BEFORE THE

Oil Conservation Commission

SANTA FE, NEW MEXICO

April 21, 1955

IN THE MATTER OF:

CASE NO. 881

TRANSCRIPT OF PROCEEDINGS

ADA DEARNLEY AND ASSOCIATES
COURT REPORTERS
ROOMS 105, 106, 107 EL CORTEZ BUILDING
TELEPHONE 7-9546
ALBUQUERQUE, NEW MEXICO

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
April 21, 1955

IN THE MATTER OF:

The application of the Oil Conservation Commission for an amendment to that portion of Order R-520 pertaining to the "Special Rules and Regulations for the Eumont Gas Pool."

Applicant, in the above-styled cause, seeks an order which amends and revises the "Special Rules and Regulations for the Eumont Gas Pool" contained in Order R-520 to provide for a system of allocating oil and gas allowables to proration units within the Eumont Gas Pool; and to provide special rules and regulations pertaining to dually completed wells within the Eumont Gas Pool and assignment of allowables thereto; and to promulgate any other rules and regulations in order to prevent waste and protect correlative rights within the Eumont Gas Pool. Case 881

BEFORE:

Mr. E. S. (Johnny) Walker
Mr. William B. Macey

TRANSCRIPT OF HEARING

MR. MACEY: The next case is Case 881.

S. J. S T A N L E Y

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

DIRECT EXAMINATION

By MR. KITTS:

Q Will you state your name and position, please?

A S. J. Stanley. Engineer for the Oil Conservation Commission.

Q Mr. Stanley, you are familiar with Case 881, are you not?

A Yes, I am.

Q In that connection, you have made a study which is incorporated in two exhibits you have prepared?

A Yes, sir, I have.

Q We will pass first to what has been marked Commission's Staff Number 9; please explain what that is.

A First of all I wish to state that my testimony will be of a general nature and the intent of the testimony is to explain the problem facing the Commission in Case 881, in a simplified manner. In the introduction of this testimony, we will introduce Mr. Montgomery, who will follow with a more technical, geological analysis of the problem.

Briefly, the problem in this case is the granting of duals within the vertical limits of one pool, namely the Eumont Gas Pool. Secondly, there is a problem of granting gas proration units and within this gas proration unit there are oil wells located down structure, which produce from the defined limits of the same pool. Exhibit Number 9 shows the horizontal boundaries of two oil pools; namely, the Eunice and Monument Oil Pools.

Q What color?

A These are colored in red. It also shows the horizontal boundaries, as defined by the Commission, of the Eumont Gas Pool, which is colored in green. The feature of these boundaries is the fact that there is nearly identical overlap. Exhibit No. 10 is a simplified cross-section showing the Yates, the Seven Rivers, the Queen, the Grayburg and the San Andres. This cross-section was chosen at random in Twp. 19S and is located 1980 feet from the south lines of Sections 31, 32, 33, in Range 37 East; in Sections 33, 34, 35, 36,

in Range 36 East. There was no special reason for choosing the location of this cross-section at this point, but it does tend to explain the problem. This simple cross-section indicates the geological structure of the Eunice-Monument Oil Pool and the Eumont Gas Pool.

The Eunice-Monument Oil Pool was discovered on March 21 of 1929 and to date the two oil pools have approximately 1,000 oil wells. When these pools were first drilled, it was a general practice to drill the wells to a certain subsea data as far as total depth is concerned. The rule of thumb was to bottom up slightly above an approximate minus 355 foot subsea data. This was considered to be the water oil contact.

Q Do you have that marked on your Exhibit?

A Yes, sir. Here is the water oil contact in the pool. With this rule operators would attempt to vary their casing program by landing the casing at such a point to reduce low gas-oil ratios. In this respect it was found that the casing point should be below the minus 150 foot subsea datum. The vertical black lines on this particular exhibit, that is Exhibit No. 10, indicate the position of wells penetrating the Monument Oil Pool. It must be noted that there is a close similarity between all wells, pertaining to total depth. This is the true characteristic of the entire field. However, the most important part and the most important feature of the cross-section is this: That if an operator conformed to completing his well at a certain subsea datum, eventually these wells would cross formational boundaries as they proceeded from the middle of the pool in a westward direction. This is also true, that if they proceeded with the completion of these wells from the center of the

pool in an eastward direction. Therefore, in the exhibit, the two furthest west wells should be discussed, and they are: first, the Amerada-Gaither No. 1, which is the well second from the westerly direction on Exhibit No. 10. The Amerada-Gaither No. 1 is a well producing oil both from the Queen and the Grayburg formations. The last well to the west is the Amerada-Gaither No. 3, which produces oil from the Queen formation due to the regional dip of the formations to the west. Theoretically, development could continue on the west flanks of this field and if porosity and permeability existed in these formations, then eventually we could have oil production not only from the Queen formation, but also from the Seven Rivers formation and eventually the Yates formation.

