANY
FOR THE CREATION OF A DEVONIAN GAS
POOL AND FOR SPECIAL POOL RULES,
LEA COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on December 4, 1963, at Santa Fe, New Mexico, before Elvis A. Utz, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this 19th day of December, 1963, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Elvis A. Utz, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Shell Oil Company, seeks the creation of a new gas pool for Devonian production and the promulgation of temporary special rules and regulations governing said pool, including provisions for 640-acre spacing units and limited well locations.

(3) That a new gas pool for Devonian production should be created and designated the Antelope Ridge-Devonian Gas Pool; that said pool was discovered by the Shell Oil Company Harris-Federal Well No. 1, located in Unit N of Section 27, Township 23 South, Range 34 East, NMPM, Lea County, New Mexico.

(4) That in order to prevent the economic loss caused by the drilling of unnecessary wells, to avoid the augmentation of risk arising from the drilling of an excessive number of wells, to prevent reduced recovery which might result from the drilling

of too few wells, and to otherwise prevent waste and protect correlative rights, temporary special rules and regulations providing for 640-acre spacing units should be promulgated for the Antelope Ridge-Devonian Gas Pool.

(5) That the temporary special rules and regulations should provide for limited well locations in order to assure orderly development of the pool and protect correlative rights.

(6) That the temporary special rules and regulations should be established for a two-year period in order to allow the operators in the subject pool to gather reservoir information to establish the area that can be efficiently and economically drained and developed by one well.

(7) That this case should be reopened at an examiner hearing in January, 1966, at which time the operators in the subject pool should be prepared to appear and show cause why the Antelope Ridge-Devonian Gas Pool should not be developed on 160-acre spacing units.

IT IS THEREFORE ORDERED:

(1) That a new pool in Lea County, New Mexico, classified as a gas pool for Devonian production is hereby created and designated the Antelope Ridge-Devonian Gas Pool consisting of the following-described area:

TOWNSHIP 23 SOUTH, RANGE 34 EAST, NMPM
Section 27: All
Section 33: E/2, E/2 W/2
Section 34: All

TOWNSHIP 24 SOUTH, RANGE 34 EAST, NMPM
Section 4: All

(2) That Special Rules and Regulations for the Antelope Ridge-Devonian Gas Pool are hereby promulgated as follows, effective January 1, 1964.

SPECIAL RULES AND REGULATIONS
FOR THE
ANTELOPE RIDGE-DEVONIAN GAS POOL

RULE 1. Each well completed or recompleted in the Antelope Ridge-Devonian Gas Pool or in the Devonian formation within one mile of the Antelope Ridge-Devonian Gas Pool, and not nearer to nor within the limits of another designated Devonian gas pool, shall be spaced, drilled, operated, and produced in accordance with the Special Rules and Regulations hereinafter set forth.

RULE 2. Each well completed or recompleted in the Antelope Ridge-Devonian Gas Pool shall be located on a standard unit containing 640 acres, more or less, consisting of a single governmental section.

RULE 3. The Secretary-Director of the Commission may grant an exception to the requirements of Rule 2 without notice and hearing when an application has been filed for a non-standard unit and the unorthodox size or shape of the unit is necessitated by a variation in the legal subdivision of the United States Public Lands Survey, or the following facts exist and the following provisions are complied with:

(a) The non-standard unit consists of quarter-quarter sections or lots that are contiguous by a common bordering side.

(b) The non-standard unit lies wholly within a single governmental section and contains less acreage than a standard unit.

(c) The applicant presents written consent in the form of waivers from all offset operators and from all operators owning interests in the section in which the non-standard unit is situated and which acreage is not included in said non-standard unit.

(d) In lieu of paragraph (c) of this rule, the applicant may furnish proof of the fact that all of the aforesaid operators were notified by registered or certified mail of his intent to form such non-standard unit. The Secretary-Director may approve the application if no such operator has entered an objection to the formation of such non-standard unit within 30 days after the Secretary-Director has received the application.

RULE 4. Each well completed or recompleted in the Antelope Ridge-Devonian Gas Pool shall be located in the SW/4 NE/4, NW/4 SE/4, NE/4 SW/4, or SE/4 NW/4 of a governmental section and no nearer than 330 feet to any governmental quarter-quarter section line.

RULE 5. The Secretary-Director may grant an exception to the footage requirements of Rule 4 without notice and hearing when an application has been filed for an unorthodox location necessitated by topographical conditions or the recompletion of a well previously drilled to another horizon, provided the well will be located no nearer than 330 feet to the outer boundary

of the unit. All operators offsetting the proposed unorthodox location shall be notified of the application by registered or certified mail, and the application shall state that such notice has been furnished. The Secretary-Director may approve the application upon receipt of written waivers from all offset operators or if no offset operator has entered an objection to the unorthodox location within 20 days after the Secretary-Director has received the application.

IT IS FURTHER ORDERED:

(1) That any well presently drilling to or completed in the Antelope Ridge-Devonian Gas Pool that does not comply with the well location requirements of Rule 4 is hereby granted an exception to said rule. The operator of any such well shall notify the Hobbs District Office of the Commission in writing of the name and location of the well on or before January 1, 1964.

(2) That any operator desiring to dedicate 640 acres to a well presently drilling to or completed in the Antelope Ridge-Devonian Gas Pool shall file a new Form C-128 with the Commission on or before January 1, 1964.

(3) That this case shall be reopened at an examiner hearing in January, 1966, at which time the operators in the subject pool may appear and show cause why the Antelope Ridge-Devonian Gas Pool should not be developed on 160-acre spacing units.

(4) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

Jack M Campbell
JACK M. CAMPBELL, Chairman

E. S. WALKER, Member

A. L. Porter, Jr.
A. L. PORTER, Jr., Member & Secretary

esr/

GOVERNOR
JACK M. CAMPBELL
CHAIRMAN

State of New Mexico
Oil Conservation Commission

LAND COMMISSIONER
GUYTON B. HAYS
MEMBER

P. O. BOX 2088
SANTA FE

STATE GEOLOGIST
A. L. PORTER, JR.
SECRETARY - DIRECTOR

January 13, 1966

Mr. Richard S. Morris
Seth, Montgomery, Federici & Andrews
Attorneys at Law
Post Office Box 2307
Santa Fe, New Mexico

Re: Case No. 2945
Order No. R-2623-A
Applicant:
Shell Oil Company

Dear Sir:

Enclosed herewith are two copies of the above-referenced Commission order recently entered in the subject case.

Very truly yours,

A. L. Porter, Jr.

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

Carbon copy of order also sent to:

Hobbs OCC ___x___
Artesia OCC _____
Aztec OCC _____

Other _____

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
COMMISSION OF NEW MEXICO FOR
THE PURPOSE OF CONSIDERING:

CASE No. 2945
Order No. R-2623-A

APPLICATION OF SHELL OIL COMPANY
FOR THE CREATION OF A DEVONIAN GAS
POOL AND FOR SPECIAL POOL RULES,
LEA COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on January 5, 1966, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 13th day of January, 1966, the Commission, a quorum being present, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.

(2) That by Order No. R-2623, dated December 19, 1963, temporary Special Rules and Regulations were promulgated for the Antelope Ridge-Devonian Gas Pool, Lea County, New Mexico, establishing 640-acre spacing units for a period of two years.

(3) That pursuant to the provisions of Order No. R-2623, this case was reopened to allow the operators in the subject pool to appear and show cause why the Antelope Ridge-Devonian Gas Pool should not be developed on 160-acre spacing units.

(4) That the evidence establishes that one well in the Antelope Ridge-Devonian Gas Pool can efficiently and economically drain and develop 640 acres.

(5) That the Special Rules and Regulations promulgated by Order No. R-2623 have afforded and will afford to the owner of each property in the pool the opportunity to produce his just and equitable share of the gas in the pool.

(6) That to prevent the economic loss caused by the drilling of unnecessary wells, to avoid the augmentation of risk arising from the drilling of an excessive number of wells, to prevent reduced recovery which might result from the drilling of too few wells, and to otherwise prevent waste and protect correlative rights, the Special Rules and Regulations promulgated by Order No. R-2623 should be continued in full force and effect until further order of the Commission.

IT IS THEREFORE ORDERED:

(1) That the Special Rules and Regulations governing the Antelope Ridge-Devonian Gas Pool promulgated by Order No. R-2623 are hereby continued in full force and effect until further order of the Commission.

(2) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

JACK M. CAMPBELL, Chairman

GUYTON B. HAYS, Member

A. L. PORTER, Jr., Member & Secretary

esr/

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
January 5, 1966

EXAMINER HEARING

IN THE MATTER OF:

In the matter of Case No. 2945 being reopened pursuant to the provisions of Order No. R-2623, which order established 640-acre spacing units for the Antelope Ridge-Devonian Gas Pool, Lea County, New Mexico, for a period of two years.

Case No. 2945

BEFORE: Daniel S. Nutter, Examiner

TRANSCRIPT OF HEARING

MR. NUTTER: We will call next Case 2945.

MR. DURRETT: In the matter of Case No. 2945 being reopened pursuant to the provisions of Order No. R-2623, which order established 640-acre spacing units for the Antelope Ridge-Devonian Gas Pool, Lea County, New Mexico, for a period of two years.

MR. MORRIS: If the Examiner please, I'm Richard Morris of Seth, Montgomery, Federici and Andrews, Santa Fe, New Mexico, appearing for Shell Oil Company in reopened Case No. 2945. Shell Oil Company was the original applicant in the case.

MR. NUTTER: Mr. Morris, it's twenty minutes to 12:00. How long do you think this case wil take, till approximately 12:00 o'clock?

MR. MORRIS: Yes.

(Whereupon, Exhibits R-1 through R-4 were marked for identification.)

RICHARD SEBA

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

DIRECT EXAMINATION

BY MR. MORRIS:

Q Will you please state your name?

A My name is Richard D. Seba, from Midland, Texas.

MR. MORRIS: Would the record show that Mr. Seba previously was sworn in reopened Case 3246 and is still under oath?

MR. NUTTER: The record shows he's under oath.

Q (By Mr. Morris) What is your position, Mr. Seba?

A I'm the Division Reservoir Engineer for the Western Division of Shell Oil Company in Midland.

Q And you have previously testified before the Commission or one of its examiners and had your qualifications made a matter of record?

A Yes, I have.

Q Are you familiar with the development, operation and characteristics of the Antelope Ridge-Devonian Gas Pool?

A Yes, I am.

Q You were not the witness in the original hearing of this case before the Commission?

A No, I was not.

Q But you have made yourself familiar with the exhibits and testimony presented at that hearing?

A Yes, I have.

Q Would you refer to what has been marked Exhibit R-1 and state what that exhibit is and point up the additional development and information that has been obtained since the original hearing in this case?

A This exhibit is a structure map on the top of the Devonian in the area of the Antelope Ridge-Devonian field. This exhibit is basically the same exhibit that was presented in the original case, however, since that time there has been one additional well drilled, Well No. 3, which is shown on this map. Well No. 3 did not alter the contour lines that appear on this map so the contours are unaltered from the original exhibit.

The exhibit also shows the gas-water contact and the unit outline, the unit covering the six sections, being Sections 27, 28, 33 and 34 in Range 34 East, and Sections 3 and 4 in the township south of that.

Q The plat also shows that Well No. 2 has become a dual completion. In what formation has it been dualed?

A It is a dual completion in the Devonian and the Pennsylvanian formation. The Pennsylvanian formation in this area is also gas-productive.

Q Just as a sidelight, Mr. Seba, are there other Pennsylvanian wells in this area?

A There is one additional Pennsylvanian well that is a twin well to the No. 2. Actually there are two separate productive members in the Pennsylvanian, one being produced in the dual completion in Well No. 2 and the other being a single zone completion in the Well No. 4, which is not shown

on the map.

Q Where is that Well No. 4?

A Well No. 4 is southwest of the Well No. 2. I don't know the exact footage, but it's a twin well to that and very close nearby.

Q One of those Pennsylvanian wells is the Atoka and one is the Morrow, is that correct?

A Yes.

Q Now, Wells 1 and 2 in the Devonian were already drilled and completed at the time of the original hearing in this case?

A That is correct.

