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BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
January 23, 1963

EXAMINER HEARING

IN THE MATTER OF:)

Application of Gulf Oil Corporation)
for special pool rules, Eddy County, New)
Mexico. Applicant, in the above-styled)
cause, seeks the establishment of special)
pool rules for the White City-Pennsylvan-)
ian Gas Pool, Eddy County, New Mexico,)
including provisions for 640-acre spacing)
therein.)
-----)

Case No. 2737

BEFORE:

Elvis A. Utz, Examiner

TRANSCRIPT OF HEARING

MR. UTZ: The next case on the docket is Case 2737.

MR. DURRETT: Application of Gulf Oil Corporation for
special pool rules, Eddy County, New Mexico.

MR. KASTLER: Bill Kastler, appearing for Gulf, and our
witness in that case is again Mr. Hoover who testified in the
last case. Mr. Hoover is still under oath.

JOHN HOOVER

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



DIRECT EXAMINATION

BY MR. KASTLER:

Q What is Gulf seeking in this application, Mr. Hoover?

A We are seeking approval of temporary special pool rules for the White City-Pennsylvanian Gas Pool, to provide for 640-acre spacing.

Q Do you have a plat of the area involved?

A Yes, sir, and we have marked it Exhibit Number 1.

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

Q Referring to Exhibit Number 1, will you state how many wells are presently located in this pool and give their locations?

A There are two wells in the pool at this time, and they are the Gulf Federal Estill AD Well Number 1, which is located 660 feet from the north and east lines of Section 29, Township 24 South, Range 26 East, Eddy County, New Mexico. The other well is the Gulf Federal Estill AD Well Number 2, which is located 2,440 feet from the east line and 2,400 feet from the north line of Section 20, also in Township 24 South, Range 26 East.

Q Which was the discovery well?

A Well Number 1 was the discovery well and it was drilled as a wildcat to test the Devonian formation. The Devonian was not productive and the well was plugged back to the Pennsylvanian.

Q How does Gulf propose to dedicate acreage to these

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wells, assuming the application for 640-acre spacing is approved?

A We propose to dedicate all of Section 20 to the Well Number 2, and this will be accomplished by pooling in with the Estill Lease the portion, the 40 acres of the Powers Lease, of Gulf's Powers Lease located in the southeast quarter southwest quarter of Section 20. We propose to contribute to Well Number 1 the east half of Section 29, and the west half of Section 28, and this will be accomplished by pooling in with the Estill Lease the southwest quarter southwest quarter of Section 28, which is Gulf's lease, and is a Federal acreage.

Q Will you please state the reason for requesting adoption of Gulf's rules for 640-acre spacing, and do you have evidence to indicate a well can drain 640 acres?

A The basic reason is strictly due to cost. We believe that it is more prudent at this time to drill the wells on 640 acres, until such time that it can be proved that it will not drain 640 acres. At that time, ~~_____~~ accomplished. We feel that this would prevent economic waste in eliminating the drilling of unnecessary wells. The wells in this pool were not connected to a pipeline until November, 1961, and due to the poor gas market the takes have been very low. Therefore, we do not have any decisive pressure information which would determine the areal drainage. We feel that if the temporary rules could be approved, say, for one year, that would give us additional time to obtain additional pressure information to prove

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that a well will drain 640 acres.

We anticipate that one well will drain 640 acres, As to the cost of the wells, in this area our Well Number 1, which was the initial well, was a very expensive well. It cost \$646,255.00. This unusual cost was due to lost circulation and so forth. Our Well Number 2 cost \$401,493.00.

Referring to Exhibit Number 1, in Section 18, it shows a Number 1 well on the Federal Lee J Lease. This well which was not productive in the Pennsylvanian cost \$387,283.00. We plan another well probably in the first quarter of this year to be located in Section 21; that's a west offset to the location of the Well Number 2. It will be approximately at a location 1,980 feet from the east line, 1,980 feet from the south line. It's only tentative, but that's the proposed. We intend to drill that well, and based on the experience that we've had from the other wells, we hope to drill it for \$315,000.00. If we do it will be a very good price.

Q Still expensive.

A Yes, sir, still expensive.

(Whereupon Applicant's Exhibit No. 2 was marked for identification.)

Q Will you please read into the record Gulf's proposed rules for the White City-Pennsylvanian Gas Pool?

A Yes, sir. That's marked Exhibit Number 2. It's entitled: "Special Rules and Regulations for the White City-



Pennsylvanian Gas Pool*.

* RULE 1: Each well completed or recompleted in the Pennsylvanian formation within one mile of the boundary of the White City-Pennsylvanian Gas Pool and not nearer to nor within the boundaries of another designated Pennsylvanian 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 White City-Pennsylvanian Gas Pool shall be located on a tract consisting of approximately 640 acres, which may comprise a single governmental section, being a legal subdivision of the United States Public Land Survey, or may comprise a square tract where all sides are the same length. For the purpose of these rules, the Unit consisting of between 632 and 648 surface contiguous acres shall be considered a standard Unit.

(b) The Secretary-Director shall have authority to grant an exception to Rule 2 (a) without notice and hearing where an application has been filed in due form and where the unorthodox site or shape of the tract is due to a variation in the legal subdivision of the United States Public Land Survey or where the following facts exist and all of the following provisions are complied with:

(1) The non-standard Unit contains less acres than a standard Unit and consists of contiguous quarter-quarter sections or lots.

(2) The length or width of the non-standard Unit does not

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exceed 5,280 feet.

(3) The entire non-standard Unit may reasonably be presumed to be productive of gas from the White City-Pennsylvanian Gas Pool.