We feel that the water-oil contact continues regionally at approximately minus 350 feet or minus 300 subsea feet. We do feel that regionally the gas-oil contact for all practical purposes remains at minus 150 feet. This actually occurs, and Mr. Montgomery will testify to this occurrence. The problem now unfolds itself; theoretically with porosity and permeability development, why not drill a well in such a manner that an operator can perforate the pipe above the gas-oil contact as shown and produce gas and also perforate below the gas-oil contact and produce oil and separate these two zones by packer.

This theoretical well could be located within one formation or at least within the vertical limits of one pool. This has actually happened and I would like to read into the record 15 oil-gas duals within the Eumont Pool and read into the record the formations which they are producing from. The Amerada-White No. 1 (P 34-20-36) is middle Seven Rivers oil, lower Yates and upper Seven Rivers gas. The

Amerada WEB No. 3 is lower Yates and upper Seven Rivers Gas and upper Queen oil. The Shell State M No. 1 is Yates-Seven Rivers gas, Queen oil. The Amerada WEF No. 1 is Yates and Seven Rivers gas, middle Seven Rivers oil. The Charm Oil Company, Gulf State No. 1 is upper Seven Rivers gas, lower Seven Rivers oil. The Amerada WEA No. 2 is lower Yates, upper Seven Rivers gas, middle Seven Rivers oil. The Shell State A12 No. 2-A is Yates and Seven Rivers gas, Queen oil. The Superior Oil Company State No. 1-12 is upper Seven Rivers gas, middle Seven Rivers oil. The Charm Superior State No. 1 is Yates gas, middle Seven Rivers oil. The Drilling and Exploration No. 4 is Seven Rivers gas, upper Queen oil. The Shell State H. No. 2 is upper Seven Rivers gas, Queen oil. The Amerada WEE No. 1 is lower Yates, upper Seven Rivers gas, middle Seven Rivers oil. The Shell State H No. 4 is Yates and Seven Rivers gas, lower Seven Rivers oil. Drilling and Exploration State F No. 3 is Yates and Seven Rivers gas, upper Queen oil. The Humble State B1 is Yates, Seven Rivers gas, lower Seven Rivers, the Queen oil.

Q What data did you use in your preparation of the testimony you have just given on these wells?

A We have used the geological data as prepared by Mr. Montgomery and the nomenclature that recognizes the various formations and the various exhibits that we shall see.

Q Is that the basis for your testimony?

A Yes.

Q All right.

A All these dual completions are within the vertical limits of one pool, namely, the Eumont Gas Pool. Secondly, the problem that

arises is to have a gas proration unit as the result of completing (a)gas up structure, and on the same unit have oil wells completed down structure in either the same formation or within the vertical limits of the Eumont Gas Pool. Here is where waste can occur. The average 160 acre gas proration unit produces on an average, over a year's time, in the Eumont Pool, an average of 800,000 cubic feet of gas per day. Let us compare volumetric withdrawals of this gas well with an offset oil well down structure and producing from the same formation. The oil wells usually, below the gas-oil contact, have the characteristic of producing with a low gas-oil ratio. A voidage, as determined by me, and I used the Cox method and A.P.I. Drilling of 1942, pages 137 to 147, based on the 40 barrel allowable, would be approximately 48 barrels. To be conservative, add an additional 600 cubic feet of gas to account for any possible free gas which could occur. The total oil voidage would be approximately 100 barrels, based on 40 barrels a day allowable. My calculations of 1,000 feet of dry gas at 1,000 pounds pressure reservoir temperature, gravity of .68, would be approximate voidage of 2 barrels.

Let me repeat, for every 1 M.C.F. of gas that we produce in the Eumont Gas Pool, we void 2 barrels of reservoir space, approximately. Taking 800,000 cubic feet of gas would be 1,600 barrels reservoir voidage, or approximately 16 times the voidage of oil. Therefore, the net result would be the movement of oil up structure.