Q And Well No. 3 has been the only additional well drilled in the interim?

A That is correct, and these are the only three wells in the entire field.

Q Would you refer next to Exhibit R-2 entitled your "Reservoir and Well Completion Data," and point out the features of that exhibit?

A This is a tabulation of the well completion data and reservoir data and is presented as a supplement to a similar exhibit which was presented at the previous hearing. As stated, Unit No. 3 was drilled since the original hearing, so the only additional data presented on this exhibit is the

data presented for the Unit No. 3. However, there is one additional item of data and that is that Well No. 2 was repotentialed and the calculated open flow potential for that well is as appears, 16.35 million cubic feet per day, whereas it was previously potentialed for 11 million cubic feet per day.

I might point out that the calculated open flow potentials for the wells range from the low of 16.35 in Unit No. 2 to a high of 41 million cubic feet per day for Well No. 1. The liquid content of this gas is approximately 20 barrels per million and the condensate has a gravity of approximately 62 degrees API.

I would also draw your attention to the reservoir data which indicates that the reservoir has a porosity of about five and a half percent, a permeability of four and a half millidarcies, water saturation of thirty-three percent and average net pay of 127 feet; the reservoir temperature is 217 degrees Fahrenheit. The original reservoir pressure was 6375 psia.

I would like to add some additional information with regard to the gas. That is, that the Devonian gas is a sour gas, having 225 grains per hundred standard cubic feet. There is an additional liquid recovered by the plant amounting to one, co 1.25 gallons per thousand, and the plant residue

gas has a BTU content of 114 BTU per thousand.

Q The grains that you mentioned were grains of hydrogen sulphate?

A Grains of hydrogen sulphate per 100 cubic standard feet.

Q Referring next to Exhibit R-3 showing economics for the 160, 320 and 640-acre spacing. Would you explain how these figures differ from those presented at the original hearing of the case?

A This, too, is similar to an exhibit presented in the original case. However, some changes have occurred in both the economic and reservoir data such that certain changes were made in this exhibit. The first change was the price of the gas, it was originally estimated that the average price over the life of the contract would be $187.50 per million cubic feet whereas our current contract is estimated to yield only $162.675 cents per million, thus yielding a lower net income after royalty and taxes which currently is estimated to be $161.442.

The well costs were the same in the Well No. 3 as for the two previous wells drilled. Additional reservoir data has indicated that our reserves are higher than were originally estimated. We estimate now that the reserves are 7,750 MCF per 160 acres, whereas before it was 5,500 and the 320 and

640 multiples of this, thus we now estimate that the reserves for 640 acres would be 31 billion cubic feet whereas previously we estimated that it was only 22 billion cubic feet. These changes, then, have caused a change in the income over the life of the project as stated in the exhibit. We estimate the income for 160-acre spacing to be $1,251,000, whereas we previously estimated it to be $1,030,000.

320-acre spacing would yield $2,502,000, whereas previously it was estimated to be $2,060,000; and 640-acre spacing would yield an income of $5,005,000, whereas before it was estimated to be $4,120,000.

These income, less direct operating cost and overhead which does include amortization of a gas sweetening plant, less federal taxes, yields a profit now estimated to be $246,000 for 160 acres, $1,006,000 for 320 acres, and $2,525,000 for 640 acres. I have reduced the profit to an average annual percent profit for each of the cases, which indicates that 160-acre spacing would yield only 1.6% average annual percent profit, whereas 320 acres would yield 6.7% and 640 acres would yield 16.8%.

I have used the economic criteria of annual average percent profit in that due to contract commitments the productive history will be essentially a flat life over the 20-year period rather than declining, recognizing that there

will be some decline at the end of the period due to deliverability, but over the majority of the life of the project it will be flat life at gas contract rates.

It is our opinion that we could not afford to accept 6.7% or 1.6% average annual profit and, therefore, I could not justify to my management to drill on anything less than 640 acres; therefore, we feel that the economics dictate 640-acre spacing in this field.

Q Mr. Seba, in your opinion what size proration unit should be established on a permanent basis in this field in order to efficiently and economically drain and develop this field?

A It is my opinion that the permanent field rules for the Antelope Ridge-Devonian field should contain 640-acre spacing. I would like to offer in evidence Exhibit No. R-4, which is a plot of pressure divided by the compressibility versus cumulative gas production. I show three points on here but have drawn a line through the latter two points, which then can be extrapolated to indicate the reserves for this well.

I have neglected point No. 1 in that the production from the field during the time that the first point and the second point were determined there were only two wells producing from the field part of the time and three the rest of the time.

An extrapolation of these two points indicates that the reserves for this Unit No. 1 well would be approximately 88 billion cubic feet; volumetric calculations of the reservoir associated with 640 acres around the Unit No. 1 well would indicate only 31 billion cubic feet. Therefore, we offer this as evidence that one well will drain at least 640 acres and possibly more.

Therefore, one well on 640 acres will effectively and efficiently drain the reservoir, and since the area is unitized we feel that correlative rights are also protected in this manner since the takes from the field are determined by field reserves by the gas contract. Additional drilling in this field would not contribute to additional daily takes, but each well would then be only allowed to produce a smaller portion of the total take from the field. Therefore, additional wells would lead to excessive waste and drilling costs.

Q Do you have a recommendation concerning the field rules that up to this point have been adopted only on a temporary basis?

A Yes. We would recommend that the temporary rules, as written, should be made permanent and are prepared to accept those rules on a permanent basis; particularly we believe that 640-acre spacing will prevent waste and protect the correlative rights of those operators in this field.

Q Were Exhibits R-1 through R-4 prepared by you or under your direction?

A Yes, they were.

MR. MORRIS: We offer Exhibits R-1 through R-4 into evidence.

MR. NUTTER: Shell's Exhibits R-1 through R-4 will be admitted in evidence.

(Whereupon, Shell's Exhibits R-1 through R-4 were offered and admitted in evidence.)

MR. MORRIS: That's all we have.

CROSS EXAMINATION

BY MR. NUTTER:

Q You state that the contract states that the takes be based on a relationship to reserves. Now, the extrapolation of your curve shows 88 billion cubic feet reserves. The volumetric shows 31 billion, when you have such a wide discrepancy as this, what are the takes based on, which set of the reserves?

A The takes from the field are based on the reserves for the entire field. The reserves quoted here are only for 640 acres. However, the total acreage in the unit is four sections. So that actually each well has 1280 acres allocated to it.

Q Is the entire unit regarded as productive and

containing reserves?

A There is some in the northwest section, you can see it's cut off by the oil-water contact that is not -- but we calculate the total reserves for the unit area and then our take from the three wells combined is determined by the total reserves for the field and the takes from individual wells are immaterial. The production will be produced from the wells as a whole rather than from any well individually.

Q Who is the purchaser here?

A Southern Union Gas Company. The gas goes into intrastate.

Q What is the average take per day from the three wells?

A Currently the minimum rate is 30 million cubic feet per day and I think that the takes are in excess of that, ranging around 40 million cubic feet per day.

Q 30 or 40 per day for the three wells?

A Yes. The contract states that the reserves are higher than this and we have additional time to commit these reserves to the gas contract.

Q Do you have anything to offer to show that one well will drain 640 acres other than the extrapolation of the pressure decline curve?

A No. Performance data is the best evidence that we have. We also feel that the permeability of this formation,

even though it is very low of four and a half millidarcies, is sufficient to drain more than 160 acres.

Q When was Well No. 3 completed?

A Well No. 3 was completed in September of 1964.

Q Well No. 1 was completed in August of '62?

A That's right.

Q And Well No. 2 in the south was completed in September of '63?

A That is correct.

Q What was the pressure and how did it compare with the other two wells when Well No. 3 was initially drilled?

A The bulk of the production has occurred this year. I don't know the exact date that we started delivering gas, but it has all been very recently so there was not too much production from the reservoir before 3 was drilled, but there was some. I don't have the original pressure in No. 3 with me at the present time.

Q I don't know if I am reading these dates on this pressure decline curve correctly or not, but is that second point 5-10-65?

A Yes, 5-10-65 and 12-6-65.

Q Do you recall what the other point --

A The other point was shortly after the original completion, so I would imagine that it was shortly after

August of '62.

Q I see.

A However, as I stated before, the production from this reservoir did not commence until some time after that.

Q Now, the takes when No. 3 was completed have been relatively small?

A Yes.

Q So no comparison of pressures would show anything?

A No, sir.

MR. NUTTER: Are there any other questions of Mr. Seba? 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 2945?

MR. DURRETT: We have a telegram from Continental Oil Company supporting Shell in this case.

MR. NUTTER: If there's nothing further in Case 2945 we will take the case under advisement and recess the hearing until 1:30.

I N D E X

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 Hearing 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 22nd day of January, 1966.

Ada Dearnley
NOTARY PUBLIC

My Commission Expires:

June 19, 1967.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2945, heard by me on 1/13, 1966.

New Mexico Oil Conservation Commission

SHELL OIL COMPANY
ANTELOPE RIDGE DEVONIAN GAS UNIT
ECONOMICS FOR 160, 320, AND 640-ACRE
WELL SPACING

1. Cost and Income Data

Gas Price $/MMCF		162.675
Liquid/Gas Ratio Over Life-Bbls/MMCF		20.000
Condensate Price $/Bbl		2.730
Gross Income $/MMCF		217.275
Royalty and ORRI $/MMCF	34.286	
Production Tax Property Tax $/MMCF	21.547	
Sub Total		55.833
Net Income After Royalty and Taxes $/MMCF		161.442
Well Costs		$750,000

2. Economics

	Well Spacing		
	160 Ac	320 Ac	640 Ac
Reserves MMCF	7,750	15,500	31,000
Life Yrs	20	20	20
Income	$1,251,000	$2,502,000	$5,005,000
Direct Operating Cost and Overhead (Includes Amortization of Gas Sweeting Plant)	103,000	128,000	178,000
Federal Income Tax	152,000	618,000	1,552,000
Profit	246,000	1,006,000	2,525,000
Average Annual Percent Profit	1.6%	6.7%	16.8%

SHELL OIL COMPANY
ANTELOPE RIDGE DEVONIAN GAS UNIT
RESERVOIR AND WELL COMPLETION DATA

WELL COMPLETION DATA

	Unit 1	Unit 2	Unit 3
Formation	Devonian	Devonian	Devonian
Completion Interval	14,655-14,832	14,692-14,823	14,695-14,830
Treatment	2,000 Gal Acid	5,000 Gal Acid	5,000 Gal Acid
Date of C.A.O.F.	8- 9-62	2- 7-65	9-15-64
C.A.O.F.	41	16.35	25
Liquid Recovery - Bbls/MMCF	23	26	14
Gas Gravity	0.695	0.660	0.660
Condensate Gravity - Deg API	56	62.3	63

RESERVOIR DATA

Porosity	5.5%	
Permeability	4.5	md
Water Saturation	33	%
Net Pay	127	ft
Reservoir Temperature	217	°
Original Reservoir Pressure	6375	psia

Dana Shultz

ANTELOPE RIDGE DEVONIAN GAS POOL
CASE NO. 2945

Purpose of Application

Shell Oil Company, as Operator of the Antelope Ridge Unit, makes application for an order establishing field rules for the Antelope Ridge Devonian Gas Pool. Special rules are to include 640-acre drilling units and well locations no nearer than 660 feet to the outer bounder of the interior quarter-quarter sections. Shell also requests establishment of horizontal limits for the Pool consisting of Sections 27, 28, 33, and 34, Township 23 South, Range 34 East; and Sections 3 and 4, Township 24 South, Range 34 East.

Exhibits

Exhibit 1

Exhibit 1 is a plat of the Antelope Ridge Area with the Antelope Ridge Unit outlined in red. well data - well ... The plat shows our structural interpretation at Devonian level based upon well control, seismic, and dipmeter data. The accumulation is controlled on the north, east, and south flanks by a gas-water contact of 11,450 feet subsea. This water level has been confirmed by DST data and production tests in Federal BE No. 1. The western limit of the accumulation is defined by a steeply dipping fault trending from southwest to northeast approximately along the western boundary of the Antelope Ridge Unit. The presence of this fault and the separation of the Antelope Ridge Devonian Gas Pool from the Bell Lake Devonian Gas Pool are confirmed by differences in pressure and reservoir fluids between the two accumulations. The average reservoir pressure in Bell Lake Unit wells 1A and 4 in May of 1962, was approximately 6100 psi while the pressure in Harris Federal No. 1 in July of 1962 was 6360 psi. Both the Harris Federal No. 1 and Federal BE No. 1 produce gas with a condensate content of more than 20 barrels per MMCF, while the two wells in the south accumulation at Bell Lake produce no liquids.