(4) The applicant presents written consent in the form of waivers from all Operators owning contiguous acreage in the section or sections in which any part of the non-standard Unit is situated, which acreage is not to be included in said non-standard Unit, and from all Operators whose acreage, or any part of it, lies within 1,500 feet of the proposed non-standard Unit well. In the alternative, the applicant may furnish proof of the fact that all of the aforesaid Operators were mailed a copy of the application for such non-standard Unit.

The Secretary-Director may approve the application if after a period of 30 days no such Operator has entered an objection to the formation of such non-standard Unit.

RULE 3: (a) Each well completed or recompleted in the White City-Pennsylvanian Gas Pool shall be located 1,980 feet from the outer boundary line of the standard Unit with a tolerance of 330 feet. A well to be attributed to a non-standard Unit shall not be located nearer than 660 feet to the outer boundary of such Unit. A well which was projected to or completed in said pool prior to the effective date of this order is excepted from the requirements of this rule.

(b) The Secretary-Director shall have authority to grant



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exceptions to the Rule 3 (a) without notice and hearing where an application therefor has been filed in due form and the necessity for the unorthodox location is based on topographical conditions or is occasioned by the recompletion of a well previously drilled to another horizon.

Applicant shall furnish all Operators within a radius of 1,980 feet of the subject well a copy of the application to the Commission and shall stipulate to the Commission that proper notice has been furnished to all such Operators. The Secretary-Director may approve the application if after a period of 20 days, no offset Operator has entered an objection to the proposed unorthodox location; provided however, if the ownership of all oil and gas leases within such radius is common, approval may be given without a waiting period."

Q These proposed rules provide for exceptions to the well location requirement for wells completed in the pool prior to the effective date of the order. Are there any wells in this category now?

A Yes, sir. Gulf's Federal Estill AD Number 1 and Well Number 2, an exception would be needed for these wells.

MR. UTZ: What is the location of that well?

A Well Number 1 is located 660 feet from the north and east lines of Section 29; Well Number 2, it's in Section 20, is located 2,440 feet from the east line and 2,400 feet from the north line.



MR. UTZ: Thank you.

Q (By Mr. Kastler) Are there any other wells being drilled in this pool at this time?

A To my knowledge there are none.

Q But one proposed, being Gulf's Lee J Number 2?

A That's correct.

Q To be drilled in Section 21, at 1,980, 1,980?

A Approximately, yes, sir.

Q Were Exhibits 1 and 2 drawn by you or prepared at your direction and under your supervision?

A Yes, sir, they were.

Q If granted would this application be in the interest of prevention of waste and protection of correlative rights, in your opinion?

A Yes, sir.

MR. KASTLER: At this time I move to admit Exhibits 1 and 2 into evidence; and this concludes our direct examination.

MR. UTZ: Without objection Exhibits 1 and 2 will be entered into the record in this case.

(Whereupon Applicant's Exhibits 1 and 2 were admitted to the record.)

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

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

CROSS EXAMINATION

BY MR. DURRETT:

Q Do you have any evidence to offer concerning, going a



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little more into detail on the economics involved, particularly comparing 640-acre spacing with possibly 320-acre spacing, percentage of profit to investment ratio?

A There is such a variation in our prices on these wells. Also, the pipelines are not taking what the minimum gas should be under the contract. They're only taking just a bare minimum volume, so it's hard to say what it would be on 320, what it would be on 640; but for the record I would like to give this for our Estill Number 1, on 640 acres, assuming that the pipeline would take what we say is a minimum volume of gas, we figure a payout of 11 plus years. To give you an idea of why, it's hard to figure a payout here. They're taking at the present time, roughly, a third. So on the present rate we're speaking of a 33 year payout. We hope that it will improve within a reasonable time.

MR. UTZ: Taking a third of what?

A Of what we consider as under the contract a minimum volume.

MR. KASTLER: What are those quantities?

MR. UTZ: Minimum take.

A They're based on reserves. As far as a well on 320 acres, and assuming the same kind of a well we get in Number 2, and using our minimum figure of \$315,000.00, which is what we think we are going to drill this next well for, we hope, by using just half of the volume that we think we should be getting, based on 320 instead of 640, it figures about 15.8 year payout.



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Q (By Mr. Durrett) I think that clarifies it somewhat.

A It's long payout at best.

MR. UTZ: When were these wells connected, Mr. Hoover?

A It was in November. I was going to get the exact date here.

MR. UTZ: That's close enough.

A November 15th of 1961. That was the date of initial delivery from the first well and probably the second well would have been connected.

Q (By Mr. Durrett) How much gas does each well produce?

A Our Federal Estill Number 1 has produced, this is through December, that would be November 16th, November 15, '61 through December of '62, 102,788 MCF. Our Federal Estill Number 2 has produced during the same period 135,931 MCF.

MR. UTZ: A little over fifty or sixty thousand a month.

A No, sir, it wouldn't be that much. It would roughly be about 14 months, say 13 months divided into 135,000 is roughly 10,000 MCF per month for the Number 2. On the Number 1 it's been less than that. It's not a big volume at the present time. They're taking, November took ten million from the Number 1; 8.7 million from Number 2; and December four and a half million Number 1, 3.9 million from Number 2. So that's not very much money to pay a well out.

MR. UTZ: Who is your purchaser?

A Transwestern.



MR. UTZ: I'm not real sure that I understand Section (a) of Rule 2, the portion that says, "or may comprise a square tract where all sides are the same length". Is it your intention that the square tract would have to be legal subdivision?

A: No, it is the intention that would not be. The standard Unit could be a section or it could be, as we propose here, the east half of 29 and the west half of 28, even though it crosses section lines, it still is a square containing 640 acres. It's our thought that it's reasonable, that if you have a square and your well is located all right on that square tract, it eliminates a hearing to get it approved.

MR. UTZ: Well, what I meant was, that this would mean then that that square tract would have to consist of legal 160 acre, or legal quarter sections?

A: Yes, sir, it sure would.

MR. UTZ: It might go over a section line?

