BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
January 8, 1964

EXAMINER HEARING

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| IN THE MATTER OF:<br><br>Case No. 2720 being reopened pursuant to the provisions of Order No. R-2397, Lea County, New Mexico. | CASE NO. 2720 |

BEFORE: DANIEL S. NUTTER, EXAMINER

TRANSCRIPT OF HEARING

MR. NUTTER: Call Case 2720.

MR. DURRETT: In the matter of Case No. 2720 being reopened pursuant to the provisions of Order No. R-2397.

(Witness Sworn)

MR. BRATTON: Howard Bratton on behalf of the applicant.

THURMON WITTE,

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

DIRECT EXAMINATION

BY MR. BRATTON:

Q Will you state your name,by whom you are employed, and in what capacity?

A I am Thurmon Witte. I am employed by Tenneco Oil as Petroleum Engineer, Midland District office.

Q Will you state briefly your educational and professional background, Mr. Witte?

A I graduated from the Colorado School of Mines and since that time I have been employed by Tenneco in Kansas and North Texas and West Texas.

Q As a Petroleum Engineer?

A Yes.

Q And does the Double-X Delaware Pool in Lea County, New Mexico come under your jurisdiction?

A Yes, sir.

Q You are familiar with that pool and the matters contained in Number 2720?

A Yes, I am.

MR. BRATTON: The witness' qualifications acceptable?

MR. NUTTER: Yes, sir. What year did you graduate?

A '57.

Q (By Mr. Bratton) Mr. Witte, this case is up for re-consideration of an order issued by the Commission promulgating

special rules for the Double-X Delaware Pool. Would you state briefly the general nature of the pool, and the basic provisions of the order under consideration?

A The Double-X Delaware Pool is an oil pool with an associated gas cap and Tenneco is asking to make the temporary rules adopted last year permanent and we are asking that spacing of 40 acres per oil well be set and a spacing of 160 acres for gas wells.

Q Those are the basic provisions of the present rules; is that correct?

A Yes.

Q And how are your allowables for an oil well and a gas well determined under the present rules?

A The allowable for an oil well is the allowable rate limited by 2,000 to one gas-oil ratio.

Q And for a gas well?

A Gas well is limited to top allowable times a 2,000 to one GOR. It allows four 40 acre spacing tracts to be put in one gas well allowable.

Q So, that on a 40 barrel oil allowable, your gas allowable would be 2,000 times 40, which would be 80,000 cubic feet a day times four for your four 40 acres, which would be 320,000 cubic feet a day?

A Yes.

Q So, those are the basic provisions of the rules under consideration; is that correct?

A Yes. And there was one other basic consideration, under the temporary rules, and that was a gas well is classified as a well with a ratio of greater than 30,000 to one, and an oil has a ratio of less than 30,000 to one.

Q All right. The whole design and purpose of rules is to afford the gas wells in the pool some opportunity to produce, but at the same time, to equalize so that you will not have oil drawn into the gas area; isthat correct?

A Yes.

Q Now, turn to your Exhibit Number One, Mr. Witte, and explain what it shows, as far as development, or what has occurred in this pool since last year?

A There has been one additional well drilled in the pool since last year, and that is Continental's Number Three Federal Hanagan, and it was a dry hole.

Q That is in the Northwest Quarter of Section 12?

A Yes.

Q All right, sir. And in addition- -

A And in addition, last year, Tenneco's Jennings Number One in the Northwest Quarter of Section 14, was classified as an oil well in March of '63. The gas-oil ratio became greater than 30,000. It was reclassified as a gas well and shut in.

Q All right, sir. Now, there are two gas wells in the pool, the Jennings well and another well down in Section 22; is that correct?

A Yes.

Q And that is in the Northwest Quarter of Section 22, the rest of the wells in the oil well- - in the pool are oil wells; is that correct?

A Yes, sir, that is correct.

Q The pool boundaries have been extended by taking of the North Half of Section 11, since last year?

A Yes. This map shows that and this, like to point out this oil well in Section 2, top of the map, is a Triesty Draw Field.

Q So, that basically, since the hearing last year, the only thing that we have which have occurred have been the drilling of the one dry hole, the conversion of one oil well to a gas well, and the production history on the oil wells; is that correct?

A That is correct, yes, sir.

Q All right, sir. Now, as a result of that, there is no need, is there, to reintroduce the cross sections and structures which we introduced last year?

A I don't think so. Nothing has changed geologically.

Q All right, sir. Now, turn to your Exhibit Number Two, Mr. Witte, explain what it is and what it shows?

A Exhibit Two is a plat showing the wells in the area, and their October, 1963, producing rate. It shows the barrels of oil per day and the current GOR, and the accumulative production that we have produced.

Q What does it show for the total field recovery as of November 1, '63?

A 140,772 barrels of oil has been accumulated, or accumulative recovery to November 1, 1963.

Q Average daily production for October of '63?

A Was 197 barrels of oil per day and 347 barrels of water per day.

Q The two gas wells have been shut in?

A That is correct. This gas well in Section 22 has been shut in since completion, and the gas well in Section 14 has been shut in since March of '63 when it was reclassified as a gas well.

Q Now, will there be a gas line in the area in the near future?

A Yes. Contract has been signed with Phillips, January 3, of this year, and they state that within 120 days, they will have a line to the field, and gas connections available to all the wells in the field.

Q All right, sir. Turn to your Exhibit Number Three, Mr. Witte, and explain what it is?

A Exhibit Three is an Isopach map of the oil sand and it shows that there are - - sand lens with basic two part, connected by a narrow saddle through Section 14. Greatest sand development is found in Section 22 and 23, the south part of the field, and in the north part, greatest sand development is in Section 11.

Q Is this the same Isopach that was presented last year?

A This is the same map presented last year.

Q Then, turn to your Exhibit Number Four, which also is an exhibit that was presented last year, I believe?

A Exhibit Four is an Isopach map of the gas cap, the associated gas cap, and there is good control down in the south part of the field. The gas cap is outlined. In the north part of the field, we know there is a gas cap there, but we do not have enough control to definitely describe the exact limits.

Q All right, sir.

A And I would like to point out again in Section 15, apparently, there is a permeability barrier porosity pinch out in the gas cap portion of the area where it separates the north and south gas cap.

Q Now, is that reflected in your Exhibit Number Five?

A Yes, sir. Exhibit Five shows the gas-oil contact and as you can see, in the south part of the field, it is at a minus 1280, whereas, after you cross this porosity barrier, the gas cap shifts to a minus 1300. So, there is a 20 foot structural difference in the position of these two gas caps. The north gas cap and the south gas cap.

Q All right, sir. Turn to your Exhibit Number Six, your production statistics, and explain what that reflects?

A Exhibit Six reflects ,the bottom line, shows the number of completions in this field, and as you can see, on this exhibit, the number of completions reached a high of 20, and now, there are

17 oil completions in the field. Two of these completions were later classified as dry holes. They produced 100 to 300 barrels of oil and they were plugged and abandoned, and one of them was our Jennings Number One well, which was reclassified as a gas well. And that leaves a total of 17 oil completions in the field at the current time.

Our production curves show that oil was relatively constant, oil production was relatively constant during 1961. And oil production increased during '62 and leveled out again in 1963. This reflects the number of additional completions that were developed in the field. Water production was basically- - basically follows the oil production curve. There has been no rapid increase in water. This reservoir is a low permeability reservoir. It has a core analysis, shows that water saturations are very high. It is not reasonable to expect that oil, free oil would have been produced out of this reservoir. Consider it to be a transition zone and therefore, water production will result with the oil throughout the life of the field.