It is my opinion that the information provided by well control, seismic, and dipmeter data are sufficient to establish the approximate field limits and prove separation from the Bell Lake Devonian Gas Pool to the west.

Exhibit 2

Exhibit 2 is a cross-section through the crest of theAntelope Ridge structure as shown by the line labled A-A' on Exhibit 1. The cross-section shows the gross Devonian interval above the gas-water contact at 11,450 feet subsea and the dip to the southwest and northeast suggested by seismic and dipmeter data. The cross-section also shows a tabulation of DST and production test data for the two wells which have penetrated the Devonian formation. You will note that DST No. 4 in Federal BE No. 1, which straddled the apparent gas-water contact flowed gas and water, while production test No. 11, with perforations just below the gas-water contact, recovered only water.

Exhibit 3

Exhibit 3 shows well test and reservoir data for the Devonian formation from Harris-Federal No. 1 and Federal BE No. 1. The test data from Harris Federal No. 1 are from the official four-point test and show a CAOF of 41 MMCF/day after treatment with 2000 gallons of acid. The indicated CAOF prior to acidization was only 10 MMCF/day. Federal BE No. 1 was drill-stem tested without treatment and had a CAOF of 11 MMCF/day with evidence of considerable formation damage. It is my opinion that when Federal BE No. 1 is completed in the Devonian, a small acid treatment will yield a potential at least equal to that of the Harris Federal well.

The reservoir data shown on Exhibit 3 have been calculated from electrical log and subsurface pressure measurements. Neutron and sonic logs were used to determine net pay and an average porosity of 5.0 per cent, and the induction log was used to determine a water saturation of 35 per cent. Permeability was calculated from the slope of the pressure buildup curve shown on Exhibit 4.

Exhibit 4

A graphical presentation of bottom hole pressure measurements made during a drill-stem test on Harris Federal No. 1 is shown on Exhibit 4. Pressures are plotted against dimensionless time, $\frac{t}{\Delta t} + 1$, where t is equal to producing time and Δt is equal to shut-in time. Pressures have been extrapolated to infinite

shut-in time in order to obtain true reservoir pressure. The permeability shown on Exhibit 3 was determined from the slope of the buildup curve according to the relationship shown on Exhibit 4.

Exhibit 5

Economic analyses for 160,320 and 640-acre spacing are presented on Exhibit 5. The reserves in each case are based on volumetric analysis using 5.0 per cent porosity, 35 per cent water saturation, 100 feet of net pay and 1000 psi abandonment pressure. The economics are based upon an average well cost of $750,000 and net income before overhead, operating costs, and amortization of gas treating plant of $186.50 per MMCF. The exhibit shows that for both 160- and 320-acre spacing the profit-to-investment ratio and rate of return would be below acceptable standards for a high risk industry.

Conclusions

It is my opinion that the data presented show that permeability in the Devonian formation is sufficient to effectively drain 640 acres and that development on 160- or 320-acre spacing is not economically feasible. I further believe that well control, seismic and dipmeter data provide sufficient information to establish initial pool limits as proposed.

I recommend that the Commission formulate field rules for the Antelope Ridge Devonian Gas Pool along the lines of those proposed in Exhibit 6, and establishment of horizontal pool limits consisting of Sections 27, 28, 33 and 34, Township 23 South, Range 34 East; and Sections 3 and 4, Township 24 South, Range 34 East, Lea County, New Mexico.

It is my opinion that granting of this application will prevent waste in the form of unnecessary drilling and will protect correlative rights through inclusion of only reasonable proved acreage in each gas unit.

Exhibit 6

Exhibit 6 presents the proposed field rules for the Antelope Ridge Devonian Gas Pool. An abstract of these rules follows.

Rule 1 provides that each well completed in the Antelope Ridge Devonian Gas Pool will be governed by these special rules.

Rule 2 provides for 640-acre gas units consisting of a single governmental section and for administrative approval of smaller non-standard units if offset operators have no objection.

Rule 3 provides for drilling locations with wells no nearer than 660 feet to the outer boundary of the inner quarter-quarter sections (1980 feet from section lines and for maximum acreage which may be allocated to non-standard locations.

Rule 4 provides that in the event of subsequent prorationing in the Antelope Ridge Devonian Gas Pool, the allowable assigned to nonmarginal wells shall be in direct proportion to the acreage factor.

Rule 5 established vertical limits of the pool as the Devonian formation.

Conclusion

Temp rules – 2 yr

Deep reservoirs – more risk

– should be given opportunity from outset to be on wide spacing

Offer Exhibits

SHELL OIL COMPANY
ANTELOPE RIDGE DEVONIAN GAS POOL
WELL TEST AND RESERVOIR DATA

Test Data

	Harris-Federal No. 1	Federal BE No. 1
Type Test	Completion test	DST
Formation	Devonian	Devonian
Test Date	8-9-62	3-22-63
Test Interval	14,655-14,832	14,660-14,900
Treatment	2,000 gals. acid	-
CAOF	41 MMCF/day	11 MMCF/day
Liquid Recovery	23 Bbls./MMCF	21.5 Bbls./MMCF
Gas Gravity	0.695	0.665
Condensate Gravity	56	57.5

Reservoir Properties from log analysis BHP analysis

Porosity	5.0%
Permeability	4.5 md. calculated
Water Saturation	35%
Net Pay	100
Reservoir Temperature	217°
Original Reservoir Pressure	6375 psia Calculated

NMOCC Case No. 2945
Exhibit No. 3
Date December 4, 1963

SHELL OIL COMPANY
ANTELOPE RIDGE DEVONIAN GAS POOL
ECONOMICS FOR 160, 320 AND 640 ACRE
WELL SPACING

1. Cost and Income Data

Gas Price - $/MMCF		187.50
Liquid/Gas Ratio Over Life - Bbls./MMCF		20
Condensate Price - $/Bbl.		2.73
Gross Income - $/MMCF		241.10
Royalty and ORRI - $/MMCF	38.10	
Production and Property Taxes - $/MMCF	16.50	
Subtotal		54.60
Net Income After Royalty and Taxes - $/MMCF		186.50
Well Cost		$750,000

2. 160-Acre Spacing

Reserves	5,500 MMCF
Life	20 Years
Income	$1,030,000
Direct Operating Cost and Overhead (Includes Amortization of Gas Sweetening Plant)	$103,000
Federal Income Taxes	$ 73,000
Profit	$104,000
Profit to Investment Ratio	0.14
Rate of Return	1%

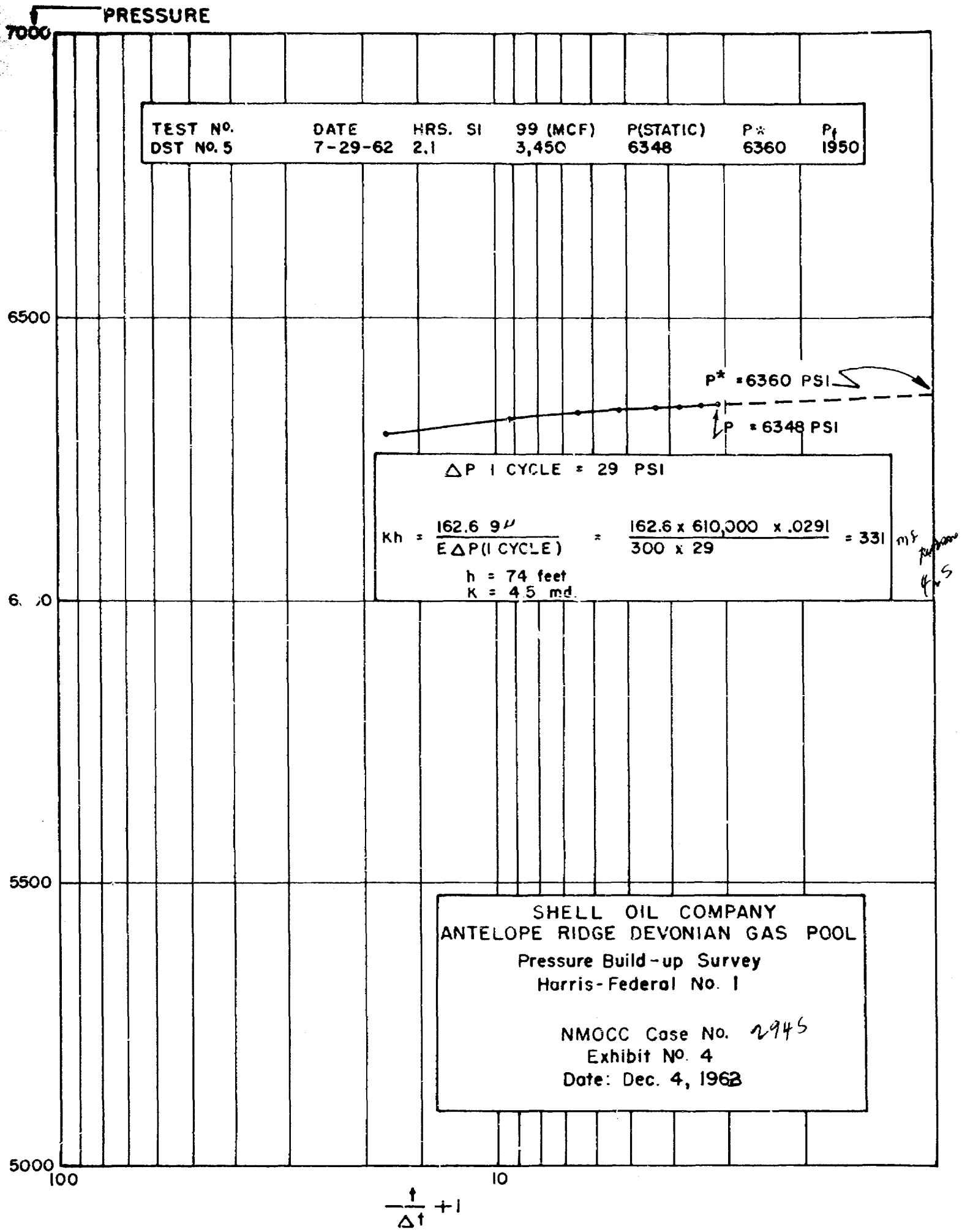
3. 320-Acre Spacing

Reserves	11,000 MMCF
Life	20 Years
Income	$2,060,000
Direct Operating Cost and Overhead (Includes Amortization of Gas Sweetening Plant)	$128,000
Federal Income Taxes	$461,000
Profit	$721,000
Profit to Investment Ratio	0.96
Rate of Return	7%

4. 640-Acre Spacing

Reserves	22,000 MMCF
Life	20 Years
Income	$4,120,000
Direct Operating Cost and Overhead (Includes Amortization of Gas Sweetening Plant)	$178,000
Federal Income Taxes	$1,242,000
Profit	$1,950,000
Profit to Investment Ratio	2.60
Rate of Return	17%