MR. KITTS: We offer Commission's Exhibit 9 and 10.

MR. MACEY: Without objection, Exhibits 9 and 10 will be received.

MR. KITTS: That is all.

MR. MACEY: Any questions of the witness?

By MR. REEDER:

Q I believe, Mr. Stanley, you have some bottom hole pressure information and pressure on the line information which might be of interest at this time.

A Well, I didn't actually prepare these exhibits in a finished matter. I do have a comparison of bottom hole pressure in the Eunice-Monument Oil Pool as compared with the Eumont shut-in pressures. During 1954 the approximate bottom hole pressure of the Monument Oil Pool was 1,012 pounds. Also during that time I had averaged the shut-in pressures of all the gas wells in the Eumont Pool, as taken on the deliverability tests, and they themselves were shut-in, the wells were shut-in for 72 hours, and that average pressure was 1,022 pounds. There was only a difference of 10 pounds between the oil reservoir and the gas reservoir.

One of the most interesting features of the bottom hole pressure curve is the fact that since 1938 to 1952 the reservoir, that is the Monument-- Eunice-Monument Oil Pool declined on the average of 18 pounds. Then, from '51 to '52 and '54, there was an average bottom hole pressure drop in this reservoir of 95 pounds. We at that time anticipated that in 1955 the bottom hole pressure in the Eunice-Monument Pool should increase, regardless of the voidage, regardless of the production due to the fact that in this particular pool we had repaired somewhere around 100 casing leaks and actually, I just received the bottom hole pressure average, the first bottom hole pressure taken in 1955, and it does indicate that the average pressure is slightly higher in 1955 in the Eunice-Monument Oil Pool than it was in 1954. I attribute that

to the fixing of casing leaks in the area.

MR. MACEY: Mr. Stanley, your 1,022 pounds Eumont shut-in pressure is a surface pressure, isn't it?

A Yes. It would be considerably higher than that if it were a reservoir pressure, there would be considerable difference between the two pools. It wouldn't be because of the weight of column of gas, if it were all gas it would be slightly higher, but it would be insignificant. I tried to take into consideration only those wells that we know that are not producing any fluid.

MR. MACEY: Your 18 pound decline you referred to is a per year average decline?

A Yes, sir.

MR. MACEY: Any other questions of Mr. Stanley? If not, he may be excused.

(Witness excused)

* * * * * * * * * * *

R A N D A L L M O N T G O M E R Y,

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

DIRECT EXAMINATION

By MR. KITTS:

Q State your name and position, please.

A Randall Montgomery. Geologist for New Mexico Oil Conservation Commission.

Q Mr. Montgomery, you are familiar with Case 881?

A Yes, sir, I am.

Q Before beginning your testimony, do you have any brief introductory statement you wish to make?

A My statements are essentially the same that Mr. Stanley

made. That is, one, what is to be done with Eumont dual completion, and, number two, if they are to be recognized, to what extent should acreage be dedicated to these Eumont dry gas wells. The third problem that we have is Eumont oil moving up structure. Possibly the fourth one that the Commission is going to have to work on would be, when we do finish recompleting the classification of the wells in the Eunice-Monument according to Order R-520, Mr. Porter has brought out the problem that we are going to have on some leases, wells on the same basic lease, some wells in the Eumont and some wells in the Eunice or Monument, the ratio in the Monument being two separate pools going into the same tank battery with the added problem that the ratio in Eumont, 10,000 to 1, the Monument, 3,000, and Eunice, 6,000 to 1.

Q You have prepared several exhibits here, taking into consideration Exhibit 1 through Exhibit 4 were those prepared by you. If not, by whom were they prepared?

A Exhibit No. 1 and Exhibit No. 3 I prepared myself. I assisted in the preparation of Exhibits No. 2 and 4. Exhibits 1, 2, 3 and 4 are those cross-sections published by the Stratigraphic Committee that met after call by the Commission during the fall of 1954. I found certain difficulties in attempting to reclassify these wells according to R-520 due to certain disagreement as to where many of the tops occurred in the Yates, Seven Rivers, Queen and Grayburg. Therefore, this Committee was called and we have arrived at certain marker beds which we feel are relatively widespread and are about as good a markers as possibly can be determined for these formations.

Q The markers shown on the exhibits are those agreed upon by

that Committee, is that correct?

A That is right.

Q Proceeding first to Exhibit No. 1, Mr. Montgomery, would you explain that exhibit?