The GORs are relatively constant. There has been a slow increase. There has been no sharp increase. And in production, in 1963, as it shows, oil, gas and water has leveled off to a relatively stable rate. We feel that this will continue during the succeeding years of the field.

Q All right, sir. Now, turning to your Exhibit Number 7, Mr. Witte, is this a calculation of your reservoir voidage?

A Yes, it is. This reservoir voidage calculation is - - shows how much the reservoir is voided by producing the oil wells and how much will be voided by producing the gas wells in gas- - in the gas cap. At the current time, our voidage in the oil section of the reservoir is 765 reservoir barrels per day and this is oil, gas and water.

Q Now, the figures on Exhibit Number Seven are calculated or calculations are figures you gave of voidage, is your actual voidage from the oil wells?

A From the 17 oil wells.

Q How much was that?

A Voidage from the 17 oil wells is 765 reservoir barrels daily at the current time.

Q Of course, at the present time, there is no voidage of gas wells?

A No. Both gas wells are shut in.

Q At such time as the two wells are permitted to produce, what would their reservoir voidage be,based on 35 barrels of oil per day allowable, and based on 40 barrels of oil per day allowable?

A Each gas well will void 304 reservoir barrels per day with a 35 barrel a day producing rate, and at a 40 barrel a day allowable, each gas well will void 347 reservoir barrels a day.

Q Now, that is if each of them has the full 160 acres dedicated?

A That is correct.

Q All right. Now, so that with both gas wells connected and producing, you would still have less reservoir voidage per day,a little less, from the gas wells than you would from the oil wells?

A That is correct. There would still be a slight positive expansion of gas cap to prevent any loss of oil in the- - into the gas cap.

Q Now, what would happen, Mr. Witte, as the oil wells' gas-oil ratio might increase, would that- - how would that effect this balance?

A As these oil wells decline and our gas-oil ratio goes up to the maximum limit, which is 30,000 to one GOR, each well would void 74 barrels per day in a reservoir, and 17 wells would void 1260 reservoir barrels per day, which is double what the gas wells would be voiding.

Q So, that even if the gas-oil ratio increased, if anything, that will increase the advantage of the oil wells?

A That is correct.

Q Now, turning to your Exhibit Number Eight, Mr. Witte, what does this demonstrate with relation to whether, or not the gas wells are being drained by the oil production?

A Exhibit Eight shows the bottom hole pressure measured in these two gas wells versus accumulative oil production, and as you can see, this bottom hole pressure is declining, which indicates

that the gas cap is associated with the oil reservoir, and the withdrawals from the oil reservoir is causing pressure depletion of the gas cap.

Q In your opinion, Mr. Witte,has the production history indicated that these rules are satisfactory to preserve a balance between the oil column and the gas cap and prevent waste and at the same time, protect the correlative rights of the gas cap?

A Yes. With the present temporary rules and the allowables fixed by them, if they are made permanent, there will be prevention of loss due to- - or correlative rights due to the expansion of the gas cap across the gas-oil contact and oil part of the reservoir.

Q Is there any change you would suggest in the present rules, Mr. Witte?

A Yes. We would like to have a well test scheduled semi annually, since the production has exhibited a stable plateau all during '63, we feel there will be no sharp changes in GORs or water production.

Q The present rules call for four GOR tests a year; is that correct?

A Yes.

Q You would suggest that two a year would do it?

A Yes. We feel that two would be sufficient.

Q Is there anything further you care to state in connection with any of these exhibits, or in connection with the case, Mr.

Witte?

A No.

Q Were Exhibits One through Eight prepared by you, or under your supervision?

A Yes, they were.

MR. BRATTON: We would offer in evidence Applicant's Exhibits One through Eight.

MR. NUTTER: Exhibits One through Eight will be admitted in evidence.

(Whereupon, the exhibits, one through eight, were admitted in evidence by the Examiner)

MR. BRATTON: We have nothing further at this time.

* * * *

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

MR. DURRETT: Yes, sir.

CROSS EXAMINATION

BY MR. DURRETT:

Q Mr. Witte, did you state that there are no gas connections in the pool at this time?

A There are no gas connections in the pool at this time.

Q What have they been doing, flaring or venting?

A This gas has been flared under a temporary order.

Q Now, they do have, or expect to have gas connections?

A Yes. The contract was signed last week and Phillips expects to have a line in there within 120 days. Gas will be delivered to their Tundell plant in Reeves County, Texas, approximately 15 miles from this field.

Q Now, what would be the possibility, if there is any possibility, of some of the wells that are presently dedicated as oil wells being reworked and become gas wells; is there any such possibility?

A There is no possibility of that if withdrawals, voidage withdrawals are made in the manner that will be made if the allowables are set as they are under these temporary rules, the gas oil - - contact will eventually remain stable. It will not encroach into the oil reservoir.

Q So, by the time the oil wells become depleted, or start approaching depletion, wouldn't be to the advantage of an operator to rework them to bring to - - to make them gas wells?

A No. Because the essential- - it is essentially as this Exhibit Six shows, that a marginal well producing 2.3 barrels a day with a 30,000 to one GOR, would be voiding 74 reservoir barrels a day. Whereas, a gas well would be, on 40 acre spacing, the allowable for that would be 70,000 cubic feet a day, would have a reservoir voidage of 76 barrels.

Q That is Exhibit Seven. All right, sir.

MR. DURRETT: Thank you. That is all I have.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Witte, essentially, we have no change whatsoever in this pool from last year, with the exception of one new well, some accumulative production and the reclassification of one well; is that it?

A That is correct.

Q And none of the exhibits show any real subjective change in conditions except the accumulative production with the possible exception here of Section No. 8, which is the bottom hole pressure decline of the Jennings Number One and the U. S. Smelting Number Two, and it has three pressure points for one well and two for the other, and the last two for each well were subsequent to the last hearing?

A Yes.

Q Now, these were bottom hole pressures taken on wells that have been shut in throughout the past year; is that right?

A Yes, sir. These wells- - these pressures were measured with bottom hole bombs in shut in gas wells.

Q And the indication from the exhibit would be that the withdrawals from the oil wells caused a decline in the pressure in the gas cap?

A Yes, it has.

Q This would be an indication of an expanding gas cap?

A Yes, sir.

Q Is it your intention to get- - dedicate one hundred 60 acres to your Jennings Number One?

A Yes, it is.

Q And how much acreage is dedicated to the U. S. Smelting Number Two well?

A At the present time, 80 acres is dedicated to the well, and we plan to approach U. S. Smelting and see if they would join in half the cost of that well, and make a full 160 acre unit there.

Q Which would be what,the Northwest Quarter of Section 22?

A Yes.

Q Or the West Half-West Half?

A The Northwest Quarter of Section 22.

Q To form a standard 160 acre square unit. Mr. Witte, you stated at the outset of your testimony, you sought to make these rules permanent. Since there hasn't been any change in conditions since the temporary order was issued a year ago, don't you think it would be more advisable for the Commission to enter a temporary order again for a period of a year to see what effect the classification has after production commences? We don't have any history of production here to base a permanent order on, do we?

A Do you mean oil production or gas production?

Q Well, I think the gas production is going to possibly change the conditions here, don't you? We don't have any gas

production from the gas wells, do we?

A No. None has been produced from the gas well. I really feel that our Exhibit Eight, this pressure decline curve, shows that gas cap is associated with the oil reservoir and is being affected by it and withdrawals from the gas reservoir will result in conditions that we have presented them before the Commission today.

Q We are talking about a decline in the pressure in the gas cap?