A: Yes, sir, but any side would be no more than 5,280 feet for the non-standard Unit, the length or width can not exceed 5,280 feet, so the standard Unit, the square sides you would not exceed 5,280 feet, you couldn't do that and have all sides equal.

MR. UTZ: I haven't had time to read this too well. It would seem to me that that portion of the sentence would take care of all your administrative approval, as it's written here; or what would be the difference between a tract that would be approved by your administrative rule of section (b) and that portion of

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section (a)?

A Except in (b) we're saying where there can be approval without notice and hearing, where you file it in due form, it's due to unorthodox size or shape of the tract, which is due to a variation in the legal subdivision of the United States Public Land Survey or where the following facts exist and the following provisions are complied with. The non-standard contains less acres than a standard Unit. It might could be written where it could cover it.

MR. KASLER: Isn't it true, Mr. Hoover, that sub-section (a) of Rule 2 was designed for the purpose in mind in taking care of wells already completed, or those hereafter plugged back that are within the White City-Pennsylvanian Gas Pool, whereas sub-section (b) is to take care of wells hereafter drilled to the White City-Pennsylvanian Gas Pool?

A Yes. Well, that's true, the (a) does take care of each well completed or recompleted, but also in (b) you could have a well completed or recompleted that maybe you wanted to assign less than 640 to, then it would fall under a non-standard Unit.

MR. KASLER: I see.

MR. UTZ: The way this is written, that's all it would take care of, isn't that true, smaller than 640-acre tracts?

A If you have 640 acres in the form of a square with all sides equal, being used for an example, half of one section and half of another, that could be considered a standard Unit if it

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met the acreage requirements and your well was so located for the standard Unit, according to the rules.

Q (By Mr. Durrett) But under these rules, Mr. Hoover, it wouldn't necessarily have to be a half of a section joined with a half of a section, isn't that correct?

A It wouldn't have to be, it could be three-quarters of one section and a quarter of the other. It certainly could be that.

Q Couldn't it also, as a technicality, not talking practically whether it could happen or not, couldn't it also create a dangerous situation in that you could dedicate 98 percent of a section and two percent of another section that contiguous to it?

A Well, you certainly could. I don't know why a person would want to do that unless they had a two percent long strung out acreage. I mean, that is a possibility all right.

Q You wouldn't necessarily have an objection if the Commission would consider trying to prevent situations like that occurring, would you?

A I don't see any objection. If these rules don't go as they are, in other words, if it crosses a section line, if it's not a standard Unit for any reason, then we'd have to have approval for a non-standard Unit, that we're asking here for Number 1, which we, according to our rules would be a standard Unit with a well location exception.

MR. DURRETT: I see. That's all I have.



MR. KASTLER: I believe in substance what Mr. Hoover means is, these rules could be improved upon.

A Certainly they could be improved upon, but I think that it's something to consider. We had a case just prior to this that it was just a technicality because we crossed a quarter-quarter section line that it takes a hearing. I think it's something to consider.

MR. DURRETT: Thank you.

A I'm not saying that it has to be that way. I think it's worthy of consideration and that is why we put it in.

MR. KASTLER: May I ask a question on re-direct?

MR. UTZ: Yes, sir.

REDIRECT EXAMINATION

BY MR. KASTLER:

Q Mr. Hoover, are topographical considerations pertinent to well locations in this pool?

A Very definitely.

Q Would you comment briefly on that?

A The terrain in that particular area is pretty rough, and it was hard, in fact the Well Number 2, the reason it was located where it is is trying to find a good location, so in our rules where we are saying 1,980 feet location with a tolerance of 330 feet is in there specifically to take care of the rough country.

Q The land is cut by deep revines, is that correct?

A That's true.

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MR. KASLER: Thank you.

MR. UTZ: Mr. Hoover, do you have any down hole information, core information on either of these wells?

A We may have. I don't have it with me. I don't have any, I am sure that's probably all been submitted on our completion reports. I believe Mr. Ramey could verify that, but these wells are in a pool at the present time, a designated pool.

MR. UTZ: But you don't have any idea as to what the permeabilities are?

A Not with me, no, sir. I'll furnish that, whatever you desire.

MR. UTZ: Do you know whether you cored these wells or not?

A No, sir, I wouldn't say offhand. I'm not sure. I suspect we did make some cores, but in what sections I don't know.

MR. UTZ: Six hundred forty six thousand, you should have got some cores out of one.

A Yes, sir, we should have, and that's a pretty expensive well.

MR. UTZ: Could you look into that and mail me any core data that you might have, permeability data, micro-logs or anything of that nature?

A On any well?

MR. UTZ: Well, either of these two wells.

A All right.

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MR. UTZ: These are the only two wells in this pool at the present time?

A That's right. You would like any core data, logs, and what else?

MR. UTZ: Micro-logs or anything that would show what the permabilities and porosities are.

A Yes, sir, if we have that information I'll certainly furnish it to you.

MR. UTZ: Are there other questions of the witness? The witness may be excused. Any other statements in this case? The case will be taken under advisement. We will take a fifteen minute recess.



BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
March 11, 1964

EXAMINER HEARING

IN THE MATTER OF: (Reopened)

In the matter of Case No. 2737 being re-
opened pursuant to the provisions of
Order No. R-2429-A, which order established
temporary 640-acre spacing units for the
White City-Pennsylvanian Gas Pool, Eddy
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 160-acre spacing units.

Case No. 2737

BEFORE: DANIEL S. NUTTER, EXAMINER.

TRANSCRIPT OF HEARING

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MR. NUTTER: The hearing will come to order, please.
The next case will be 2737.

MR. DURRETT: In the matter of Case No. 2737 being re-opened pursuant to the provisions of Order No. R-2429-A, which order established temporary 640-acre spacing units for the White City-Pennsylvanian Gas Pool, Eddy County, New Mexico, for a period of one year.