NMOCC Case No. 2116
Exhibit No. 5
Date December 4, 1963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6000
5500
5000
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DATE 7-29-62
HRS. SI 2.1
99 (MCF) 3,450
P(STATIC) 6348
P* 6360
Pf 1950
P* = 6360 PSI
P = 6348 PSI
ΔP 1 CYCLE = 29 PSI
Kh = 162.6 qμ / EΔP(1 CYCLE) = 162.6 x 610,000 x .0291 / 300 x 29 = 331
h = 74 feet
K = 4.5 md.
SHELL OIL COMPANY
ANTELOPE RIDGE DEVONIAN GAS POOL
Pressure Build-up Survey
Harris-Federal No. 1
NMOCC Case No. 2945
Exhibit Nº. 4
Date: Dec. 4, 1962
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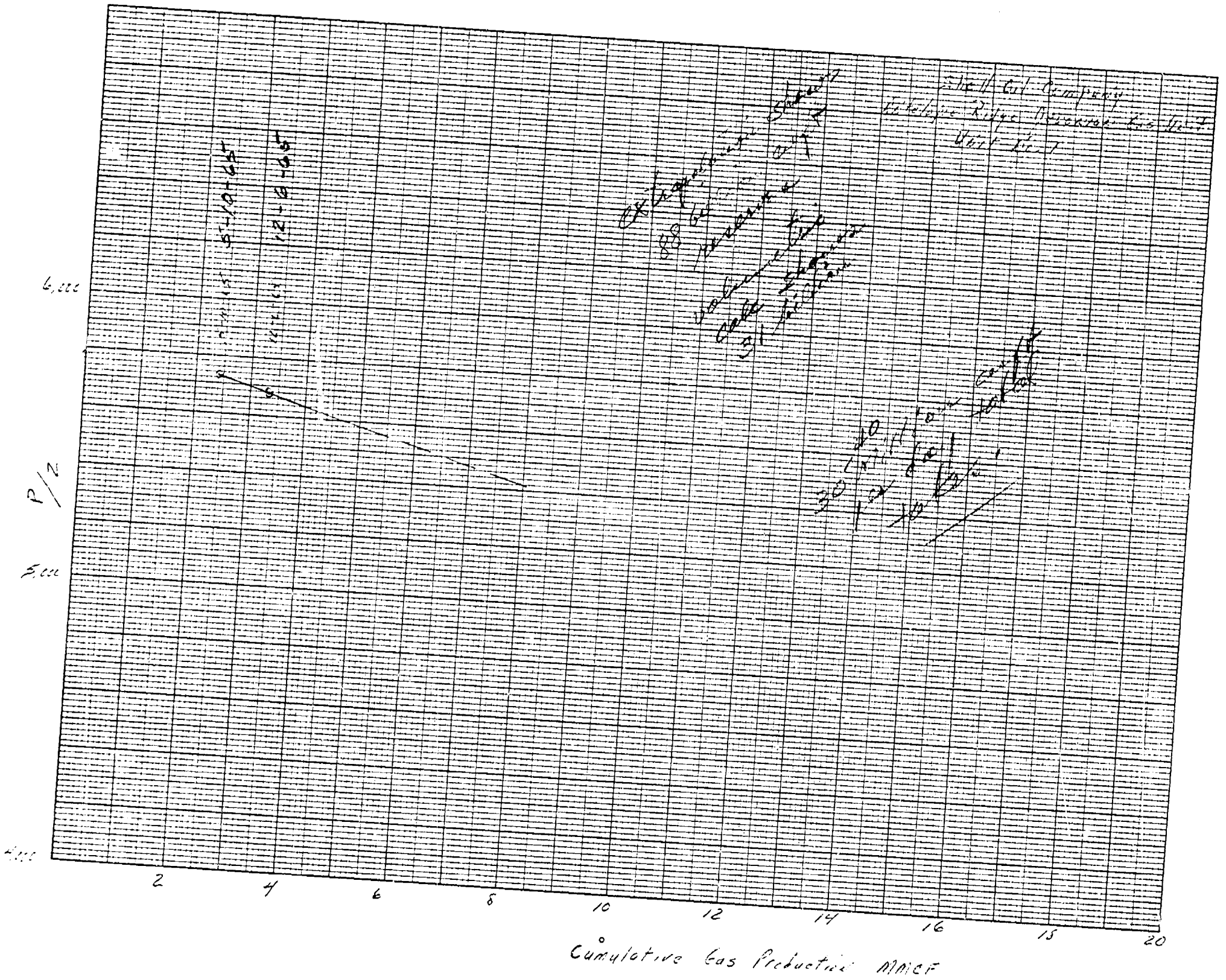
t / Δt + 1


P/Z
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5,000
4,000
3,000
2,000
1,000
0
2
4
6
8
10
12
14
16
18
20
Cumulative Gas Production MMCF

PROPOSED FIELD RULES
ANTELOPE RIDGE DEVONIAN GAS POOL
LEA COUNTY, NEW MEXICO

Rule 1. Each well completed or recompleted in the Devonian Formation within one mile of the boundary of the Antelope Ridge Devonian Gas Pool and not nearer to nor within the boundaries of another designated Devonian gas pool, shall be drilled, spaced, and produced in accordance with the special rules and regulations hereinafter set forth.

Rule 2. (a) Each well completed or recompleted in the Antelope Ridge Devonian Gas Pool shall be located on a standard proration unit consisting of approximately 640 contiguous surface acres substantially in the form of a square which is a legal section of the United States Public Lands Survey. For purposes of these rules, a unit containing 632 through 648 acres shall be considered a standard unit.

(b) For good cause shown, the Secretary Director of the Commission may grant an exception to the requirements of Rule 2 (a) without notice and hearing when the application is for a nonstandard unit comprising less than 640 acres. All operators offsetting the proposed nonstandard unit shall be notified of the application by registered or certified mail, and the application shall state that such notice has been furnished. The Secretary Director of the Commission may approve the application if, after a period of 30 days, no offset operator has entered an objection to the formation of such nonstandard unit.

The acreage factor assigned to any such nonstandard unit shall bear the same ratio to a standard acreage factor in the Antelope Ridge Devonian Gas Pool as the acreage in such nonstandard unit bears to 640 acres.

Rule 3. (a) Each well completed or recompleted in the Antelope Ridge Devonian Gas Pool shall be located within 330 feet of the center of the SW/4 NE/4, NW/4 SE/4, NE/4 SW/4, or SE/4 NW/4 of the section. Any well drilling to or which has penetrated the Devonian formation on the date of this order is hereby granted an exception to the well location requirements of this rule.

(b) The acreage assigned to any well not granted an exception to the well location requirement under the provisions of Rule 3. (a) shall be determined by the location of the well with respect to the two nearest section boundary lines as follows:

Location	Maximum Acreage
660-660	160
660-1980	320 acres

The acreage factor assigned to any such well shall bear the same ratio to a standard acreage factor as the acreage assigned bears to 640 acres.

Rule 4. In the event of subsequent prorationing of the Antelope Ridge Devonian Gas Pool, the allowable assigned to a nonmarginal well shall be in the same ratio that its acreage factor bears to the total of the acreage factors for all nonmarginal wells in the pool.

Rule 5. The vertical limits of the Antelope Ridge Devonian Gas Pool shall be the Devonian formation.

OIL CONSERVATION COMM.
EXHIBIT 6
CASE NO. 2945

NMOCC Case No.
Exhibit No. 6
Date: December 4, 1963

SHELL OIL COMPANY
ANTELOPE RIDGE DEVONIAN GAS UNIT
RESERVOIR AND WELL COMPLETION DATA

WELL COMPLETION DATA

	Unit 1	Unit 2	Unit 3
Formation	Devonian	Devonian	Devonian
Completion Interval	14,655-14,832	14,692-14,823	14,695-14,830
Treatment	2,000 Gal Acid	5,000 Gal Acid	5,000 Gal Acid
Date of C.A.O.F.	8- 9-62	2- 7-65	9-15-64
C.A.O.F.	41	16.35	25
Liquid Recovery - Bbls/MMCF	23	26	14
Gas Gravity	0.695	0.660	0.660
Condensate Gravity - Deg API	56	62.3	63

RESERVOIR DATA

Porosity	5.5%	
Permeability	4.5	md
Water Saturation	33	%
Net Pay	127	ft.
Reservoir Temperature	217	°
Original Reservoir Pressure	6375	psia

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
EXHIBIT NO. K-2
CASE NO. 2945

SHELL OIL COMPANY
ANTELOPE RIDGE DEVONIAN GAS UNIT
ECONOMICS FOR 160, 320, AND 640-ACRE
WELL SPACING

1. Cost and Income Data

Gas Price $/MMCF		162.675
Liquid/Gas Ratio Over Life-Bbls/MMCF		20.000
Condensate Price $/bbl		2.730
Gross Income $/MMCF		217.275
Royalty and ORRI $/MMCF	34.286	
Production Tax Property Tax $/MMCF	21.547	
Sub Total		55.833
Net Income After Royalty and Taxes $/MMCF		161.442
Well Costs		$750,000

2. Economics

	Well Spacing		
	160 Ac	320 Ac	640 Ac
Reserves MMCF	7,750	15,500	31,000
Life Yrs	20	20	20
Income	$1,251,000	$2,502,000	$5,005,000
Direct Operating Cost and Overhead (Includes Amortization of Gas Sweeting Plant)	103,000	128,000	178,000
Federal Income Tax	152,000	618,000	1,552,000
Profit	246,000	1,006,000	2,525,000
Average Annual Percent Profit	1.6%	6.7%	16.8%

SHELL OIL COMPANY
ANTELOPE RIDGE DEVONIAN GAS POOL
WELL TEST AND RESERVOIR DATA

Test Data

	Harris-Federal No. 1	Federal BE No. 1
Type Test	Completion	DST
Formation	Devonian	Devonian
Test Date	8-9-62	3-22-63
Test Interval	14,655-14,832	14,660-14,900
Treatment	2,000 gals. acid	-
CAOF	41 MMCF/day	11 MMCF/day
Liquid Recovery	23 Bbls./MMCF	21.5 Bbls./MMCF
Gas Gravity	0.695	0.665
Condensate Gravity	56	57.5

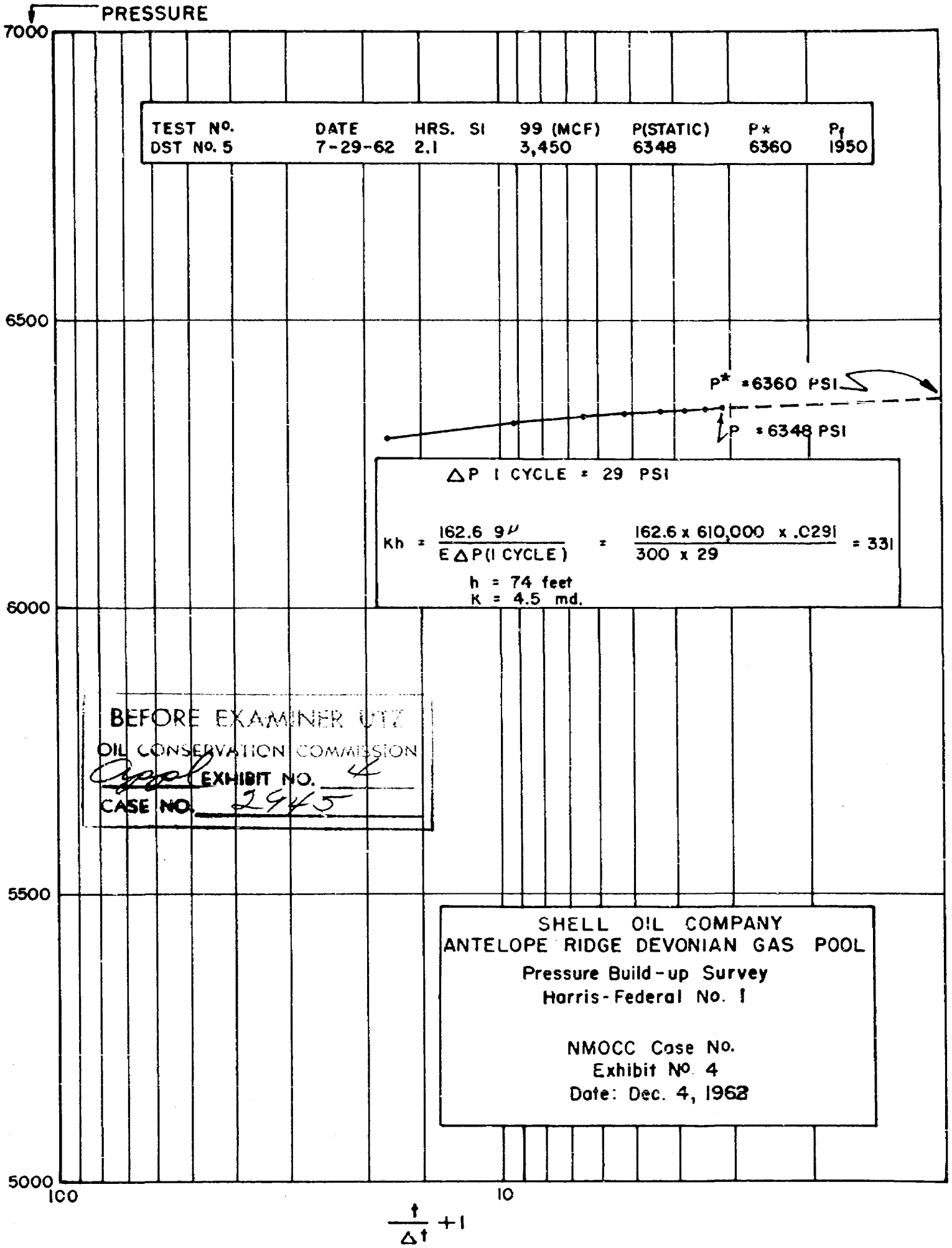
Reservoir Properties

Porosity	5.0%
Permeability	4.5 md.
Water Saturation	35%
Net Pay	100
Reservoir Temperature	217°
Original Reservoir Pressure	6375 psia

BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
EXHIBIT NO. 3
CASE NO. 2945

Texas
AE 14

NMOCC Case No.
Exhibit No. 3
Date December 4, 1963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6500
6000
5500
5000
TEST Nº. DST Nº. 5
DATE 7-29-62
HRS. SI 2.1
99 (MCF) 3,450
P(STATIC) 6348
P* 6360
Pf 1950
P* = 6360 PSI
P = 6348 PSI
ΔP 1 CYCLE = 29 PSI
Kh = 162.6 9μ / EΔP(1 CYCLE) = 162.6 x 610,000 x .0291 / 300 x 29 = 331
h = 74 feet
K = 4.5 md.
BEFORE EXAMINER UTZ
OIL CONSERVATION COMMISSION
EXHIBIT NO. 4
CASE NO. 2965
SHELL OIL COMPANY
ANTELOPE RIDGE DEVONIAN GAS POOL
Pressure Build-up Survey
Harris-Federal No. 1
NMOCC Case No.
Exhibit Nº 4
Date: Dec. 4, 1962
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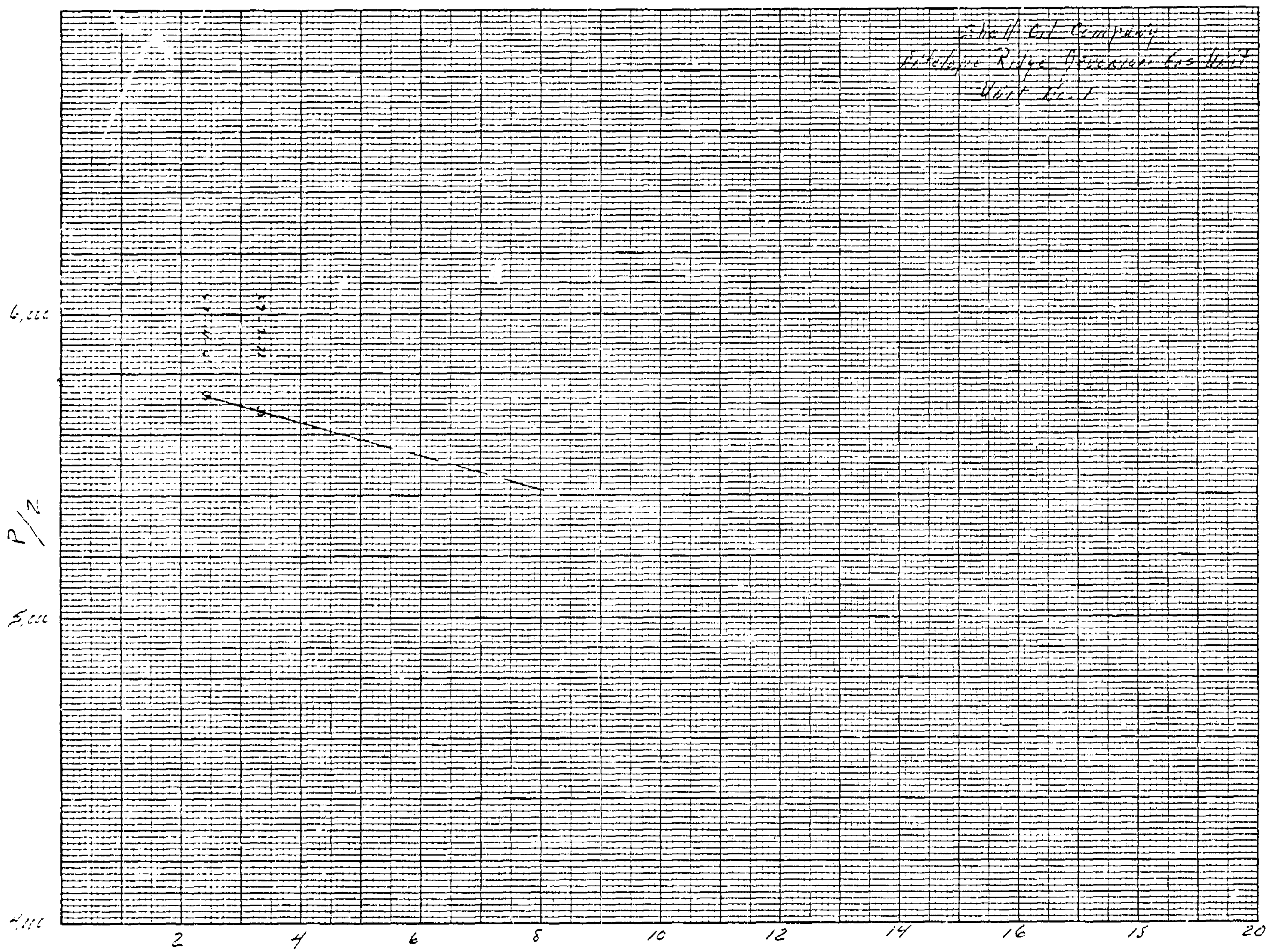
SHELL OIL COMPANY
ANTELOPE RIDGE DEVONIAN GAS POOL
ECONOMICS FOR 160, 320 AND 640 ACRE
WELL SPACING

1.	Cost and Income Data		
	Gas Price - $/MMCF		187.50
	Liquid/Gas Ratio Over Life - Bbls./MMCF		20
	Condensate Price - $/Bbl.		2.73
	Gross Income - $/MMCF		241.10
	Royalty and ORRI - $/MMCF	38.10	
	Production and Property Taxes - $/MMCF	16.50	
	Subtotal		54.60
	Net Income After Royalty and Taxes - $/MMCF		186.50
	Well Cost		$750,000
2.	160-Acre Spacing		
	Reserves		5,500 MMCF
	Life		20 Years
	Income		$1,030,000
	Direct Operating Cost and Overhead (Includes Amortization of Gas Sweetening Plant)		$103,000
	Federal Income Taxes		$ 73,000
	Profit		$104,000
	Profit to Investment Ratio		0.14
	Rate of Return		1%
3.	320-Acre Spacing		
	Reserves		11,000 MMCF
	Life		20 Years
	Income		$2,060,000
	Direct Operating Cost and Overhead (Includes Amortization of Gas Sweetening Plant)		$128,000
	Federal Income Taxes		$461,000
	Profit		$721,000
	Profit to Investment Ratio		0.96
	Rate of Return		7%
4.	640-Acre Spacing		
	Reserves		22,000 MMCF
	Life		20 Years
	Income		$4,120,000
	Direct Operating Cost and Overhead (Includes Amortization of Gas Sweetening Plant)		$178,000
	Federal Income Taxes		$1,242,000
	Profit		$1,950,000
	Profit to Investment Ratio		2.60
	Rate of Return		17%

NMOCC Case No.
Exhibit No. 5
Date December 4, 1963


Shell Oil Company
Antelope Ridge Devonian Gas Unit
Well No. 1
6,000
5,000
4,000
P/Z
2
4
6
8
10
12
14
16
15
20
Cumulative Gas Production MMCF

Case 2745

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
January 5, 1966

EXAMINER HEARING

IN THE MATTER OF:

In the matter of Case No. 2945 being reopened pursuant to the provisions of Order No. R-2623, which order established 640-acre spacing units for the Antelope Ridge-Devonian Gas Pool, Lea County, New Mexico, for a period of two years.

Case No. 2945

BEFORE: Daniel S. Nutter, Examiner.

TRANSCRIPT OF HEARING

MR. NUTTER: We will call next Case 2945.

MR. DURRETT: In the matter of Case No. 2945 being reopened pursuant to the provisions of Order No. R-2623, which order established 640-acre spacing units for the Antelope Ridge-Devonian Gas Pool, Lea County, New Mexico, for a period of two years.

MR. MORRIS: If the Examiner please, I'm Richard Morris of Seth, Montgomery, Federici and Andrews, Santa Fe, New Mexico, appearing for Shell Oil Company in reopened Case No. 2945. Shell Oil Company was the original applicant in the case.

MR. NUTTER: Mr. Morris, it's twenty minutes to 12:00. How long do you think this case wil take, till approximately 12:00 o'clock?

MR. MORRIS: Yes.

(Whereupon, Exhibits R-1 through R-4 were marked for identification.)

RICHARD SEBA

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

DIRECT EXAMINATION

BY MR. MORRIS:

Q Will you please state your name?

A My name is Richard D. Seba, from Midland, Texas.

MR. MORRIS: Would the record show that Mr. Seba previously was sworn in reopened Case 3246 and is still under oath?

MR. NUTTER: The record shows he's under oath.

Q (By Mr. Morris) What is your position, Mr. Seba?

A I'm the Division Reservoir Engineer for the Western Division of Shell Oil Company in Midland.

Q And you have previously testified before the Commission or one of its examiners and had your qualifications made a matter of record?

A Yes, I have.

Q Are you familiar with the development operation and characteristics of the Antelope Ridge-Devonian Gas Pool?

A Yes, I am.

Q You were not the witness in the original hearing of this case before the Commission?

A No, I was not.

Q But you have made yourself familiar with the exhibits and testimony presented at that hearing?

A Yes, I have.

Q Would you refer to what has been marked Exhibit R-1 and state what that exhibit is and point up the additional development and information that has been obtained since the original hearing in this case?

A This exhibit is a structure map on the top of the Devonian in the area of the Antelope Ridge-Devonian field. This exhibit is basically the same exhibit that was presented in the original case, however, since that time there has been one additional well drilled, Well No. 3, which is shown on this map. Well No. 3 did not alter the contour lines that appear on this map so the contours are unaltered from the original exhibit.

The exhibit also shows the gas-water contact and the unit outline, the unit covering the six sections, being Sections 27, 28, 33 and 34 in Range 34 East, and Sections 3 and 4 in the township south of that.

Q The plat also shows that Well No. 2 has become a dual completion. In what formation has it been dualed?

A It is a dual completion in the Devonian and the Pennsylvanian formation. The Pennsylvanian formation in this area is also gas-productive.

Q Just as a sidelight, Mr. Seba, are there other Pennsylvanian wells in this area?

A There is one additional Pennsylvanian well that is a twin well to the No. 2. Actually there are two separate productive members in the Pennsylvanian, one being produced in the dual completion in Well No. 2 and the other being a single zone completion in the Well No. 4, which is not shown

on the map.

Q Where is that Well No. 4?

A Well No. 4 is southwest of the Well No. 2. I don't know the exact footage, but it's a twin well to that and very close nearby.

Q One of those Pennsylvanian wells is the Atoka and one is the Morrow, is that correct?

A Yes.

Q Now, Wells 1 and 2 in the Devonian were already drilled and completed at the time of the original hearing in this case?

A That is correct.

Q And Well No. 3 has been the only additional well drilled in the interim?

A That is correct, and these are the only three wells in the entire field.

Q Would you refer next to Exhibit R-2 entitled your "Reservoir and Well Completion Data," and point out the features of that exhibit?