A Yes.

Q But, we might see a more drastic decline, certainly, if the gas cap is also being produced?

A That is possible.

Q Also, Rule 9 of the special rules, which calls for gas liquid ratio tests on a quarter basis, quarterly basis, perhaps has been restrictive or burdensome in a year when there hasn't been any production from the gas cap, but maybe to some greater necessity once the gas cap is produced on a quarterly basis, don't you think?

A That is possible.

Q All right.

MR. NUTTER: Any further questions?

MR. DURRETT: Yes, sir, I have one. Mr. Witte, you stated that you are thinking about approaching U. S. Smelting concerning your well Number Two in Section 22.

A Yes.

MR. DURRETT: I wonder if you are thinking about approaching them with a force pool case in case they can't work out an agreement concerning that well?

A No, I don't think so. If they don't want to participate in the well, why, we would just have an 80 acre gas well there with an 80 acre allowable.

MR. DURRETT: Well, just a matter of interest. Thank you.

MR. BRATTON: We are peaceable souls, Mr. Durrett.

MR. NUTTER: Well, Mr. Witte, the exhibit presented last year shows that C. B. Reid owned that lease. Has he assigned that to U. S. Smelting?

A That lease was a farmout from U. S. Smelting and has expired and U. S. Smelting now owns it again.

MR. NUTTER: It was a farmout from U. S. Smelting to Reid, and has reverted back to the Smelting Company?

A Reverted back.

MR. NUTTER: I see. Are there any further questions of Mr. Witte? He may be excused. Do you have anything further, Mr. Bratton?

MR. BRATTON: No, sir.

MR. NUTTER: Does anyone have anything they wish to present in Case 2720? Take the case under advisement.

The hearing is adjourned.



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General Court Reporting Service
Suite 1120 Simms Building Albuquerque, New Mexico Phone 243-6691

STATE OF NEW MEXICO I

COUNTY OF BERNALILLO I

I, ROY D. WILKINS, 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 of Office, this 10th day of January, 1964.

NOTARY PUBLIC

My Commission Expires:

September 6, 1967.

I do hereby certify that the foregoing is a comp. [illegible] of the proceedings in the [illegible] hearing of Case No. 2720, heard by me on 1/8, 1964.

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

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
January 6, 1965

EXAMINER HEARING

IN THE MATTER OF:

CASE NO. 2720 BEING REOPENED PURSUANT TO THE PROVISIONS OF ORDER NO. R-2397-A 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 No. 2720

(Reopened)

BEFORE:

DANIEL S. NUTTER

TRANSCRIPT OF HEARING

MR. NUTTER: We will call Case Number 2720.

MR. DURRETT: In the matter of Case Number 2720 being reopened pursuant to the provisions of Order Number R-2397-A.

MR. CHRISTY: Sim Christy of Hinkle, Bondurant & Christy, Roswell, New Mexico, representing the applicant, Tenneco Oil Company. We have one witness, Mr. Examiner, whom we would like to have sworn.

* * *

T H U R M O N W I T T E, the witness, having been duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. CHRISTY:

Q Please state your name, address, occupation, by whom you are employed and in what capacity.

A I am Thurmon Witte, employed by Tenneco Oil Company as reservoir engineer at their Midland, Texas office.

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

City Service, supporting indefinitely continuing the 320-acre spacing; a letter from Sinclair Oil and Gas Company concurring with Shell Oil; a letter from Humble Oil and Refining Company concurring with Shell; a letter from Continental Oil Company supporting Shell; a letter from Mobile Oil Company supporting Shell. These are--that was Case Number 2715.

MR. CHRISTY: Mr. Witte, are you familiar with what is sought in Case Number 2720, and familiar with the wells in the Double-X Delaware Pool in Lea County, New Mexico?

A Yes, sir.

Q I believe you previously testified in the case at the last hearing as a petroleum engineer, and had your qualifications accepted?

A Yes.

MR. CHRISTY: Does the Examiner have any questions concerning the qualifications of the witness?

MR. NUTTER: No, sir.

MR. CHRISTY: Before we start, Mr. Examiner, to be very brief about it, the truth of it is that nothing much has happened in the last year. We had hoped to get gas under production in March and have enough history to present some evidence. As it turned out, we did not get the wells on the line until September, and we only have two months' history. We have up-dated the exhibits, and request that the case be

Number 3 in the northeast northeast of Section 22, and also Tenneco's U. S. Smelting Number 2 in the southwest of the northwest of Section 22--it has always been a gas well.

Q These figures that you have shown here on Exhibit 2 also show your production, do they not?

A Yes, sir.

Q And you show cumulative production for the field as of November 1 also?

A Yes.

Q Was I accurate in my statement to the Examiner that the gas wells just went on the line in September?

A Yes. Phillips ran a line to the field in September and is now taking gas to their plant in Reeves County, Texas.

Q I hand you Exhibit 3 and ask you if you will briefly identify that for us.

A This is a plot of oil production, water production and GOR for the Double-X Delaware field, and it is a continuation of past exhibits showing production--it has been up-dated to November 1964.

Q It looks like your gas is getting a little high, isn't it?

A Yes, sir, average GOR for the field shows to be 4,000 to one--well, it dropped; 3200 to one by November. This was after the gas line was put in the field.

Q I hand you what has been marked Exhibit 4, and ask you to briefly identify this.

A Exhibit 4 is a plot of pressure of time to gas wells versus cumulative oil production from the field, and it shows gas wells present in the community; some oil column, and withdrawal from the oil column has caused a pressure decline in the gas well.

Q I notice on the edge here "18 SI well head pressures." What date would that be?

A January 5, 1965.

Q You are familiar with the special rules temporarily adopted for the Double-X Delaware pool?

A Yes.

Q Do you have any recommendation to the Commission with regard to continuation or change of the pool rules?

A I would recommend that they be continued for another year as temporary rules, until we see what the effect of withdrawals from the gas cap has on production in the field.

Q Do you see any necessity from the last year's history of any changes in pool rules otherwise?

A No, sir.

Q Were Exhibits 1 through 4 prepared by you or under you or under your direct supervision?

A I think that is so.

MR. CHRISTY: I think that is all.

MR. NUTTER: Are there any questions of the witness? ... Have any wells been drilled since the last one a year ago, Mr. Witte?

A No, sir.

Q So the status of the pool is essentially the same, except that you have had a gas connection since September?

A Yes.

Q Does this include a gas well as well as the casing head from the oil wells?

A Yes, this line takes gas from the gas wells as well as from the oil wells.

MR. NUTTER: Is there anything further from this witness? ... He may be excused.

MR. CHRISTY: We offer in evidence Applicant's Exhibits 1 through 4.

MR. NUTTER: Exhibits 1 through 4 are admitted into evidence. Do you have anything further?

MR. CHRISTY: That's all.

MR. NUTTER: Does anyone have anything further in Case Number 2720? We will take the case under advisement, and call Case Number 2935.

* * *

STATE OF NEW MEXICO )
) ss
COUNTY OF BERNALILLO )

I, Elizabeth K. Hale, Notary Public and Court Reporter, do hereby certify that the proceedings in Case Number 2720 were taken and transcribed by me, and that the foregoing is a true and accurate transcript of proceedings to the best of my knowledge, skill and ability.

IN WITNESS WHEREOF, my hand and seal of office this 17th day of January, 1965.

Notary Public

My commission expires

May 23, 1968.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2720, heard by me on 1-6, 1965.

, Examiner,
New Mexico Oil Conservation Commission.

BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
January 26, 1966

EXAMINER HEARING

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 No. 2720

BEFORE:
Elvis A. Utz, Gas Engineer

TRANSCRIPT OF HEARING

MR. UTZ: The hearing will come to order. Case 2720, matter of Case 2720 being reopened pursuant to Order R-2397-B.

MR. CHRISTY: Sim Christy, for Tenneco Oil Company who is one of the chief operators on the Double-X Delaware Pool. We have one witness. I would like to have him sworn.

(Witness sworn.)

(Whereupon, Applicant's Exhibits 1-4 marked for identification.)

J O H N J. L A C E Y, a witness, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. CHRISTY:

Q For the record would you please state your name, address, by whom you are employed, and in what capacity?

A My name is John J. Lacey, District Reservoir Engineer for Tenneco, Midland, Texas.

Q Mr. Lacey, have you previously testified before this regulatory body and had your qualifications accepted?

A Yes, sir.

Q Are you familiar with the Case 2720?

A Yes, sir.

Q Are you familiar with the Double-X Delaware Pool and the wells located there?

A Yes.

MR. CHRISTY: Are the witness's qualifications

acceptable?

MR. UTZ: Yes, sir.

Q (By Mr. Christy) Mr. Lacey, let me refer you to what has been marked as Applicant's Exhibit 1. Would you please identify it?

A Exhibit 1 is a plat outlining the pool limits and the wells completed within the well limits as of January 1, 1965.

Q Mr. Lacey, you are familiar with the--

MR. UTZ: Do you mean 1966?

THE WITNESS: It says January 1, 1965, but it's '66.

Q (By Mr. Christy) You are familiar with the prior testimony?

A Yes.

Q It's been established that there is a north and south area in the Double-X Delaware Pool?

A Yes.

Q And there is one common oil reservoir with two separate gas caps, is this correct?

A This is true.

Q What is the present gas-oil ratio, or oil well limits?

A The present field rule provides for a limit of

two thousand to one.

Q And on your gas wells what is the allowable?

A The allowable for gas wells--let me state first that the field rules provide for 40 acre proration units in oil wells, and a hundred and sixty acre proration units on gas wells. The allowable for a gas well is the top oil allowable times the GOR limit times the acreage dedicated to the gas well which would be a hundred and sixty acres over the acreage of the oil wells, which is 40, so it has a gas limit equal to 40 times the wells.

Q This is to permit voiding the reservoir from both oil and gas, taking into consideration the acreage factors?

A Yes, sir.

Q Now, sir, have any other wells been drilled since the prior hearing in this case, which I believe, Mr. Examiner, was January of '65; have any other wells been drilled in the area?

A No.

Q So that the well data is the same today as in the last hearing and depicted in Exhibit 1?

A Yes, sir.

Q Has any well been plugged?

A I do not believe so. There may have been one or two abandoned that are not now producing.

Q All right, sir. Now, for the purposes of later testimony on Exhibit 1, would you identify the U.S. Smelt Number 5 well, please?

A Well, it is located in the Southeast Quarter of the Southeast Quarter of Section 22.

MR. CHRISTY: That well will be referred to later, Mr. Examiner.

Q (By Mr. Christy) And on your gas wells which will be testified to as located in the Southwest, Northwest of Section 22, the one in the North area is Northeast, Northwest of Section 14?

A Yes.

Q Now, let's take up Exhibit 2. Would you briefly tell us what this exhibit depicts?

A Exhibit 2 is a plat showing the location of all the producing wells, or wells that have been drilled, in the pool, both oil and gas. It also shows the oil wells and the gas wells currently producing and--which is October of '65, and the GOR, and also shows the cumulative oil or gas production.

Q What is your production in the North end of the pool, oil production?

A Well, looking at the exhibit, there's approximately five, seven, thirty-five barrels a day in October.

Q And how is the gas well doing up at the North end?

A The gas well in the North end of the pool, the Tenneco Jennings Number 1 is actually a limited capacity gas well, It's not capable of producing it's full gas allowable.

Q And neither are the oil wells?

A Right.

Q Take the South end, what is the production on the oil wells at the South end of the pool, presently?

A Well--

Q Is it in the neighborhood of about 660 barrels per day for the whole South end?

A No, I don't believe it's this large, it's more like 60.

Q Like 60?

A Right.

Q And how is the gas well holding up?

A The gas well is a good gas well and is capable of making well in excess of it's allowable.

MR. CHRISTY: Mr. Examiner, at this point I would like to advise this Commission of something unknown to us at the last hearing. We had planned to have the same witness but he fell on the ice the other day. We have been assigned in the Tenneco Number 2 Well a hundred and sixty acre allowable but actually there is not that much acreage dedicated to the



well, and as a result of which we have been producing it based on a 160 acre allowable and we should have only been producing on an 80 acre allowable. The East half, Northwest is owned by U.S. Smelting, and is not dedicated to that well as of November 1, '65. We have over-produced the well by some 33,499 MCF. We propose to pay back our over-production. There will be testimony on the method in which we propose to pay it back, but we did want to advise the Commission that it was only when we started going into the exhibit that our producing department was producing what was assigned by the Commission, and the Commission assigned it assuming there was a hundred and sixty acres, and there was not.

Q (By Mr. Christy) Is there anything else on Exhibit 2 that you think would be of interest to the Examiner?

A No.

Q Explain the meaning of the figures?

A The legend on the exhibit, in the lower portion on the top line it shows the October, 1965 daily average oil production and the GOR, the most recent GOR, and then below the line it shows cumulative oil production for the oil wells for November, 1965, and cumulative gas production for the gas wells.

Q All right, sir. Now, referring to Exhibit 3, would

you please identify that for us?

A Exhibit 3 is a plat showing the production history; number of wells; oil production; GOR; and water production from the pool since its initial discovery.

Q Based on time?

A Based on time, yes.

Q And I believe, also, down at the bottom of that Exhibit 3, it shows the wells on production and it shows this straight line of no change since 1963?

A Right, no additional change.

Q What is the purpose of this exhibit, what are you attempting to show here?

A Well, I think the most important piece of information on the exhibit is that in the Fall of '64 when the gas wells, the two gas wells had been shut-in in the field for the first couple of years because of lack of market facilities, and they started producing then in '64 and on the GOR curve you can see the large increase. That is the result of these two gas wells being connected to a line and starting to produce. And with this gas, sales from these two gas wells, there has been no drastic change in what appears to be the established productivity decline in the oil production.

Q I believe that is the most important point, no drastic change?

MR. UTZ: What's the bottom curve?

A Nubmer of wells producing in the pools. The peak, at the peak there was twenty wells producing in late '62. I believe there's now seventeen.

Q (By Mr. Christy) Now, in previous hearings we have had a plat concerning pressures, reservoir pressures, is that correct, sir?

A Yes.

Q And have you updated that plat, and is that Exhibit 4?

A Yes. Exhibit 4 is a plat showing the bottom hole pressure data that we have in the field plotted against cumulative oil production in the field. This exhibit has been previously presented in other testimony and we have updated it to the most current information we have.

Q I want to go back to the U.S. Smelt Number 5. Is that a pumping well or a flowing well?

A No, that well is actually being produced by gas lift. The gas from the U.S. Smelting Number 2 actually is metered and then a line goes from the U.S. Smelting Number 2 to the Number 5 where the gas is used to lift the oil production out of the 5, where, then this lift gas and what gas is made with the oil, is sold to the pipeline.

Q Approximately how much of the legal production from

the gas well is necessary in order to lift the Smelt Number 5 Well?