MR. KASTLER: If the Examiner please, my name is Bill Kastler and I'm appearing on behalf of Gulf Oil Corporation. Our one witness in this case is Mr. John Hoover, who would like to be sworn at this time.

(Witness sworn.)

JOHN HOOVER

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

DIRECT EXAMINATION

BY MR. KASTLER:

Q For the record, would you please state your name and position?

A John Hoover, District Production Engineer, Gulf Oil Corporation, Roswell, New Mexico.

Q Have you previously appeared before the New Mexico Oil Conservation Commission Examiner Hearings and been qualified as an

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expert petroleum engineer?

A Yes, I have.

Q Are you familiar with the facts in this case concerning the establishment of temporary rules for 640-acre spacing in the White City-Pennsylvanian Gas Pool?

A Yes, I am. I presented the testimony in the previous hearings concerning this matter of this case.

Q At the time of the previous hearing held in March, 1963, how many wells were developed in this pool and how many wells are now developed?

A There were two wells, those being the Federal Estelle A. D. Wells No. 1 and No. 2, both Gulf wells, and these two wells are still at this time the only two wells in the pool. These wells are shown on Exhibit No. 1 and they are outlined in red, circled in red. Well No. 1 is located 660 feet from the North and East lines of Section 29, and Well No. 2 is located 2444 feet from the East line and 2400 feet from the North line of Section 20, both of them in Township 24 South, Range 26 East, Eddy County, New Mexico.

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

Q Mr. Hoover, at the previous hearing you indicated that reservoir pressure information would be obtained to attempt to



justify 640-acre spacing permanent rules, did you not?

A Yes, I did. At that time I stated that we intended to drill another well in Section 21, and if we did drill it we planned to take an initial bottom hole pressure in that well and compare it with existing bottom hole pressures in the two wells completed. This well was not drilled due to high cost, poor economics and high risk. In fact, the acreage on which this well was planned to be drilled has been released by Gulf.

Q Do you have any pressure information on tests on the existing two wells, namely Federal Estelle A. D. Wells 1 and 2?

A Yes. We conducted shut-in bottom hole pressure buildup tests starting on February 11, 1964.

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

Q Will you please explain the results of these tests?

A Yes. Exhibit No. 2 is a procedure that we use for running these bottom hole pressure tests, and basically we had two Amerada bombs which were calibrated prior to the test. We closed in Well No. 1 and ran the bomb to approximately 9500 feet. There was a choke, bottom hole choke in the well at 9525. We opened after the bomb was on bottom, we opened the well up at the previous flow rate for thirty minutes and then closed the well in, recording the tubing pressures by dead weight tester on the time

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intervals as shown there every fifteen minutes the first hour, and then up to four hours, and then thereafter we took the tubing pressures every twenty-four hours and the test was run for seventy-two hours. The same procedure was used for Well No. 2.

Q You took both bottom hole pressure tests with the Amerada bomb and tubing pressure tests, is that correct?

A Yes, we did. Exhibit No. 3 is a tabulation of the results of the bottom hole pressure taken in Well No. 1. The bomb was actually run to a depth of 9490 feet. The bomb was on bottom at 10:00 A.M. on February 11 and you might note there that the pressure was 3943 pounds. Then the well was opened up to the previous flow rate, which was 5,237 MCF per day.

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

Q Pardon me for interrupting. Prior to your test had this well and the Well No. 2, as well, been produced at a high rate for some time?

A Yes, they had. We caught these wells when they both had been producing for a continuous period of eighteen days. Well No. 1 was flowing at well over five million and Well No. 2 was flowing at about one million six hundred thousand, so this test was conducted after the eighteen-day flow test, immediately after the wells were shut-in, in fact, to run the test.

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On this Exhibit No. 3 when the well was opened up it may be noted there that the bottom hole pressure drops quite drastically, in other words, it was opened up at 10:15, we had 1952, and 10:30, 1803, and so forth. The reason that pressure is down so low is due to the bottom hole choke. Actually it's a bottom hole regulator that was in the well, not run in for this test, but it was already there, so we are getting a drop across that choke which is reflected here on the bomb during the flow test.

Then the well was shut-in after that approximately forty minutes and we started the shut-in test, and you might note there the other significant thing on this exhibit is at the end of our pressure test the reading of 4848 pounds is the same for 10:00 A.M. on February 13 and the time the bomb went off bottom at 6:00 A.M. on the 14th. So the pressure had built up in that well.

Exhibit No. 4 is a bottom hole pressure on Well No. 2. The bottom hole pressure in this well was taken, or the bomb was run at 9808 feet. The same procedure was established here, after the bomb was on bottom the well was opened at a previous flow rate which was 1,677 MCF per day.

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

Q No choke in this well?

A No choke. Then the well was shut-in at 12:45, approxi-



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mately thirty-minute flow period, and we started the seventy-two hour shut-in bottom hole pressure test. It may be noted that when the gauge was taken off bottom at 8:00 A.M. on February 14 that the pressure was up to 4781 pounds. It had not built up because the 2:00 A.M. reading was 4765 pounds. This information, when it got in to us, it is evidence that the well had not built up, so we took shut-in tubing pressures again on February the 18th.

Q You actually continued your tubing pressure test beyond February 14?

A Yes, we did. In order to get our complete buildup. Exhibit No. 5 is a tabulation of the shut-in tubing pressures for Well No. 1. This is taken at the -- in other words, we're showing the time, or the time we took it and the time interval as shown on the exhibit, zero time being the time the well was shut-in and the minutes and hours after that time is the shut-in time. Exhibit No. 6 is the shut-in tubing pressures taken on Well No. 2. So, in effect, what we have here now, Exhibits 2 through 6 are just the test information which we are supplying to the Commission for your information. It's the test results. Exhibit No. 7 --

(Whereupon, Applicant's Exhibits 5, 6 and 7 were marked for identification.)