A This is a tabulation of the well completion data and reservoir data and is presented as a supplement to a similar exhibit which was presented at the previous hearing. As stated, Unit No. 3 was drilled since the original hearing, so the only additional data presented on this exhibit is the

data presented for the Unit No. 3. However, there is one additional item of data and that is that Well No. 2 was repotentialed and the calculated open flow potential for that well is as appears, 16.35 million cubic feet per day, whereas it was previously potentialed for 11 million cubic feet per day.

I might point out that the calculated open flow potentials for the wells range from the low of 16.35 in Unit No. 2 to a high of 41 million cubic feet per day for Well No. 1. The liquid content of this gas is approximately 20 barrels per million and the condensate has a gravity of approximately 62 degrees API.

I would also draw your attention to the reservoir data which indicates that the reservoir has a porosity of about five and a half percent, a permeability of four and a half millidarcies, water saturation of thirty-three percent and average net pay of 127 feet; the reservoir temperature is 217 degrees Fahrenheit. The original reservoir pressure was 6375 psia.

I would like to add some additional information with regard to the gas. That is, that the Devonian gas is a sour gas, having 225 grains per hundred standard cubic feet. There is an additional liquid recovered by the plant amounting to one, to 1.25 gallons per thousand, and the plant residue

gas has a BTU content of 114 BTU per thousand.

Q The grains that you mentioned were grains of hydrogen sulphate?

A Grains of hydrogen sulphate per 100 cubic standard feet.

Q Referring next to Exhibit R-3 showing economics for the 160, 320 and 640-acre spacing. Would you explain how these figures differ from those presented at the original hearing of the case?

A This, too, is similar to an exhibit presented in the original case. However, some changes have occurred in both the economic and reservoir data such that certain changes were made in this exhibit. The first change was the price of the gas, it was originally estimated that the average price over the life of the contract would be $187.50 per million cubic feet whereas our current contract is estimated to yield only $162.675 cents per million, thus yielding a lower net income after royalty and taxes which currently is estimated to be $161.442.

The well costs were the same in the Well No. 3 as for the two previous wells drilled. Additional reservoir data has indicated that our reserves are higher than were originally estimated. We estimate now that the reserves are 7,750 MCF per 160 acres, whereas before it was 5,500 and the 320 and

640 multiples of this, thus we now estimate that the reserves for 640 acres would be 31 billion cubic feet whereas previously we estimated that it was only 22 billion cubic feet. These changes, then, have caused a change in the income over the life of the project as stated in the exhibit. We estimate the income for 160-acre spacing to be $1,251,000, whereas we previously estimated it to be $1,030,000.

320-acre spacing would yield $2,502,000, whereas previously it was estimated to be $2,060,000; and 640-acre spacing would yield an income of $5,005,000, whereas before it was estimated to be $4,120,000.

These income, less direct operating cost and overhead which does include amortization of a gas sweetening plant, less federal taxes, yields a profit now estimated to be $246,000 for 160 acres, $1,006,000 for 320 acres, and $2,525,000 for 640 acres. I have reduced the profit to an average annual percent profit for each of the cases, which indicates that 160-acre spacing would yield only 1.6% average annual percent profit, whereas 320 acres would yield 6.7% and 640 acres would yield 16.8%.

I have used the economic criteria of annual average percent profit in that due to contract commitments the productive history will be essentially a flat life over the 20-year period rather than declining, recognizing that there

will be some decline at the end of the period due to deliverability, but over the majority of the life of the project it will be flat life at gas contract rates.

It is our opinion that we could not afford to accept 6.7% or 1.6% average annual profit and, therefore, I could not justify to my management to drill on anything less than 640 acres; therefore, we feel that the economics dictate 640-acre spacing in this field.

Q Mr. Seba, in your opinion what size proration unit should be established on a permanent basis in this field in order to efficiently and economically drain and develop this field?

A It is my opinion that the permanent field rules for the Antelope Ridge-Devonian field should contain 640-acre spacing. I would like to offer in evidence Exhibit No. R-4, which is a plot of pressure divided by the compressibility versus cumulative gas production. I show three points on here but have drawn a line through the latter two points, which then can be extrapolated to indicate the reserves for this well.

I have neglected point No. 1 in that the production from the field during the time that the first point and the second point were determined there were only two wells producing from the field part of the time and three the rest of the time.

An extrapolation of these two points indicates that the reserves for this Unit No. 1 well would be approximately 88 billion cubic feet; volumetric calculations of the reservoir associated with 640 acres around the Unit No. 1 well would indicate only 31 billion cubic feet. Therefore, we offer this as evidence that one well will drain at least 640 acres and possibly more.

Therefore, one well on 640 acres will effectively and efficiently drain the reservoir, and since the area is unitized we feel that correlative rights are also protected in this manner since the takes from the field are determined by field reserves by the gas contract. Additional drilling in this field would not contribute to additional daily takes, but each well would then be only allowed to produce a smaller portion of the total take from the field. Therefore, additional wells would lead to excessive waste and drilling costs.

Q Do you have a recommendation concerning the field rules that up to this point have been adopted only on a temporary basis?

A Yes. We would recommend that the temporary rules, as written, should be made permanent and are prepared to accept those rules on a permanent basis; particularly we believe that 640-acre spacing will prevent waste and protect the correlative rights of those operators in this field.

Q Were Exhibits R-1 through R-4 prepared by you or under your direction?

A Yes, they were.

MR. MORRIS: We offer Exhibits R-1 through R-4 into evidence.

MR. NUTTER: Shell's Exhibits R-1 through R-4 will be admitted in evidence.

(Whereupon, Shell's Exhibits R-1 through R-4 were offered and admitted in evidence.)

MR. MORRIS: That's all we have.

CROSS EXAMINATION

BY MR. NUTTER:

Q You state that the contract states that the takes be based on a relationship to reserves. Now, the extrapolation of your curve shows 88 billion cubic feet reserves. The volumetric shows 31 billion, when you have such a wide discrepancy as this, what are the takes based on, which set of the reserves?

A The takes from the field are based on the reserves for the entire field. The reserves quoted here are only for 640 acres. However, the total acreage in the unit is four sections. So that actually each well has 1280 acres allocated to it.

Q Is the entire unit regarded as productive and

containing reserves?

A There is some in the northwest section, you can see it's cut off by the oil-water contact that is not -- but we calculate the total reserves for the unit area and then our take from the three wells combined is determined by the total reserves for the field and the takes from individual wells are immaterial. The production will be produced from the wells as a whole rather than from any well individually.

Q Who is the purchaser here?

A Southern Union Gas Company. The gas goes into intra-state.

Q What is the average take per day from the three wells?

A Currently the minimum rate is 30 million cubic feet per day and I think that the takes are in excess of that, ranging around 40 million cubic feet per day.

Q 30 or 40 per day for the three wells?

A Yes. The contract states that the reserves are higher than this and we have additional time to commit these reserves to the gas contract.

Q Do you have anything to offer to show that one well will drain 640 acres other than the extrapolation of the pressure decline curve?

A No. Performance data is the best evidence that we have. We also feel that the permeability of this formation,

even though it is very low of four and a half millidarcies, is sufficient to drain more than 160 acres.

Q When was Well No. 3 completed?

A Well No. 3 was completed in September of 1964.

Q Well No. 1 was completed in August of '62?

A That's right.

Q And Well No. 2 in the south was completed in September of '63?

A That is correct.

Q What was the pressure and how did it compare with the other two wells when Well No. 3 was initially drilled?

A The bulk of the production has occurred this year. I don't know the exact date that we started delivering gas, but it has all been very recently so there was not too much production from the reservoir before 3 was drilled, but there was some. I don't have the original pressure in No. 3 with me at the present time.

Q I don't know if I am reading these dates on this pressure decline curve correctly or not, but is that second point 5-10-65?

A Yes, 5-10-65 and 12-6-65.

Q Do you recall what the other point --

A The other point was shortly after the original completion, so I would imagine that it was shortly after

August of '62.

Q I see.

A However, as I stated before, the production from this reservoir did not commence until some time after that.

Q Now, the takes when No. 3 was completed have been relatively small?

A Yes.

Q So no comparison of pressures would show anything?

A No, sir.

MR. NUTTER: Are there any other questions of Mr. Seba? 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 2945?

MR. DURRETT: We have a telegram from Continental Oil Company supporting Shell in this case.

MR. NUTTER: If there's nothing further in Case 2945 we will take the case under advisement and recess the hearing until 1:30.

I N D E X

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 Hearing 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 22nd day of January, 1966.

Ada Dearnley
NOTARY PUBLIC

My Commission Expires:

June 19, 1967.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 1945 heard by me on 1-5 1966.

New Mexico Oil Conservation Commission

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
December 4, 1963

EXAMINER HEARING

IN THE MATTER OF:
Application of Shell Oil Company for the creation of a Devonian Gas Pool and for special pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the creation of a new Devonian gas pool for its Harris-Federal Well No. 1 located in Section 27, Township 23 South, Range 34 East, Lea County, New Mexico, said pool to comprise all of Sections 27, 28, 33 and 34, Township 23 South, Range 34 East, and all of Sections 3 and 4, Township 24 South, Range 34 East.

Case No. 2945

BEFORE: Elvis A. Utz, Examiner

TRANSCRIPT OF HEARING

NEW MEXICO OIL CONSERVATION COMMISSION

EXAMINER HEARING

SANTA FE, NEW MEXICO

REGISTER

HEARING DATE DECEMBER 4, 1963 TIME: 9 A.M.

NAME:	REPRESENTING:	LOCATION:
[illegible]	[illegible]	[illegible]
[illegible]	Shell	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Hobbs
[illegible]	[illegible]	[illegible]
[illegible]	Sunray DX	[illegible]
[illegible]	Sunray DX	[illegible]
[illegible]	Atlantic	[illegible]
[illegible]	Atlantic	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	U S & S.	[illegible]
[illegible]	"	[illegible]
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[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

NEW MEXICO OIL CONSERVATION COMMISSION

EXAMINER HEARING

SANTA FE, NEW MEXICO

REGISTER

HEARING DATE DECEMBER 4, 1963 TIME: 9 A.M.

NAME:	REPRESENTING:	LOCATION:
[illegible]	[illegible]	[illegible]
[illegible]		Roswell
Jason Kellahin	Kellahin & Fox	Santa Fe
E. V. Shine	Sunray D-X	Midland
E. A. Riley	Ambassador Oil	Ft. Worth, Tex
[illegible]	[illegible]	[illegible]

MR. UTZ: The hearing will come to order, please. The first case on the docket will be Case 2945.

MR. DURRETT: Application of Shell Oil Company for the creation of a Devonian Gas Pool and for special pool rules, Lea County, New Mexico.

MR. MORRIS: If the Examiner please, I'm Richard Morris of Seth, Montgomery, Federici, and Andrews, Santa Fe, appearing on behalf of the Applicant, Shell Oil Company. We will have one witness, Mr. Dana Stokes.

(Witness sworn.)

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

(Whereupon, Applicant's Exhibits Nos. 1 through 6 marked for identification.)

D. D. STOKES

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

DIRECT EXAMINATION

BY MR. MORRIS:

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

A D. D. Stokes, Staff Reservoir Engineer for Shell Oil Company, Roswell, New Mexico.

Q Mr. Stokes, have you previously testified before the Oil Conservation Commission or one of its examiners?

A Yes, I have.

Q Are you familiar with the application of Shell Oil

Company in Case 2943?

A Yes, sir.

Q What is the purpose of Shell's application in this case, Mr. Stokes?

A We're making application for the establishment of a Devonian Gas Pool to be called the Antelope Ridge Devonian Gas Pool, and for special field rules for production from this pool. We're also requesting establishment of horizontal limits for the pool which are to consist of Sections 27, 28, 33, and 34 of Township 23 South, Range 34 East, and Sections 3 and 4, Township 24 South, Range 34 East.

Q What are the pertinent features, briefly, of the special rules that you intend to request, Mr. Stokes?

A Well, we intend to ask for 640-acre spacing and for well locations no nearer than 660 feet to the outer boundary of the interior quarter quarter sections. This, in effect, in a standard section would be no closer than 1980 feet to the outer boundaries of the section.

Q Do you have a plat of the area of the proposed pool?