A Well, we believe that half of the Smelting 2 legal gas allowable, which would be in excess of the top oil allowable, two thousand times one, would be sufficient to lift the gas production from the Number 5.

Q And based upon that, in order to pay back the over-production of the gas well, do you have a recommendation to make to the Commission as to how it should be paid back?

A Yes, I would like to recommend that rather than shutting the well in completely until it's over-production is made up, we be assigned a 456 half allowable to the well so that we be permitted to get it from the U.S. Number 5.

Q If we have to produce the well entirely, the only way to produce is from the pump?

A The Number 5 was producing on a pump and they have had operational difficulties, and the well has never been able to pump satisfactorily, so that if we are not permitted to pump the gas well we'll have to shut it in.

Q It leads to premature abandonment?

A Yes.

Q All the other wells are on the pump?

A I believe that's correct.

Q Now, let's go back on Exhibit 4, and you updated

it since the last hearing in January of '65. I notice in the right-hand edge of Exhibit 4, you show 1367 pounds (1/14/66). What well is that?

A That is the bottom hole pressure in the U.S. Smelting Number 2 which is the gas well in the South portion of the field.

Q Then you show below that, 1187 pounds (1/14/66). What well is that?

A That is the bottom hole pressure in the U.S. Smelting Number 5, which is the oil well in the Southwest Southwest of Section 22.

Q So that your bottom hole pressure in the gas well in the South area is greater than the only non-pumping well in the area, the only well you have to test with?

A This is correct. 971 pounds (1/14/66), which is the bottom hole pressure, the Tenneco Jennings Number 1.

Q It looks like oil pressures are not the same in the two gas wells, again proving and indicating the two separate gas caps?

A This is correct. The pressure in the U.S. Jennings 1 appears to be in line with what the previous pressures have shown on the well where it has already exhibited less bottom hole pressure than the one in the South.

Q A drastic drop commencing in September of '64. Do

you account for that, again, that that was when the first sales of gas occurred?

A Yes, the two--like I said, the two gas wells had been shut in for the first several years because of lack of a market outlet, and this bottom hole pressure you see on Exhibit 4, dated February 2, '65, is a result of these wells having to be produced into the gas line.

Q Now, Mr. Lacey, are you familiar with the temporary rules in the Double-X Delaware Pool?

A Yes.

Q Do you have any suggestion to the Commission with respect to one, making them permanent, and two, any ammendments to them?

A We would like to recommend to the Commission that this field has now been producing for several years. It appears that there's going to be no more additional development in the field and we recommend that the temporary rules for the field now be made permanent.

Q Operationally-wise you get along fine as it is?

A Right.

Q And the field rules should be made permanent?

A Yes.

Q Is there anything I missed that I haven't asked you about?

A No, I don't believe so.



Q Were Exhibits 1 through 4 prepared by you or under your supervision?

A Yes, they were.

MR. CHRISTY: That's all from this witness. I move the introduction of Exhibits 1 through 4.

(Whereupon, Exhibits 1 through 4 were offered into evidence.)

MR. UTZ: Exhibits 1 through 4 will be entered into evidence.

(Whereupon, Exhibits 1 through 4 were admitted into evidence.)

CROSS-EXAMINATION

BY MR. UTZ:

Q What is your specific testimony as to drainage in these two areas you offer? Exhibit 4 has an indication of that drainage, is that the purpose of it?

A Well--

Q That is to justify the spacing?

A Yes, sir. Exhibit 4, of course, was originally presented to show that the North and South areas of the pools, they were in fact a common reservoir, and that the gas as was gas capped associated with the oil production and the most recent pressure point on Exhibit 4, particularly on the 1367 and the 1187.

I think this indicates that the withdrawal from the



oil column and the gas colume is staying pretty much together, and that the gas cap has a greater bottom hole pressure than the oil column, and so it appears that the gas cap should be at lease expanding downward and helping to maintain the pressure and recovery of the oil wells.

Of course, this is only true for the South. We don't have a bottom hole pressure oil column in the North area.

Q Haven't you testified that this is probably two separate sources of supply?

A No, sir, I think previous testimony--there's been isopach maps, and like I say, this Exhibit 4 has been shown that this is all one column reservoir, both the gas caps in both the North and South area, and the oil column in both.

Q Wouldn't your pressure on Exhibit 4 indicate that the gas well in the North 14, and your Number 2 would be in different gas caps?

A Right. I believe the two gas caps are in communication with each other through the oil column. In other words, there's a common underlying oil column and there's two separate gas caps.

Q Let's look at the bottom hole pressure and the oil column. Do you have those?

A No, sir, we only have one bottom hole pressure in the

oil column in the entire field, and that is on the U.S. Smelting Number 5. We have no pressure data on the oil column in the North area.

Q Frankly, it seems to me that we're a little hard pressed to prove communication here with what you offered.

MR. CHRISTY: It had been my plan, Mr. Examiner, to offer in evidence the prior testimony in connection with, both with 80 acre spacing and with the communication, it being one oil pool with two gas caps. I believe that has been testified to rather thoroughly in prior hearings.

A I believe the testimony in previous hearings have pretty well established that the communication existed, that the gas caps in all were common.

MR. CHRISTY: That was my purpose with asking him if he was familiar with and prescribed to the prior testimony. It was simply to save time.

MR. UTZ: Is this the only witness you have in this case?

MR. CHRISTY: Yes, sir.

MT. UTZ: Now, in regard to this request that you have made for the alternative to complete shut-in of an over-produced gas cap well, I'm wondering if there is anything in the Order that would allow us to do this, and further I'm wondering if there is anything in this application that would

allow us to discuss that in this hearing. Do you have any opinion?

MR. CHRISTY: There is not. It just came to our attention that we had been granted an allowable too great and our production people had been producing it.

MR. UTZ: That application is real easy to administer. I would assume that in the absence of any specific rules that this probably could be done administratively rather than having it enter into the rule case. Are there other questions of the witness? The witness may be excused.

MR. CHRISTY: At this point we would like to offer the testimony in prior hearings in Case 2720 for the purposes I just stated to the Examiner, and which testimony has been reaffirmed by the present witness. We would also like to offer in evidence Exhibits 1 through 4.

MR. UTZ: They have already been accepted. The evidence will be made part of the record.

MR. CHRISTY: This is all for Tenneco.

MR. UTZ: Any other statements to be made in this case?

MR. IRBY: Mr. Examiner, may I ask at this time if the Coastal States will go on before noon?

MR. UTZ: Depends on how long the Humble Case is.

MR. CHRISTY: The Humble Case will take 10 or 15



minutes direct.

MR. UTZ: Who is the attorney for Coastal States?

MR. CHRISTY: I am.

MR. UTZ: I would doubt that we finish it.

MR. IRBY: I am in this position. Due to the change of the schedule of these cases I will not be able to be here after lunch until about 3:00 o'clock. I have objections to the plans of Coastal States and I can write a letter setting forth my objections.

MR. UTZ: First, let's dispose of this other case, 2720, and take it under advisement.



# I N D E X



## E X H I B I T S

| NUMBER | MARKED FOR IDENTIFICATION | OFFERED | ADMITTED |
|---|---|---|---|
| Applt's 1 | 2 | 13 | 13 |
| Applt's 2 | 2 | 13 | 13 |
| Applt's 3 | 2 | 13 | 13 |
| Applt's 4 | 2 | 13 | 13 |

STATE OF NEW MEXICO )
) ss
COUNTY OF BERNALILLO )

I, BOBBY J. DAVIS, 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 23rd day of February, 1966.

Bobby J. Davis
NOTARY PUBLIC

My Commission Expires:

March 13, 1969

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2220, heard by me on Jan. 26, 1966.