Q One question there. On Exhibit No. 6 can you establish that your tubing pressure had built up?



A Yes.

Q To constant?

A Yes. Thank you. In the time from 9:00 A.M., February 14 until 11:20 A.M., February 18, the tubing pressure on Well No. 2 had built up 90 pounds, so, in effect, on No. 1 it had only built up six pounds. So, we're positive that the pressure built up sooner than the 166½ hours, so that we had a maximum buildup of only 90 pounds, so at the end of our seventy-two hour test the bottom hole pressures had built up within 90 pounds of each other.

On Exhibit No. 7 we have tabulated the shut-in bottom hole pressures corrected to 9811 feet. That is the depth for approximately the mid point of our perforations in Well No. 1, and that is the interval where our initial bottom hole pressure was taken, so we have corrected the test readings to this 9811 feet, and that is reflected on Exhibit No. 7 for Well No. 1.

MR. NUTTER: Mr. Hoover, what is the perforated interval in each of these two wells?

A Well No. 1 is 9806 feet to 9816. Well No. 2 is 9828 to 9874.

MR. NUTTER: Thank you.

(Whereupon, Applicant's Exhibit No. 8 was marked for identification.)

A On this Exhibit No. 7 the significant thing there is the



final bottom hole pressure is 4881 pounds, that is correcting the 4848 pounds which was recorded at 9490, which was a built up pressure correcting that to 9811, which comes out approximately 9881.

Exhibit No. 8 is the corrected bottom hole pressure for Well No. 2. Actually there is no correction because the bomb was placed at 9898 and the depth we are correcting it to was 9811, so it only made one-eighth of a pound difference, so we showed no correction.

On the final bottom hole pressure of 4871 pounds estimated on February 18, all I have done there is added the 90 pounds that the tubing pressure built up. So the two bottom hole pressures are within ten pounds of each other by this method. I think we had reason that we could have probably added a little more to that tubing differential, but rather than do that we just took the actual tubing pressure build up. So, therefore, the wells built up to within ten pounds of each other.

Exhibit No. 9 is merely a graph of the tabulated information on Exhibits 7 and 8. The only thing we show here is that the Well No. 1 built up faster than Well No. 2, which we certainly, that's what we expected. Well No. 1 is the better well, it had an open flow potential of approximately forty-seven million, whereas this Well No. 2 is tighter and it had an open flow potential of only

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about 3.7 million. Also on the exhibits on 5 and 6 where the tubing pressures were recorded, they built up within 22 pounds of each other. I believe that covers the tests.

(Whereupon, Applicant's Exhibit No. 9 was marked for identification.)

Q What conclusions can you make from the results of these tests?

A In view of the fact that both wells had been produced constantly for, at a relatively high rate for this eighteen-day period prior to the shut-in of the test, and that these bottom hole pressures built up to practically the same pressure in a short period of time, we conclude that there is good communication between the wells.

The initial bottom hole pressure in Well No. 1, which was taken in April of 1960, was 5,476 pounds at 9811 feet. The cumulative production from Well No. 1 from the initial completion to the date of the test was 539,160 MCF, Well No. 2, 243,633 MCF. In view of this unequal production and in view of the fact that the bottom hole pressures built up to practically the same pressure, which pressure is considerably lower than the initial pressure, we think this is also evidence that there is good communication between the wells.

At the previous hearing the geological testimony presented

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stated that the micrologs indicated that the permeability in the Strawn was present in both wells and it was concluded that it was continuous between the two wells. Also in that testimony the core analyses presented on Well No. 2 indicated that the permeability was predominantly through fractures, and from those two facts it was concluded that one well could drain 640 acres.

We believe that this test has substantiated that testimony and the logs that there is permeability continuous between the two wells. Also, since these wells are 4100 feet apart and we had a reservoir build up pressure to within ten pounds, or we can say practically the same pressure, we can say that the wells are definitely in the same pool and that the one well can and is draining 640 acres.

Q Mr. Hoover, at the previous hearing you gave the economics for development on 320-acre spacing as against 640-acre spacing. How have the economics changed, or have they?

A They have not changed. It is still not economical to develop on less than 640 acres.

(Whereupon, Applicant's Exhibit No. 10 was marked for identification.)

Q Has Gulf communitized the leasehold rights on 640-acre spacing for each well?

A Yes, we have. Exhibit No. 10 is a copy of the United

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States Geological Survey's communitization order for Well No. 1, and that communitizes all of Section 29. Exhibit No. 11 is the United States Geological Survey communitization order for Well No. 2 and that communitizes all of Section 20.

(Whereupon, Applicant's Exhibit No. 11 was marked for identification.)

Q What is your recommendation concerning the temporary pool rules for the White City-Pennsylvanian Gas Pool?

A It is requested that the Commission make permanent the rules providing for 640-acre spacing in this pool.

Q In your opinion would that order provide the protection of correlative rights and the prevention of waste that is necessary?

A Yes.

Q Do you have anything further to add in this case?

A No, sir.

Q Where Exhibits 1 through 9 prepared by you or at your direction and under your supervision?

A Yes, sir, they were.

Q Were Exhibits 10 and 11 true copies of the executed certificate of communitization in the White City-Pennsylvanian Gas Unit No.s 1 and 2?

A Yes, they are.

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MR. KASTLER: This is the conclusion of our direct testimony and I would like to move at this time that Exhibits 1 through 11 be entered into evidence.

MR. NUTTER: Gulf's Exhibits 1 through 11 are admitted in evidence.

(Whereupon, Applicant's Exhibits 1 through 11 were offered and admitted in evidence.)

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

CROSS EXAMINATION

BY MR. NUTTER:

Q I presume at the first hearing that estimates of reserves were based on volumetric calculations, would that be correct?