A Exhibit No. 1 is a north-south cross-section from the northern end of the Eunice-Monument and Monument Pool to the southern end, starting with the Schermerhorn Gulf State No. 1 to the Gulf Ramsey No. 17, the southern portion of the area roughly covering the span of 3 townships. Starting on the north end, we notice the Schermerhorn Gulf State No. 1 is bottomed up in the Penrose Section.

Q The green represents what?

A The green represents that interval that the well is actually producing gas from as best we can determine true perforations or open hole sections. The red represents those intervals as best we can determine that are either all open hole in the oil pool or for the perforations in the oil pool.

One will note on the northern end that we are relatively low and as we go up to the crest of the Monument structure in the vicinity of the township of Monument, roughly, the highest point, and going southward we get the general dip going back all the way down to Gulf-Ramsey No. 17. There is relative thickening in the Seven Rivers and Yates as we go off the structure.

Q I don't believe the people in the back of the room can make out the various formations there, the sands. Will you point those out?

A This upper band in here is the Yates. This portion in here is the Seven Rivers. This portion here is the Queen. The Queen is broken down into two parts, the "Q" representing the Queen and

the Penrose, which is actually a member of the Queen, but is widely recognized as the Penrose member of the Queen. In this portion is the Grayburg. The top of the San Andres is not represented here. I have not been able to pick the top of the San Andres on gamma ray and electrical log, so that top is not indicated on these cross-sections, but these wells are probably producing from the wells that would be in the area structure, they are probably producing from the San Andres, these two wells. This well is producing from the Paddock and this well, the Gulf Matthews No. 9, is producing from the Paddock, but the Gulf Culp B No. 4 is producing from the Blinebry . They were used because there happened to be a log there for the cross-sections. One will note in examining the cross-sections, generally we can say, roughly, that the gamma ray neutron log, if it stays out well it is dolomite and denser anhydrite, possibly when it comes in we can generally say it is sand and possibly porous. We can see that the Penrose sand is a relatively good blanket sand, within areas, becomes more dolomitic. It starts becoming more dolomitic toward the base of the Penrose as you come off the Monument structure. The sands tend to come up. As we go south, we notice the dolomites become higher in the Penrose until we get into the vicinity of the Tidewater State A No. 4. Then we notice that percentagewise there is more dolomite than anydrite. Now referring to the upper part of the Queen, we find that on top of the structure that it is predominantly a dolomitic section. As we go down, we notice it becomes more sandy, also in the neighborhood of the Texas ~~AG~~ Aggirs "H" Yates No. 5, becoming more sandy as we go off structure clear on into the Humble State B No. 7 and Gulf Ramsey No. 17. These in part

are sample logs. There is possibly some confusion caused in picking tops. After you get out of the sandy wells, say we are in Grayburg, and actually using, keeping this concept of correlating this formation, actually is still in the Penrose portion of the Queen. We will notice that as we come off the structure, as I said earlier, probably the wells on top of the structure are producing from San Andres, and as we go off structure we come into the Grayburg and as we continue to go off structure in the neighborhood of the Tidewater Coleman No. 3 we notice that the casing is set about in the midpoint of the Penrose sand, indicating there is some possible production from the Penrose, but according to the gamma ray log, it was an old well with a log running in the well after it produced for a number of years, indicates that probably a large portion of the oil was actually coming from the Grayburg. This is interpreted by the calcium, it seems to deposit not only where the oil comes out, but it comes out of the water, the water that is actually associated with the oil, and sometimes it is actually water that is from the water table. Here it is probably that water that is associated with the oil.

As we go on further south to Cities Service State C No. 3, we notice that the oil is entirely within the Penrose Section. Going further south, Humble State B No. 7, we notice that the oil has been produced, the well is now plugged back, the oil has been produced from the Penrose Section even higher than what it was in the Cities Service State C No. 3. The well was plugged back and completed as a dry gas well in December of 1947. The portion of the Queen was perforated for dry gas and in the Yates up here and in the Seven Rivers in the middle. Going further off structure

we come to the Gulf Ramsey No. 17, which is a relatively new well completed last year. It was completed as a dry gas well. I have indicated, the red here is the symbol I have used for oil. Actually the well has never produced any oil. I put it on there to show the correlation, because on the drill stem test there was a small amount of oil recovered in this well. Gulf apparently did not feel it was a commercial well. There were several engineering problems involved; they had already landed their pipe at the top of the Yates, near the top of the Yates, and there probably would have been an engineering problem involved if they could have made a well. It is a dry gas well.