A Yes. Exhibit 1 is a plat of the area. It shows the Antelope Ridge Unit outlined in red. We have two wells completed in the unit, the 1, the Harris Federal No. 1 Devonian completion located in Section 27. In Section 4 we have the Federal BE No. 1, which is a Morrow completion. This well is drilled to the Ellenburger and subsequently completed to the Morrow. We do

have a commercial zone in the Devonian but have not as yet completed the well in the Devonian. Both of these wells are shut in at the present time for lack of market.

Q Does this plat also show your structural interpretation of the Devonian formation in this area?

A Yes. The contours shown on the plat are on the top of the Devonian, and the data here is based on the well control furnished by the two wells, on seismic data, and on dipmeter data in Harris Federal No. 1. These data show the dip to the south, north, east, and west, with a gas-water contact at 11,450 feet subsea defining the productive limits of the pool on the north, east and south flanks, and a fault indicated by seismic data along the west edge of the unit boundary. Our water level has been proved by production and drill stem test data in the Federal BE No. 1. We recovered both gas and water on drill stem test from an interval that overlapped this 11,450 subsea.

We feel that our seismic fault on the west side of the structure is confirmed by differences in pressures and fluid content in wells in the Bell Lake Unit to the west. The pressure in the Bell Lake Unit at the time of our completion of Harris Federal No. 1 was approximately 6100 pounds, while the pressure in the Harris Federal No. 1 was 6360 pounds.

The Bell Lake Unit wells produced dry gas while both wells in the Antelope Ridge Unit have produced condensate of more than twenty barrels per million.

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Q Now the Bell Lake Unit that you've referred to, does that adjoin the Antelope Ridge Unit immediately on the west?

A Yes. It's a common boundary between the Antelope Ridge Unit and the Bell Lake Unit along the west boundary of the Antelope Ridge Unit.

Q You feel from the information that you have that there is geological separation between those two areas?

A Yes, seismic data indicate the fault to be present and that this is to a large extent confirmed by the difference in fluid content of the gas produced from the two reservoirs.

Q Refer now, Mr. Stokes, to what has been marked as Exhibit No. 2, and state what it is and what it shows.

A Exhibit 2 is a cross section along the crest of the Antelope Ridge structure trending from southwest to northeast. It shows our interpretation of the Devonian gas column with a dip indicated by seismic and dipmeter data to the northeast and southwest.

Q This is along the line A-A' as shown on Exhibit No. 1?

A That is correct. This cross section also has the drill stem test and production data on the two wells that have penetrated the Devonian to date. The test data shown on the Federal BE No. 1, drill stem test No. 4, which overlapped the gas-water contact, recovered both gas and water, while production test which is labeled No. 11, with the top perforations just below the gas-water contact, recovered only water.

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This Federal BE No. 1 is presently completed on the interval noted 12 on this cross section, which is a Morrow formation. We intend to dual this well in the Devonian. However, the pressure in the Morrow is so much higher than the Devonian pressure that we feel that we can't complete it until we have depleted the Morrow zone and the pressures are more nearly equivalent.

Q Do you have a tabulation showing the well tests and reservoir data for the Devonian formation in these two wells that have been completed so far in this unit?

A Yes, sir, I have a completion test on the Harris-Federal No. 1 and drill stem test of the Devonian interval on the Federal BE No. 1. On the Harris-Federal No. 1 we had a calculated open flow potential from the Devonian of 41 million cubic feet per day after treatment with 2,000 gallons of acid. Prior to the treatment we had a drill stem test on this same interval which showed calculated open flow potential of 10 million cubic feet per day.

On the Federal BE No. 1, we have a drill stem test with a CAOF of 11 million cubic feet per day without treatment. We're confident with a small acid treatment on the completion of Federal BE No. 1, we'll have a potential at least equal to that of Harris-Federal No. 1.

You'll see that the condensate recovery was 1.5 million barrels cubic feet of gas more in the Harris-Federal than the Federal BE No. 1. Condensate and gas gravities are comparable.

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We also have tabulated on this exhibit the reservoir properties, which have been determined from log analysis and botton hole pressure measurements. From log analysis we have determined an average porosity of 5.0 per cent, water saturation of 35 per cent, average net pay of 100 feet. From bottom hole pressure data we have found an original reservoir pressure of 6375 pounds per square inch absolute, and have calculated the permeability of 4.5 millidarcies from the slope of the pressure build-up curve.

Q This information that you have been giving is reflected on what has been marked as Exhibit No. 3 in this case?

A That's correct.

Q Referring now to what has been marked as Exhibit No. 4, is that the pressure build-up curve that you just referred to?

A Yes. This is a graphical presentation of the pressure build-up data with the pressures plotted versus dimensionless shut-in time, which would be "t" over "delta t" plus 1, where "t" is your producing time and "delta t" is your incremental shut-in time. Each of the pressure points is plotted in a straight line portion of the curve, is then extrapolated to infinite shut-in time which is equivalent to "t" over "delta t" plus 1 over 1. This gives the pressure to which the reservoir would build if you were able to leave the well shut-in for an infinite length of time. The slope of the build-up curve is also related to permeability through the equation shown below the curve on Exhibit 4. From the production data during the flowing period prior to shut-in, and the slope of

the build-up curve, we've calculated 331 millidarcy feet of permeability; and using the 74 feet of pay which we find in the Harris-Federal No. 1, gives an average permeability of 4.5 millidarcies.

Q What conclusions can you draw from the mere fact that you believe you have 4.5 millidarcies of permeability in this reservoir, Mr. Stokes?

A We feel that this permeability is adequate for gas production to drain more than 640 acres, particularly where you have a large section of pay. We feel that while this indicates the well can drain more than 640 acres, we have no production data to back this up. For that reason we are requesting temporary field rules at the present time. We feel that we can prove drainage when we have sufficient production data to base our calculations on.

Q Refer now to what has been marked Exhibit No. 5, Mr. Stokes, which appears to be an economic analysis on 160, 320, and 640-acre spacing in this pool.

A Item No. 1 on Exhibit 5 shows the cost and income data. We expect an income after royalty and taxes of $186.50 per million cubic feet of gas. This includes the condensate income. We show a well cost of $750,000. This well cost is the minimum that we anticipate. We've drilled two wells, one of which cost around $750,000, the other one cost $1,200,000. I believe the experience with the Devonian in this general area has been that the average well cost runs more than a million dollars.

The next three items, 2, 3, and 4, show the economics on 160, 320, and 640-acre spacing. On the 160 it shows reserves of 5.5 billion cubic feet, a life of 20 years based on our gas sales contract which would yield an income over life of $1,030,000. Our direct operating costs and overhead and amortization of a gas sweetening plant would amount to $103,000 over the life. The Federal income tax is $73,000, leaving a profit of $104,000 or profit to investment ratio of .14 and a rate of return of approximately one percent.

On 320-acre spacing the picture is improved somewhat. We have a profit to investment ratio of .96 and a rate of return of 7 percent, neither of which are satisfactory in a risk venture of this type.

On 640-acre spacing we show a profit to investment ratio of 2.6 and a rate of return of 17 percent. These are approaching more satisfactory factors. However, 17 percent rate of return on a risk venture is still not outstanding when you consider that the average for all manufacturing industries is around 16 percent and these industries have no risk.

Q Would you care to draw some conclusions from the exhibits and the data that you've presented to this point, Mr. Stokes?

A It's my opinion that the data presented show that the permeability in this formation is sufficient to effectively drain 640 acres, and that development on 160 or 320 is not economically feasible. I also believe that the well control, the seismic and

dipmeter data provide sufficient information for us to establish initial pool limits as proposed. I would recommend that the Commission formulate field rules for the Antelope Ridge Devonian Gas Pool along the lines of those suggested in Exhibit 6.

Q Referring to Exhibit 6 that you have just mentioned, are these the proposed field rules that Shell requests be adopted in this pool?

A Yes, these are the rules that we propose. These rules are based primarily on the rules for prorated gas pools in Southeastern New Mexico, which were set forth in Order R-1670. We have set them up on this basis so that in the event of future prorationing in this field, the rules would be fairly well in line with the standard rules. They're also quite similar to rules that have been adopted temporarily for the Lusk-Morrow Gas Pool in Order No. R-2373.

Q Would you go through these rules and hit the high point of each rule?

A Rule 1 is a standard provision that each well completed or recompleted in the Devonian formation within one mile of the boundary of this pool will be drilled, spaced, and produced in accordance with the rules hereinafter set forth.

Rule 2 provides that each well shall be located in a standard proration unit of 640 acres, and provides that 632 through 648 acres would constitute a standard unit. Rule 2 also provides for administrative approval of smaller units, providing there's

no objection from offset operators. Another provision of Rule 2 is that the acreage factor assigned to any such nonstandard unit shall bear the same ratio to the standard acreage factor in the Antelope Ridge Devonian Gas Pool as the acreage in such non-standard unit bears to 640 acres.

Rule 3 provides for the well location, provides that any well drilled or recompleted in the Antelope Ridge Devonian Gas Pool shall be located within and not closer than 660 feet to the outer boundary of the Southwest Quarter of the Northeast Quarter, the Northwest Quarter of the Southeast Quarter, Northeast Quarter of the Southwest Quarter, or Southeast Quarter of the Northwest Quarter of the section.

Q Does that language, Mr. Stokes, come pretty directly from the order in the Lusk-Morrow Pool?

A Yes, it does. I believe the Lusk Morrow Pool provides 330 feet and we've asked for 660. In a standard section that would mean that you could not drain closer than 1980 feet from the outer boundary. This section also provides that any well drilling to or which has penetrated the Devonian formation on the date of this order is hereby granted an exception.

Section (b) of Rule 3 provides for the acreage that may be assigned to any well which is not drilled within the standard location provided, or which has not been granted an exception by the provisions of Rule 3 (a). It provides that a location 660 and 660 from the section be given only a maximum of 680 acres, and a

well drilled 660 and 1980 would be given a maximum of 320 acres.

Q This follows pretty near in line with the R-1670 for the prorated gas pools?

A Yes, taken directly from that. It also provides that the acreage factor assigned to such well shall bear the same ratio to the standard acreage factor as the acreage assigned bears to 640 acres.

Rule 4 provides that in the event of subsequent prorationing of the Antelope Ridge Devonian Gas Pool, the allowable assigned to a nonmarginal well shall be in the same ratio that its acreage factor bears to the total of the acreage factors for all nonmarginal wells in the pool.

Rule 5 provides that the vertical limits of the Antelope Ridge Devonian Gas Pool shall be the Devonian formation.

Q You stated earlier in your testimony that you were only seeking temporary rules at this time because you had no production data from the two wells in this pool. What would be your suggestion as to the duration of these temporary rules?

A We request that temporary rules be granted for a period of two years. Our reason for that, we are not at the present time selling gas, and we expect to start selling around the first of the year. However, the take at that time will be very small. According to the terms of our contract, we should go on full production at 1-1-65, so the two-year term on these temporary rules would give us one year of full production under our gas contract.

Q Would you care to make any final conclusions or give any final opinions concerning Shell's application in this case?

A Well, we feel that the request for temporary field rules is justified, that the permeability indicated by our pressure build-up test shows that a well should drain 640 acres. We feel that production tests will confirm this. We think that the wider spacing is necessary in this case because of the high risk and costs associated with deep drilling in the Delaware Basin. On our Harris-Federal No. 1, we had two blowouts and two fishing jobs. I believe several of the wells in the general vicinity have lost rigs and costs have been excessive.

Q Do you have anything further to add to your testimony?

A No, that's all.

Q Were Exhibits 1 through 6 prepared by you or under your direction?

A Yes, sir.

MR. MORRIS: We offer Shell's Exhibits 1 through 6, and that completes the direct examination of Mr. Stokes.

MR. UTZ: Without objection the Exhibits 1 through 6 will be entered into the record of this case.

(Whereupon, Applicant's Exhibits Nos. 1 through 6 received in evidence.)

CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Stokes, what is the pay of the Devonian in each of

your wells?

A In our Harris Federal No. 1, we have 74 feet of net pay. In the Federal BE No. 1, 173 feet. Our seismic isopac over the structure when plenimetered yields an average pay thickness of 100 feet.

Q You also have a Morrow pay in this area?

A Yes.

Q Are there any other pays that you know of at this time?