A We did not give any reserves.

Q How did you establish the economics of development then?

A We established the economics based on takes, daily takes by the purchaser.

Q If you didn't establish the reserves, how long did you figure that they would be taking daily?

A Well, certainly the takes by the purchaser had a relation to reserves, that's true, and we did not give any reserve figures, we gave what we figured the contract take would be on a daily basis.



Q But for what length of time?

A We did not state a length of time; however, I'll be glad to read those economics into the record again. We gave the pay-out on 320 acres and 640 acres at certain rates.

Q Now, the purchaser in the first eighteen days, or the eighteen days preceding this shut-in had been taking from No. 1 at about the rate of five million a day?

A Yes, sir. In fact, the takes from these wells from the time of the last hearing up until November of '63 had been very low, starting in November, the market for that gas improved. Whether it's on a permanent basis or a temporary basis, but it did improve for part of November, I am sorry, for December, part of December, all of January and into February.

Q So this five million a day hasn't been a permanent thing through the life of the wells?

A No, sir, it sure has not. In fact, the average take from Well No. 1 from the date of connection to the date of the test has only been 540 MCF per day.

Q When were the two wells connected, do you have that handy?

A Yes, sir. They were connected on November 15, 1961.

Q Both the same day?

A Yes, sir. The average takes from Well No. 2 have been

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

DIRECT EXAMINATION

BY MR. KASTLER:

Q Mr. Hoover, have you previously qualified and testified before the New Mexico Oil Conservation Commission as an expert petroleum engineer?

A Yes, sir.

MR. KASTLER: Mr. Examiner, are the witness' qualifications acceptable?

MR. UTZ: They are.

Q (By Mr. Kastler) Mr. Hoover, what is the purpose of this hearing?

A Gulf's application for special pool rules in the White City-Pennsylvanian Gas Pool to provide for 640-acre spacing was heard before the Examiner on January 23, 1963. As a result of that hearing the Commission issued Order No. R-2429 dated February 21, 1963 which reads in part "That the subject application shall be denied if the applicant does not appear at the last Examiner Hearing in March, 1963 and present additional evidence concerning the reservoir characteristics of the White City-Pennsylvanian Gas Pool". We are here to present additional information.

Q Mr. Hoover, at the hearing in January, did the Examiner ask for additional information as to logs, core analysis, etc.?

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A Yes, sir. We furnished logs on the Federal Estill "AD" Wells No. 1 and No. 2 as well as a core analysis for Well No. 2 by transmittal letter dated January 30, 1963. We advised that no core was taken in Well No. 1.

MR. KASTLER: Mr. Examiner, we would like to move that this information be made a part of the record in Case 2737.

Q Mr. Hoover, do you have additional reservoir characteristics to present as requested by the Commission?

A Yes, sir. Mr. Lester Marshall, our District Production Geologist, will present this testimony; however, I would like to add additional testimony on economics at this time which I hope will clarify my previous testimony.

Q Will you please proceed.

A The previous testimony indicated well costs as follows: Federal Estill "AD" Well No. 1, \$646,255; Federal Estill "AD" Well No. 2, \$401,493; Federal Lee "J" Well No. 1 which was non-productive, \$387,283; Estimated cost of next well if one is drilled, \$315,000.

The economics are as follows: For 640 Acre Spacing; Well cost, \$315,000; Producing Rate, 938 MCF/day; Price of gas, 16¢/MCF; Payout time, 7.07 years; Discounted cash flow rate of return before Income Tax, 14.1%; Profit to investment ratio, 1.3 to 1.0.

For 320 Acre Spacing; Well cost, \$315,000; Producing rate, 469 MCF/day; Price of gas, 16¢/MCF; Payout time, 13.46 years; Discounted cash flow rate of return before Income Tax, 3.4%;

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Profit to investment ratio, 0.4 to 1.0.

We stated in the previous testimony that the determination of the economics was difficult because the market demand for this gas is poor at this time. For example, the average daily purchases from initial delivery through February, 1963 from the two completed wells are as follows: Federal Estill "AD" Well No. 1, 313 MCF/day; Federal Estill "AD" Well No. 2, 329 MCF/day.

The actual purchases to date are considerably lower than the producing rates used in the economic evaluation; therefore, the payout time which is long under the best conditions will be extended an X number of years, depending on the duration of the slack gas market.

Q In your opinion, would a reasonable prudent operator undertake to drill a gas well in this pool for a calculated profit to investment ratio of 0.4 to 1.0, discounted cash flow rate of return and a 13.46 year payout which are the figures you gave for a 320-acre unit?

A No, sir. The payout of 7 years for 640 acres is long and the payout of 13-1/2 years for 320 acres is unreasonable.

Q Based on these figures, therefore, what you have said in effect is that the pool stands a good chance of never being further developed if 320-acre spacing or less is enforced.

A Yes, that is right.

Q Might this possibly lead to waste?

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A Yes. It is possible that the two wells developed could drain the entire pool; however, it is also possible that gas could be left in place resulting in waste by not developing the pool further.

Q Do you have anything further to add in this case?

A No, sir, nothing further insofar as economics are concerned.

Q Mr. Hoover, the well logs you submitted by correspondence, could they be marked for exhibit purposes consecutively as Exhibits 1A, 1B and 1C. 1C being the Core Analysis of Well Number 2; 1B, the log of Federal Number 2; and, 1A being Federal Estill "AD" Number 1?

A That would be all right. Our Exhibit 1 is a plat. If 1A would suffice, 1B and 1C would be allowable.

Q Were these logs prepared by you or under your supervision?

A That's right, at my direction.

MR. KASTLER: That is all I have. I would like to submit that these Exhibits be marked as 1A, B and C.

(Exhibits 1A, 1B and 1C were marked for identification.)

MR. UTZ: They will be.