Examiner
New Mexico Oil Conservation Commission

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. 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 No. 2720

BEFORE: Daniel S. Nutter, Examiner

TRANSCRIPT OF HEARING

MR. NUTTER: We will call Case 2720.

MR. DURRETT: 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.

If the Examiner please, I have a letter that the Commission has received from Mr. Sim Christy, attorney for the applicant in this case, requesting that the case be continued to the Examiner Hearing which would be held on January 26th.

MR. NUTTER: Case No. 2720 will be continued to January 26, 1966, same place.

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 13th 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. 2720 heard by me on 1/5, 1966.

Examiner
New Mexico Oil Conservation Commission

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

EXAMINER HEARING

IN THE MATTER OF:

Application of Tenneco Oil Company for special rules and regulations governing wells in the Double-X Delaware Pool, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the promulgation of 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 2720

BEFORE: Daniel S. Nutter, Examiner

TRANSCRIPT OF HEARING

MR. NUTTER: The hearing will come to order, please. The first case this afternoon will be Case 2720.

MR. DURRETT: Application of Tenneco Oil Company for special rules and regulations governing wells in the Double-X Delaware Pool, Lea County, New Mexico.

MR. BRATTON: Howard Bratton, appearing on behalf of the Applicant. We have one witness, Mr. Nance.

(Witness sworn.)

WAYNE NANCE

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

DIRECT EXAMINATION

BY MR. BRATTON:

Q Will you state your name, by whom you are employed and in what capacity?

A Wayne Nance, employed by Tenneco Oil Company, as District Engineer, Hobbs, New Mexico.

Q Have you previously testified before this Commission as an expert witness?

A Yes, I have.

Q Are you familiar with the Double-X Delaware Pool and the matters contained in the application in the pending case?

A Yes, I am.

MR. BRATTON: If the Examiner please, are the witness' qualifications acceptable?

MR. NUTTER: Yes, they are, Mr. Bratton.

Q (By Mr. Bratton) Will you explain briefly what Tenneco is requesting in this case?

A Tenneco Oil Company is requesting an order classifying the Double-X Delaware Field as an associated gas-oil reservoir with a limiting gas-oil ratio of 2,000 to one; 40-acre spacing in the oil column; 160-acre spacing in the gas cap; with gas allowablesto be limited to the top unit oil allowable times the limiting GOR multiplied by a fraction, the enumerator of which is the number of acres dedicated to the gas well, the denominator of which is the basic oil unit, 40 acres; a provision for balancing,

six month balancing period for the gas wells, and the classification of any well producing 30,000 to one GOR or greater as a gas well, any well producing under that ratio as an oil well.

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

Q Mr. Nance, turn to your Exhibit No. 1 and explain what that is and what it reflects.

A Exhibit No. 1 is an outline of the horizontal pool limits as of October 1st, 1962. On it also is shown the trace of a cross section which will be entered as Exhibit 2.

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

Q Does that cross section pick up the only well that currently would be classified as a gas well in the pool?

A That's correct.

Q And the pool outlines are indicated by the dashed line?

A That's right.

Q The pool outline runs through the middle of Sections 15 and 22 on the west, is that correct?

A That is correct.

Q Turn then to your Exhibit No. 2, the cross section. That cross section runs from west to east as depicted on Exhibit No. 1?

A Yes, sir.

Q What does it reflect in connection with this pool?

A Exhibit No. 2 shows the gas-oil contact and the gas

productive interval east-west cross section, which shows the pinchout as it drops off into the oil column on the east.

Q Your Tenneco U. S. Smelting No. 2 is your gas well on the west, is that correct?

A That is correct.

Q And then it runs through the pinchout on the oil column to the east?

A That's correct.

Q What are the slashed lines; those aren't the perforations, are they?

A No, the slashed lines indicate the interval that was cored by each operator. The productive intervals are shown on the cross section by the dots.

Q Does this show contact between your gas area, your gas cap?

A It shows that the zone is continuous across the field.

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

Q Now turn to your Exhibit No. 3, Mr. Nance.

A Exhibit No. 3 are copies of the core analyses.

Q Excuse me, I believe those are at the back. What do those show?

A Those show only the occurrence of the gas zones on top of the oil column as they occurred in each well, and are entered here for information purposes.

Q Those are the core analyses of the same wells reflected on Exhibit No. 2?

A That's right. They reflect the lower oil saturations or practically zero oil saturation in the gas cap, even though there is favorable permeability and porosity.

Q They show the oil zone?

A Yes.

Q The oil accumulation, lower.

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

Q Now turning to your Exhibit No. 4, explain what that is, Mr. Nance.

A Exhibit No. 4 is a plot of the bottom hole pressure as measured in the Smelting U. S. No. 2, the gas well on the west end of the cross section, plotted against total field withdrawals and shows that there has been a pressure decline in the gas cap without any withdrawals from the gas well.

Q This well has never been produced?

A No, it has not.

Q It is a pure gas well, is that correct?

A That's right. The gas-oil ratio is 400,000 to one.

Q During the approximately seven months interval reflected there without any production, the pressure declined approximately what, 40 --

A 40 psi. This indicates that the gas and oil zones are



in communication and that this is an associated gas-oil reservoir.

(Whereupon, Applicant's Exhibit No. 5 marked for identification.)

Q Turn then to your Exhibit No. 5, Mr. Nance. Explain what that is, please.

A Exhibit No. 5 is a structure map contoured on top of the Delaware sand porosity. This point also is shown on the cross section for reference. It also shows in yellow the gas-oil contact as it would occur on the top of the porosity.

Q This reflects your west to east dip?

A That's correct.

Q On top of the porosity. Would you explain the gas-oil contact further, Mr. Nance?

A The gas-oil contact in the southern end of the field is at minus 1282, as reflected on a cross section, Exhibit 2. In the north part of the field it appears that the gas cap is at minus 1302, based on information obtained from one well, the Tenneco Jennings U. S. A. No. 1 located in Section 14.

Q This would indicate some kind of a pinchout, possibly, in the interval of the dry hole reflected in Section 15?

A There was apparently some type of pinchout of porosity or some irregularity that has occurred within that interval on the gas-oil contact. We do not have enough information at this time to show what happens in that area.

(Whereupon, Applicant's Exhibit No. 6 marked for identification.)

Q Now turn to your Exhibit No. 6, your isopac, and explain what it is.

A Exhibit No. 6 is the isopac of the oil column and shows the occurrence of the pay, approximate pay thickness as 13 feet, approximate average pay thickness.

(Whereupon, Applicant's Exhibit No. 7 marked for identification.)

Q Comparing it with your Exhibit No. 7, which is an isopac of the net gas pay, you obtain an idea of the relative position of the gas pay and the oil pay in the pool as you can observe it at this time?

A That's right. By comparing the two exhibits, you can see the relative volumes of the gas cap area as compared to the oil column. Sufficient information is not available in Section 14 to prepare an isopac of the gas cap in that area, or detailed isopac.

Q Is there anything further you care to state in connection with those two isopacs?

A Nothing further.

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

Q Turn then to your Exhibit No. 8 and explain what it is, please.

A Exhibit No. 8 is a map which has been plotted, the October average producing rate by wells, the October GOR by wells, and the cumulative recoveries to November 1st, 1962 by wells.

This exhibit was prepared to show that current status of the various wells in this pool. There has been no withdrawal from the gas well, the Smelting U. S. A. No. 2. There were two wells that were completed in October, 1962, from which there has been very little withdrawals during October, the Tenneco Smelting U. S. A. No. 4, and the Tenneco Jennings U. S. A. No. 2. The wells for which there is no production information are wells that have been completed since this time and/or are currently being completed.