A There's another pay within the Morrow in the Federal BE No. 1 which has not been perforated. We have drill stem test data on this pay. It would be within the Morrow section, though, and I think if we were to apply for field designation on this we would include it in the total Morrow interval.

Q Your economics that you have on your Exhibit No. 5 include only Devonian economics and do not consider any other pays in the area?

A Yes, that is correct.

Q This would be an economic consideration for one well bore, would it not?

A Yes, sir, that's correct.

Q So actually your Exhibit No. 5 shows the picture somewhat worse than it actually is, considering other pays?

A Well, in our Harris-Federal No. 1, we had no pays that we considered commercial except the Devonian. We cannot dual that well. In the Federal BE No. 1, the preasure in the Morrow is

nearly 9,000 pounds and the pressure in the Devonian is only 6400 pounds, and with this higher pressure on top we can't possibly dual this well at the present time. Whether or not we'll be able to subsequently we can't say, but we certainly can't take into account an economic value for it until we are able to complete it.

Q There's no question in your mind but what you will complete wells in the Morrow and produce them?

A Yes, but they may not be in the same well bore as a Devonian well.

Q I see. What is the location of your BE No. 1?

A It's 660 from the North line and 1650 from the East line of the section.

Q Do you or your company anticipate 640-acre spacing in this unit when you drill these wells?

A At the depth that we expect to find production here, we would also consider a request for 640-acre spacing.

Q Then I'm wondering why you didn't drill a little further inside the section lines.

A Well, we drilled Harris-Federal No. 1 as the discovery well in this field. We drilled it at what we thought to be the best structural position. Following the completion of that well, we ran other seismic lines which indicated some shift of the structure to the south. Federal BE No. 1 was drilled on this same basis, to further prove the direction of the axis of this structure. We felt that during the proving and confirmation phase, you might

say, of development of this field, that we should drill our wells at the optimum structural position. I think we found the optimum in these two wells.

Q And you are asking for six sections in this pool, are you not?

A Yes, sir.

Q Does that coincide with the boundaries of the Antelope Unit?

A Yes, sir, they are the same.

Q You would have six standard units, and we already have two wells and two nonstandard locations?

A Yes, sir.

Q In your opinion, do you think all six sections are proved to be productive of gas in the Devonian reservoir?

A Yes, sir.

Q Your Exhibit No. 1 would indicate that Section 28 and part of Section 33 would be outside the fault line.

A Yes, a small part of Section 28 and an even smaller part of Section 33. However, if we were -- or when we drill in either of these sections, our well locations will be such that I believe the productive area of the section will be proved. Any subsequent wells we drill will be covered by these field rules and in order to obtain 640-acre allocation, we would have to drill them within the interior quarter-quarter section.

Q In other words, if you drill Section 29, you'll drill

say, of development of this field, that we should drill our wells at the optimum structural position. I think we found the optimum in these two wells.

Q And you are asking for six sections in this pool, are you not?

A Yes, sir.

Q Does that coincide with the boundaries of the Antelope Unit?

A Yes, sir, they are the same.

Q You would have six standard units, and we already have two wells and two nonstandard locations?

A Yes, sir.

Q In your opinion, do you think all six sections are proved to be productive of gas in the Devonian reservoir?

A Yes, sir.

Q Your Exhibit No. 1 would indicate that Section 28 and part of Section 33 would be outside the fault line.

A Yes, a small part of Section 28 and an even smaller part of Section 33. However, if we were -- or when we drill in either of these sections, our well locations will be such that I believe the productive area of the section will be proved. Any subsequent wells we drill will be covered by these field rules and in order to obtain 640-acre allocation, we would have to drill them within the interior quarter-quarter section.

Q In other words, if you drill Section 29, you'll drill

1980 from the South and East lines, will you not?

A Yes.

Q Actually your water-oil contact as you have it now, or water-gas contact, cuts right through the middle of Section 28, does it not?

A Yes.

Q You might have a productive well but in your opinion would you have 640 acres productive in your Section 28?

A Not on the basis of the information we have available at present, no, sir.

Q In the event of prorationing then you'd be, if you assign 640 acres to the well, you'd be receiving an allowable in excess of the reserves under the tract, would you not?

A If we can be that confident of our exact location of all these things, yes. I think that's the purpose of requiring that the well be drilled close to the center of the section is to prove the maximum amount of acreage in the section.

Q Would you say that your anticipated location of the gas-water contact now is pessimistic or optimistic?

A I think it's as realistic as we can make it, and I don't believe it's shaded in either direction. The location on this north flank is confirmed by seismic and dipmeter run in the Federal No. 1. Both of these indicated the same amount of dip to the north and east.

Q What is the advantage of requesting six full sections

for the pool at the present time on the basis of two wells?

A Well, this would make the pool limits conform with our request to the U.S.G.S. for participating in the area in these six sections. I think that the data we have available show that these sections are productive.

Q You expect to include all six sections in the participating area then?

A Yes, sir.

Q On your Exhibit No. 6 in Rule 4, you have presented no reserve data here except in the form of economics on your Exhibit No. 5 on which to base an equitable proration formula, have you?

A No, sir, other than the fact that under Order 1670, I believe it is, the standard for prorated fields in Southeastern New Mexico is straight acreage. This would fall right in line with straight acreage allocation.

Q You are aware of the Jalmat decision, are you not?

A The latest one that I was aware of put it back on straight acreage.

Q Would you have any objection to the deletion of Rule 4 until such time as we had reserve data on which to base a formula?

A Well, of course, from our interpretation it would be much to our advantage for allocation of production to be based on reserves, since the thickest part of the pool lies within our acreage.

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MR. MORRIS: If I might interrupt, Mr. Examiner, we're not suggesting at the present time that the pool be prorated, and I believe Mr. Stokes' comments are possibly a little premature in that these are matters that would not be considered until such time as the pool was to be prorated.

MR. UTZ: Well, but you are suggesting a proration formula.

MR. MORRIS: I think he is indicating his preliminary thinking in this regard.

Q (By Mr. Utz) Do you believe that this is a water drive?

A There's a good chance that it's a potential water drive. However, the wells in the Bell Lake Unit adjacent have shown pressure drop with the limited amount of production they have, so that the water movement in the Devonian here certainly is as extensive as it is in the pools to the north. We would expect some water movement; however, certainly not 100 percent effective water drive.

Q Do you then believe that the rate of production per well would be important in producing this pool?

A If the well were completed with perforations close to the gas-water contact, I believe that rate could have an effect; otherwise, I don't believe so.

MR. UTZ: Are there other questions of the witness?

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

MR. UTZ: Mr. Durrett.

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MR. DURRETT: The first question I would like to ask Mr. Morris. Your client would not necessarily have any objection to the Commission's not adopting this proposed Rule 4 if it should feel that it would be more proper to take up this matter at a later date of prorating the pool, if it's prorated?

MR. MORRIS: I wouldn't think so. However, I would have to check with my client to be sure.

MR. DURRETT: Would you check with them and ask them if they feel that they have to adopt the Rule 4, that that wouldn't mean if we don't feel so that we should deny the application or that we should consider Rule 4, if we feel it should be undertaken at this time.

MR. MORRIS: I might say that the Commission is certainly within its rights in adopting whatever pool rules it deems appropriate in this pool. Shell has made its suggestions, but I'm sure that they wouldn't stand upon any particular provision of it. In that regard, if the Commission felt that Rule 4 should be deleted, we would suggest that it be deleted.

MR. DURRETT: Thank you.

BY MR. DURRETT:

Q Now, Mr. Stokes, will you give me the permeability again that you testified to on direct examination that you feel is in this area?

A 4.5 millidarcies.

Q And I believe you stated that that in your opinion

would be sufficient to establish that you could drain 640 acres with one well?

A Yes, sir, particularly where the thickness of the pay is sufficient to maintain a commercial rate with that permeability; the two go together.

Q What would you feel would be the minimum thickness of pay and permeability that could drain 640 acres, as an engineer?

A I don't believe I could give you that figure directly. I would have to make some calculations and I don't have the data available to make them. I would say that when you fall below a tenth of a millidarcy, a rock, we discard any rock below that as being pay. The depth would enter into it, the amount of pressure available and so on.

Q Let me ask this question. I'm not looking for a real specific answer, I'm looking for a more general answer. From your professional standpoint, do you feel that 4.5 millidarcies is approaching the minimum, or do you feel that that fairly well establishes that you can drain 640, or do you think it definitely establishes it from what you know at this time?

A Well, I have seen reservoirs with equivalent pay and equivalent porosity and permeability which have drained more than 640 acres, so I would say it's within the range of satisfactory drainage.

Q Have you seen reservoirs with equivalent permeability and thickness of pay that would not drain 640 acres?

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A No, sir.

Q Not in your experience as of this date?

A That's correct.

Q Referring to your Exhibit No. 5, which is your economics, I'm interested a little bit in the Federal income taxes that you have in your various explanations of the spacing.

A Yes.

Q In computing this or these tax figures, did you consider your deduction for amortization of this gasoline plant?

A Yes.

Q Was the normal depletion allowance computed and figured on that?

A Either depletion or fifty percent of net, whichever fit the case for the particular year.

Q Depletion or fifty percent of the net?

A Yes, sir.

Q Do I understand correctly that neither of these wells is connected at the moment?

A That's correct.

Q Then would you have any objection to this proposition? I believe you stated on direct that you would like obviously rules because you felt it would take you about a year to get a connection?

A No, sir, we expect to have our connection by the first of this coming year. However, our contract calls for a very low

rate during this first year. We won't go on the full production rate until 1-1-65, so that I believe we'll be producing around five million a day during 1964 and then our rate of production increases at 1-1-65. We feel that we need more sustained production than five million a day would give us in order to prove drainage of more than 640 acres.

Q I missed you a little bit on the first. When do you say that you are going to get your connection?

A We expect by the first of 1964.

Q First of this coming year?

A Yes, sir.

Q And you don't think that the one-year period of time from that date would be adequate?

A No, sir, because of the reduced rate during that period.

Q Would it be possible to come up with any reservoir information within a one-year period of time?

A No, sir. We have one other problem here. The Devonian gas is sour and requires treating before it can be sold. We don't have our treating plant in operation yet. So during the first portion of our gas sales out there, we'll be selling only from the Morrow and the information obtained from the Morrow certainly would be of no help.

Q Well, we are arriving at this situation that if the Commission cannot issue a two-year order that it should not issue 640. In other words, if you feel it is of no avail to issue

a one-year order and the Commission would not issue a two-year order, it would seem to me that the alternative would be to issue no order.

A If we are not given an order, I don't think we could prove, when the rehearing is held, that we could drain 640 acres. We would have to ask for a year's extension in order to gain enough production history to provide the production data.

MR. DURRETT: That's all I have.

BY MR. UTZ:

Q The initial production out of this unit will be from the Morrow?

A Yes.

Q And you won't produce the Devonian until such time as you get a treating plant installed?

A Yes.

Q When do you anticipate that to be?

A They're working on it now; I would say probably the plant should be completed by March or April.

Q Even after the treating plant is in, you don't feel a year's production from the Devonian would be enough to show anything?

A No, sir, if we allocate the production evenly between these two wells, that would be two and a half million a day for three-fourths of a year. I believe from a reservoir this large we would require more production than that in order to drop the

pressure a sufficient amount to show drainage.

Q Who is your contract with?

A Southern Union.

Q Southern Union Gas?

A Yes, sir.

MR. UTZ: Are there other questions?

MR. MORRIS: Might I make one comment, Mr. Examiner? We have referred here today to the order that was entered in the Lusk-Morrow Gas Pool. That order is an eighteen-month temporary order. If the Commission should not see fit to grant a two-year temporary order in this case but if it should see fit to grant an eighteen-month order, I'm sure that Shell would take a close look at all of the production history that it would have at that point and attempt to make the best showing possible.

It might be, as Mr. Stokes has pointed out, that we would just have to say that we needed a little more time in order to have something definite, but at least at the end of the eighteen-month period we would, I am sure, be more than willing to evaluate the situation at that point to see what production history we've had and what it might show.

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

(Witness excused.)

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

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 Hearing 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 11th day of December, 1963.

NOTARY PUBLIC

My Commission Expires:

June 19, 1967.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2945, heard by me on Dec. 4, 1963.

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

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