MR. KASTLER: Thank you.

CROSS EXAMINATION

BY MR. UTZ:

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Q You still have only drilled two wells?

A Two wells, producing.

Q Are you drilling any other wells?

A No, sir.

Q Your 160 is out of the north of Section 21?

A That is correct.

Q Do you have any knowledge of why you drilled that well so close to the corner of Section 29?

A Yes, that well was drilled as a Wildcat and it was drilled for a Devonian Test, something below 1,000 feet, so, therefore, it was drilled on a normal location under the state-wide rules. And, that was the discovery well for the White City-Penn gas.

MR. UTZ: Any other questions of the witness?

MR. KASTLER: I'd like to ask a question to clarify a point.

MR. UTZ: Go ahead.

REDIRECT EXAMINATION

BY MR. KASTLER:

Q Mr. Hoover, there are to date three wells that have been drilled in the White City gas pools, is that correct?

A Yes.

Q Those being Federal Estill Numbers 1 and 2 and Federal Lee "J" Number 1?

A Yes.



Q Is Federal Lee "J" Number 1 a producing well?

A No, sir.

Q Where is the well located? Is it in Section 18?

A Yes, sir, it is in Section 18, in the NW $\frac{1}{4}$ of the SE $\frac{1}{4}$ of Section 18.

MR. KASTLER: That is all I have.

MR. UTZ: Any other questions of the witness? The witness may be excused. The hearing will recess until 1:00 o'clock.

(Witness excused.)

MR. UTZ: The hearing will come to order.

Please continue with Case No. 2737.

LESTER MARSHALL

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

DIRECT EXAMINATION

BY MR. KASTLER:

Q Mr. Marshall, for the record, would you please give your name, your address, and your position with Gulf Oil Corporation?

A Lester Marshall, District Production Geologist with Gulf Oil Corporation, Roswell.

Q Are you familiar with Case No. 2737, which is Gulf's application of 640-acre spacing approval, Case No. 2737 continued in White City-Penn?

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A Yes.

Q Have you previously stated your qualifications and have those qualifications been approved by the New Mexico Oil Conservation Commission?

A Yes.

MR. KASTLER: Mr. Examiner, are Mr. Marshall's qualifications satisfactory?

MR. UTZ: Yes, they are.

Q (By Mr. Kastler) Mr. Marshall, have you made a study of geology for the area of the White City-Penn Gas Pool?

A Yes, I have.

Q Have you prepared the structure map?

A Yes, and it is marked Exhibit No. 1.

Q Referring to Exhibit 1, will you state what is shown in the structure map?

A This is a structure map contoured on top of the Strawn formation, with 100 foot contour interval. This shows the structural relationship of the White City-Penn Gas Pool, the Crawford-Penn Gas Pool to the east and the Black River-Penn Pool to the northeast. From this limited control, a structure is indicated underlying the two producing wells shown in the White City Pool.

Q From this map, can you define the limits of the White City-Penn Gas Pool?

A It is defined to the northwest of Gulf's Federal Lee

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"J" No. 1, located in Section 18, which is found to be tried in Pennsylvania formation. The limits to the southeast are indefinite, but range between Union of California Crawford No. 2-27 and Gulf's Federal Estill No. 1. The limits to the northeast and southeast are undefined.

Q Has Gulf sought to establish in this application the permanent or temporary area boundaries of the White City-Penn Gas Pool?

A No, it is our feeling that a pool rule should be adopted to cover the two producing wells now completed in the pool. As additional wells are drilled on offsetting spacing units, they will automatically come within those rules.

Q Referring now to Exhibit No. 2, will you please explain what it is?

A Exhibit No. 2 is a cross section and this cross section shows the relationship of the stratigraphy of the White City-Penn Pool--these two wells, the Crawford-Penn Pool, these two wells, and the Black River-Penn Pool, this well. It will be noted that the producing Horizon in the White City-Penn Pool is the Strawn formation and are in New Mexico and this formation becomes tight and unproductive in the Crawford-Penn and Black River-Penn Pools. The prorated intervals in all the wells are shown in the producing Horizon in the Black River-Penn and the Crawford-Penn is marble.

Q Would you now refer to Exhibit No. 3 and explain



what it is?

A Exhibit No. 3 is a chart showing continuity of permeability in the Strawn lime pay between Federal Estill No. 1 and No. 2. These wells are located 4,100 feet apart.

Q The curve on the right of each well column is a microlog which indicates zones of permeability, and these zones are colored in red. It can be seen that the permeable section in the Strawn lime is present in both wells and that is the same stratigraphic level and this leads to the conclusions that the permeability in the Strawn lime is continuous and uninterrupted.

Q What is Exhibit No. 4?

A Exhibit No. 4 is core analysis of the Strawn formation in Gulf's Federal Estill No. 2. This analysis was previously furnished to the Commission, but I would like to discuss it in a little more detail here. The average porosity in the Strawn lime is 5 per cent, average permeability is 3.7 millidarcies. In the Strawn sand the average permeability is 4 millidarcies. I wish to call your particular attention to samples, numbers 2 and 8. The sample numbers are in the center left-hand column there. These sample numbers show that permeability is predominantly through fractures. Likewise, in the Strawn sand, samples, numbers 14, 15, 16, 17 and 26, show permeability predominantly through fractures.

Q As a result of your studies, what is your conclusion as to the drainage area of a Strawn Gas Well in the White City-Penn

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Gas Pool?

A Because of the fact that reservoir is fractured and good continuity of the permeability has been demonstrated and in view of any lack of evidence tending to show otherwise, I concluded that one well will drain in excess of 640 acres.

Q Do you have anything further to add?

A No, there is nothing further, based on the information available at this time.

Q Were Exhibits Numbers 1, 2, 3, and 4 of this case, 2737-Continued, prepared by you or at your direction and under your supervision?