Q Have the gas-oil ratios in the oil column increased rapidly or have they been increasing slowly, Mr. Nance?

A Most of the development has been within the last few months in this field. However, the Gulf Hannegan "B" 1 and 2 have been on production for about 20 months and also the Tenneco Smelting U. S. A. No. 1. The gas-oil ratios on these wells have not increased but very little. The ratio increase has been very small.

Q On your gas well, Tenneco Smelting No. 2, I believe you said the GOR was 400,000 to one on it?

A Yes, sir.

Q And what was the potential on it?

A Absolute open flow was 5.6 million per day.

Q Is there anything else you care to state with respect to that?

A The gravity of the fluid recovered from the Smelting

U. S. A. No. 2 was 60 degrees API compared with about 43 degrees API in the oil column.

(Whereupon, Applicant's Exhibits 9 & 10 marked for identification.)

Q Turn to your Exhibit No. 9, Mr. Nance. Explain what that is, please.

A Exhibit 9 is a table which has been prepared showing the relative withdrawals of various types of wells in the field. It shows the withdrawal rates as they would occur under the proposed rules. They are the best approximations that we can make at this time as to the relative reservoir voidage of each type of well.

Q What conclusions do you draw from that, Mr. Nance?

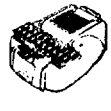
A We concluded that one gas well with 160 acres would withdraw approximately the same reservoir voidage as four marginal oil wells or three top allowable oil wells with a 2,000 to one GOR limit. Therefore, under the proposed rules, the voidage from the gas cap area would not be greater than the oil column, unless the ratio of gas wells to oil wells were increased drastically.

Q In which eventuality, the rules might need reconsideration?

A The proration of the wells might need consideration, proration formula.

Q Turn then to your proposed rules, Mr. Nance, and let's go through those. I might ask you first, are these patterned





substantially after the Angel's Peak rules?

A Yes, they are, with certain modifications to apply to the Double-X Delaware Field. But basically, they are the same type of rules that were adopted in the Angel's Peak-Gallup Pool.

Q Of course, they had 320-acre gas and 80-acre oil spacing there?

A That is correct. These have been modified for 40-acre oil and 160-acre gas units.

Q Go through them briefly, without reading them in detail, Mr. Nance.

A Well, Rule 1 is substantially the same as the Angel's Peak, which provides that any well within one mile of the Pool should be drilled and spaced in accordance with these rules.

Q Rule 2 is just your 160-acre spacing on gas wells?

A Gas wells, that's correct.

Q Now, Rule 3 just provides that oil wells are on 40-acre spacing?

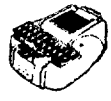
A That's right.

Q Rule 4 is your location of your wells?

A That's right. It provides for the location of any well, whether it be oil or gas, that would be drilled under these rules.

Q In your opinion, is it feasible, Mr. Nance, to have a different location requirement for oil wells and gas wells in this pool?

A No, it is not, because a well that has been in the past,



and it could be drilled in the future as an oil well, and then encounter gas; therefore, I think that the spacing of the wells should be the same for both oil and gas wells.

Q In your estimation, is there any problem resulting from the location of a gas well at a 330 location, let's say?

A No, not in my opinion.

Q Would it in your opinion void equally from the oil-gas cap; is the communication excellent?

A Yes, the information that we obtained on the absolute open potential of our Smelting U. S. A. No. 2 indicated that the various flow rates would stabilize in less than 15 minutes; that there was excellent drainage; and that under the proposed 160-acre unit we have asked for, the drawdown in reservoir pressure around a gas well would be less than 50 pounds, which would indicate that the gas cap would perform as a unit; that any depletion of the gas cap would cover a large area.

Q Are all your oil wells pumping in the pool?

A Yes. All or substantially all of them; I believe there is one well that is currently flowing, but a pumping unit is scheduled for it. Correction, there are two wells that are flowing.

Q Turn to your Rule 5, then. What does it provide?

A Rule 5 provides for the classification of a gas well with a gas liquid hydrocarbon ratio of 30,000 or greater, and also for the classification of an oil well if the ratio is less than this; also prohibits the simultaneous dedication of acreage to an

oil or gas well.

Q And Rule 6 is your standard 2,000 to one gas liquid ratio limitation?

A That's right.

Q And Rule 7 is your allowable provision for a gas well, is that correct?

A That is correct.

Q What does that provide?

A It provides for the establishment of the gas allowable by multiplying the top unit oil allowable for the pool by 2,000, and multiplying it by a fraction, the enumerator of which is the number of acres dedicated to the gas well, and the denominator of which is 40. In other words, a gas well on 160 acres would be assigned four times the gas allowable of an oil well.

Q And also if 80 acres were assigned to the well, it would be twice?

A Twice.

Q Rule 8 -- well, actually, Rules 8 and 9 together.

A Well, Rules 8 and 9 actually only require that a gas-oil ratio test be taken on a well within a short period of time after it has been completed. Also, Rule 9 requires that the future gas liquid ratios will be taken on a well in accordance with the provisions of the Commission's State-wide Rule 301.

Q Do you see any necessity for gas-oil ratio tests more frequently than that, Mr. Nance?



A I do not see any need at this time for more frequent tests. Possibly in the future, if the field develops differently, there might be, which if it were necessary, the Commission would have the authority to require more frequent testing.

Q And Rule 10?

A Only requires that each gas well should have a bottom hole pressure test filed with the Commission.

Q Rule 11 just provides for the assigning of a gas allowable to a gas well?

A That's correct.

Q Rule 12 and the subsequent rules provide for your balancing periods, is that correct?

A That is correct. They're similar, in fact, they are identical to the Angel's Peak rules.

Q Let's note in Rule 12 we are asking for an initial balancing period of seven months in order to get it on the February 1 and August 1 basis, is that correct?

A That's correct; seven months initially.

Q Otherwise, you would have to have a January 1 to February 1 period and then start from there?

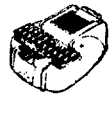
A That's correct.

Q Do you see any point in doing that?

A No, I don't.

Q Other than that, the rest of them are taken off of the Angel's Peak, as far as balancing, is that correct?





A That is correct.

Q Your Rule 23 defines the vertical limits of the pool, is that correct?

A That is right, being the upper 200 feet of the Delaware sand.

Q That's correlated to a formation located in your Tennessee No. 1, Tennessee Smelting No. 1, is that correct?

A That is correct.

Q Is that the best identifiable marker you could determine, Mr. Nance?

A Well, yes, it is. That well probably went as deep as any well in the field, with the exception of our Smelting No. 2 which we carried quite a bit deeper; and there were no productive zones. Most of the completion has just been in the upper part, which you can't correlate too well.

Q Is there anything else you care to state in connection with these proposed rules.

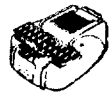
A There was one provision, page 3, --

Q Yes.

A -- that we would like to modify that to read in the last sentence on the page to mark out the word "said."

Q The last sentence on page 3, take out the word "said" and insert "any well or" then follow with the word "wells","as presently located thereon." That's purely grammatical, isn't it, Mr. Nance?





A That is correct.

Q To show that you could produce it from any one of your wells?

A That's right.

Q Whichever you wanted to?

A Yes.

Q Mr. Nance, in your opinion will these rules best provide for the prevention of waste and the protection of correlative rights in this pool?

A Yes, they will.

Q In your opinion, will these rules provide for approximately correlative withdrawals from the oil column and the gas cap?