A They were.

MR. KASTLER: This concludes my questions on direct testimony of Mr. Marshall, but I would like at this time to move that Exhibits 1, 2, 3, and 4 be entered into evidence.

MR. UTZ: Without objection, Exhibits 1, 2, 3, and 4 will be entered into the record of this case.

Does that complete your direct examination?

MR. KASTLER: Yes, sir, it does.

CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Marshall, your Exhibit No. 3, from the way I interpret that, your Number 1 Well doesn't have any Strawn sand in it at all, is that right?

A That is correct, yes, sir. Apparently the sand has shaled out in going from Number 2 to Number 1.

Q And was it your testimony that in the Strawn lime



that permeability was predominately through fractures from top to bottom of the Section or just the top half of it?

A Just at these intervals designated in core analysis, Exhibit No. 4.

Q So that there was no evidence of fracturing from your Sample Number 2 down to your Sample No. 8?

A That is correct.

Q Those permeabilities are in the order of one tenth to six tenths in millidarcies, is that true?

A The highest permeability is 24 millidarcies, Sample No. 8.

Q Yes, I was speaking of the samples, from No. 2 to No. 8?

A Yes, sir, you are correct.

Q Number 4 is 24 millidarcies, partially due to fracturing?

A Yes, sir.

Q So since we only have fracturing at the top and bottom of the Strawn lime, it would seem questionable as to how far those fractures extended in the reservoir, would it not?

A It would be purely conjectural, I am afraid.

Q These wells are still not connected to the pipeline, are they?

A Yes, they are.

Q Are they both connected now?

A Yes, sir, they are--Transwestern.



Q How much gas are they taking from the wells? Do you have any idea?

A I believe Mr. Hoover has those exact figures, but I don't.

Q Actually, on your core graph, you don't show any perforation into these fracture zones at all, do you? Can you explain why you didn't fracture in that zone?

A The perforations were pictured from the microlog as shown in Exhibit No. 3. You notice the perforations are opposite the microlog permeability and I am sure that is the reason they are pictured there.

Q So then your microlog and your core graph don't agree, is that true?

A Not precisely, no. The microlog, generally speaking, will not indicate fracture permeability or fracture porosity.

MR. PORTER: Mr. Utz, Mr. Marshall indicated Mr. Hoover might have those production figures. I would be interested to know as to what volumes of gas are being taken from the wells.

MR. UTZ: Do you have those figures with you and available?

MR. HOOVER: Yes, I do.

MR. UTZ: We can put you back on the stand when we are finished with Mr. Marshall here on the record.

Are there any other questions of this witness? Witness may be excused.

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(Witness excused.)

JOHN F. HOOVER

was recalled, examined and testified as follows:

RE CROSS EXAMINATIONBY MR. PORTER:

MR. HOOVER: Mr. Porter, on the testimony I gave just before lunch on the economic evaluation, we gave some average daily purchases and daily production from our Federal Estill "AD" Well No. 1 which was averaging 313 MCF per day and that was from initial delivery which was in November of 1961 through February of 1963. That has been the actual average per day.

Q Approximately 10 million a month or something like that?

A Yes, sir, slightly under 10 million a month. On our Well No. 2 it is averaging approximately 329 MCF per day. And on our economic evaluation, we used a well cost of \$315,000, which is \$72,000 cheaper than any well that we have drilled to date. So it is the minimum well, and on that evaluation for 640-acre spacing, we used a production rate of 938 MCF per day, which is the gas rate that they should take which would produce the gas in place over the term of the contract.

Now, bearing in mind we used the producing rate of 938 MCF per day, the actual rate has been 313 and 329, roughly a third, and we have found that the payout time was 7.07 years under those conditions of a very economical well cheaper than we have

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done. Our discounted cash flow rate of return was 14.1 per cent, which gave us a profit investment ratio of 1.3 to 1 or on \$1.30 earned for each dollar spent.

On 320-acre spacing, we used the same well cost, \$315,000. Our producing rate was 469 MCF per day, which was half of what it would be on 640, and bearing in mind that 469, even on 320 acres, is more than what they are taking now at the existing time, a price of 16 cents again gave us a payout of 13.46 years.

Q Mr. Hoover, I am sure you explored this this morning, but Gulf is requesting a temporary order, is that right?

A Yes, sir, that is correct.

Q Then, my main concern was whether or not you were selling gas at what volumes so I might know whether you would be in a position to conduct interference tests and so forth during the time of the temporary order?

A We hope to, say, at the end of another year to have enough gas produced out of the reservoir that we could at least run bottom hole pressures in each well as compared to what our one volume hole pressure was in No. 1 well. We do intend--I believe we can probably make arrangements to run some interference tests by cooperation of the pipeline, I believe that we could get that concession made all right.

BY MR. UTZ:

Q Mr. Hoover, you have used half of the rate flow in your 320 as you did in your 640-acre economics picture that was



prepared. Is that due to economics or is that a contract figure?

A That would be a contract figure. It would be based on the same provision that you get the gas out of the term of the contract, but on 320 acres you have only half the gas to produce in the same contract term. So you have just like in our existing pools, where we have 640 acres spacing, a well on 640 acres under proration gets, which is the allowable that a well does on 320. The same thing holds true in this case.

Q The contract minimums are based on the acreage rather than deliverability?

A That is right, on reserves which is based on acreage.

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

Any other statements to be made in this case? The case will be taken under advisement.

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STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

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

IN WITNESS WHEREOF I have affixed my hand and notarial seal this 30th day of April, 1963.

Elaine Buchanan
NOTARY PUBLIC

My Commission Expires:

October 14, 1966.

I do hereby certify that the foregoing is a copy of the transcript of the proceedings in the examination of Case No. 2737 heard by me on April 30, 1963.
[Signature], Examiner
New Mexico Oil Conservation Commission