A They will provide for approximate withdrawals. The only thing is that if the ratio of gas wells to oil wells were to increase drastically, then the proration formula would need to be reviewed and revised to limit the withdrawals from the gas cap to the withdrawals from the oil column.

Q But as of now or anything in the foreseeable future, your estimation these rules will adequately protect the oil co and prevent the migration of oil in the oil column and the mig of gas into the gas area?

A That's correct.

Q Were these exhibits prepared by you or under you tion?

A Yes, they were.

Q Is there anything else you wish to state in connection with this application?

A No.

MR. BRATTON: We offer Exhibits 1 through 10 into evidence.

MR. NUTTER: Tenneco's Exhibits 1 through 10 will be admitted.

(Whereupon, Applicant's Exhibits Nos. 1 through 10 entered in evidence.)

MR. BRATTON: That's all we have.

MR. NUTTER: Does anyone have a question of Mr. Nance?

MR. DURRETT: Yes, I have a question.

CROSS EXAMINATION

BY MR. DURRETT:

Q Referring to page 2 of your Exhibit No. 10, the rules, which is actually paragraph 5 of 2-B, that's Rule 2-B-5, where it states that the Secretary-Director may approve the application if after the period of 20 days, no such operator has entered an objection to the formation of the non-standard unit. If these rules were adopted by the Commission, would you have any objection to having that read 30 days?

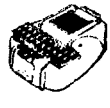
A None at all.

MR. DURRETT: Thank you. I believe that's all I have.

MR. NUTTER: Are there any other questions? Mr. Utz.

BY MR. UTZ:





Q Mr. Nance, is it your recommendation that we put this gas cap and wells in this gas cap on the Southeast Gas Proration Schedule, if it balances, as we do in the other prorated gas pools?

A I think offhand that would be my recommendation, unless there is a better, more efficient means of handling it.

Q At the present time, you only have one gas well in the pool?

A That is correct.

Q And its allowable would be assigned on the basis of a normal oil allowable?

A That's right.

Q I would like to call your attention to Rule 12, in which you have suggested that the balancing periods and proration periods be from February 1 to August 1.

A Yes.

Q And that the Southeast proration periods are from January 1 to July 1. Wouldn't it be more appropriate to have balancing periods identical to all the Southeast prorated pools?

A Yes, it certainly would.

MR. BRATTON: We just took these off the Angel's Peak. You are certainly correct.

Q (By Mr. Utz) Since all the prorated gas pool orders are contained in R-1670, would it further be your recommendation to make this order, if approved, a part of the 1670 series?

A Yes, sir.

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

BY MR. NUTTER:

Q I'm having a little difficulty reading some numbers on one of these exhibits, Exhibit No. 8.

A Yes.

Q Now the number on the left above the line under each well --

A Yes, sir.

Q -- is the average daily production from that well during the month of October?

A That's correct.

Q Well, is there a top allowable well in the pool?

A Not to my knowledge. That Dove Hankin "B" 1 is close to a top allowable, 34.7.

Q And it has a ratio of 18,700, is that correct?

A No, sir. That is the cumulative recovery. The ratio is 1671 in parenthesis, GOR.

Q Referring to Exhibit 9 where you have given these two hypothetical cases to compare the withdrawals from a gas well with the withdrawals from an oil well. You have a top allowable oil well with 35-barrel per day production and a GOR of 2,000 to one voiding 78 barrels per day in the reservoir?

A Yes, sir.

Q Then you have a hypothetical well that makes 2.3 with a ratio of 30,000 to one voiding 55 barrels. Is there any well



here that actually fits either of those hypothetical oil wells?

A Not at the present time there isn't.

Q Did you state that there hasn't been any marked increase in GOR's during the productive life of the well?

A That's right.

Q Do you expect to see a marginal well here with a ratio of 30,000 to one?

A I do.

Q Where will it be drilled?

A Well, the Tenneco Jennings U.S.A. No. 1 was initially completed for a ratio of 4,000 to one.

Q Is that the well --

A Section 14.

Q Oh, in Section 14.

A I anticipate there may be future wells or as the gas cap expands into these oil wells, that the ratios will increase on those wells.

Q Have the ratios of any of the wells gone down since they have been produced?

A Not to my knowledge.

Q The gas well hasn't been producing, either?

A It has not been producing.

Q What is the solution GOR in the oil column?

A It has been estimated by correlation that it is 800 to one.



Q There hasn't been any fluid analysis made?

A There has been none taken.

Q Is it your opinion that this north area is connected with the south area, or do you think that there is a permeability pinchout there which would result in the shifting of the gas-oil contact?

A It's my opinion that there is a permeability pinchout there which has caused the gas cap to be shifted some 20 feet down-dip in the upper portion. I might point out that's based on only one well, also.

Q The Commission has, however, designated this entire area as being one pool?

A That is correct.

Q Did Tenneco give any thought to the formulation of rules which would use a volumetric type of formula for obtaining the equivalents in the gas cap compared to the withdrawals from the oil column?

A Yes, we gave some consideration to that type of rules.

Q Were any calculations or computations made there that would indicate the withdrawals?

A Well, we calculated the withdrawals on the basis of October production from the oil column. They were calculated to be about 370 reservoir barrels per day.

Q From the oil wells?

A From the oil wells. And I might point out that was

based on 12 wells. At the present time there are 20 wells. If you ratioed that up to December, January 1, something like 620 reservoir barrels per day being voided from the oil column.

Q If the one gas well received all that, it would receive a higher allowable than what you are proposing here?

A That's correct. It would be much higher than what we have proposed.

Q Now, you said that this would be a fine system to use until such time as there were an abundance of gas wells drilled here, and then it should be reviewed again?

A That's correct. If the ratio of the gas wells were to exceed the withdrawals of the oil column, then some means should be provided to balance the withdrawals of the gas cap with the oil column withdrawals.

Q By what criterion would the Commission decide when it would be time to change the rates of withdrawal?

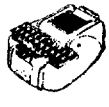
A Well, I think on the ratio of one gas well to four to six oil wells, depending on the quality of the oil wells, when that ratio was exceeded. At the present time, we have one gas well to 20 oil wells.

Q It would also make a difference if you were talking about oil wells like the 4,000 to one, or the Reed Bradley well that's too small to measure?

A That's correct.

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





MR. BRATTON: I would like to ask a question.

REDIRECT EXAMINATION

BY MR. BRATTON:

Q Mr. Nance, with your difference in your gas-oil contact in your south and north areas, that would present pretty insurmountable barriers as far as using a volumetric formula in the field, wouldn't it?

A Well, it would if they were not connected. We do not have information at this time to prove that they are not connected but if they are connected, well, it wouldn't; but if they were not, well, then, it might present some problems.

Q So as of now this formula appears more feasible than a volumetric formula?

A That's right. This formula seems to be more workable with less work, less paper work at this time.

MR. NUTTER: Are any wells drilling in the field at the present time, do you know?

A I think that they are in the process of being completed. I don't believe there is a rig actively drilling.

MR. NUTTER: Is Tenneco drilling any well at the present time?

A No, sir, at the present time we have discontinued drilling.

MR. NUTTER: Are there any other questions? The witness may be excused.

(Witness excused.)

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

MR. BRATTON: No, sir.

MR. NUTTER: Does anyone have anything further to offer in this case?

MR. KASTLER: Bill Kastler with Gulf. Gulf Oil Corporation owns some acreage in the vicinity of this associated gas-oil field. We have no objection to these proposed rules.

MR. NUTTER: Any further statements? We'll take the case under advisement and take a five-minute recess.

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