Q Mr. Montgomery, as a result of your study of this exhibit do you have any opinion as to whether there is communication throughout the Queen?

A Yes, sir, I believe regionally there is communication throughout the Queen.

Q Are any of the problems you spoke of in your introductory statement shown by this exhibit?

A Yes, sir. We will notice that taking the Queen Section in the oil, the Humble B No. 7 has produced from, Cities Service State C No. 3 is producing from -- I am sorry, not the Cities Service State C No. 3, but the Humble State B No. 7 -- the interval it has produced from is in the same zone that the Tidewater State A No. 4 has been perforated for dry gas. In other words, the greater volumetric withdrawal due to the gas allowable as opposed to oil allowables, the Tidewater State A No. 4 and their other wells in the area are voiding considerably more space than the oil wells are or have. Going to the Amerada State W No. 2, which is a

plugged-back well for dry gas well, and it is in the Penrose portion of the Queen, whereas we had in the Cities Service C No. 3 the Penrose oil. There does not appear to be any reasonable geological barrier between those oil wells and gas wells.

Q Do you have any further comment on Exhibit No. 1?

A I believe that is all.

Q Passing now to Exhibit No. 2 - -

A Exhibit No. 2 is an east-west cross-section through the northern portion of the Monument Pool. This is represented on this small plat by the red line that goes east to west here. Again we are considerably off the flank on the west side and the east side. The well on the west side, the Ohio State McGrail No. 4, is an oil well producing from the Penrose Section. Going up structure and one mile east, we find that Amerada Weir B No. 1 is a dry gas well completed in the Penrose Section. Continuing on up the other gas wells shown on the cross-section are completed within the Queen for dry gas, with the exception of the Amerada State O No. 1, which did take in a small portion of the lower Seven Rivers in the perforations. One will notice again that the oil is remaining at relatively common horizon. I do have some red indicated on the Aztec Burke No. 1 -- I intended that red should not be there. I intended to check in for drill stem tests or other information that would show possible shows of oil, but I did not obtain the information. I attempted to erase the red, but I did not have a successful job of doing it. The well was plugged back to the middle portion of the Queen and is now completed as a dry gas well. To the best of my knowledge, it does not make any fluid. It is plugged back as about a minus 10 or 115 in relation to sea

level.

Q Do any of the dual completions there show production entirely within the Eumont?

A No, sir, not on this cross-section. The dual completions here are in the Monument and Eunice Pools. There is no problem as far as that point is concerned with any well shown here.

Q Are any other problems you spoke of illustrated by this exhibit?

A No, sir, they are not.

Q Do you have any further comment on Exhibit No. 2?

A No.

Q Passing to Exhibit 3 - -

A It is a cross-section here that runs in a southwesterly direction, northerly direction through Township 20 South and represented on the small plat with the red line on Exhibit No. 1. One will note here that this is slightly south of the Monument high, which would be in this general neighborhood here.

We are a little lower stratigraphically, a little higher stratigraphically in the oil that occurs at the common datum that Mr. Stanley spoke of. In the previous exhibit, Exhibit 2, we noticed that the oil was in the Penrose; Exhibit No. 1 we had oil in the Penrose and Queen. Now on Exhibit No. 3, the upper portion of the Queen comes down low enough and porosity and permeability has developed in that interval that we do have an oil well.

Q Is that the Queen you are pointing to?

A Yes, this is the upper portion of the Queen. The Penrose is this portion here which is part of the Queen. The Yates being

this interval, the Seven Rivers this, and the Queen this interval. Down below being the Grayburg.

The second cross-section on the well less than a mile away is Continental Reed B23-No. 6. It is an oil well completed within the Penrose Section. Continuing on up structure, we come to Stanolind Gilluly A No. 4. The Stanolind is a dry gas well, previously produced oil; that has been plugged back and recompleted as a dry gas well. It is perforated in the Yates, Seven Rivers and Queen. Down structure the perforations where probably most of the gas is coming from is the same stratigraphic interval that the Continental Reed B23 No. 6 is producing oil from. The second set of perforations in the Stanolind well is in the same stratigraphic horizon that Amerada WED No. 1 is producing oil from.

Going on across the structure, we note that the wells in the higher portion are probably producing oil from the Grayburg, possibly San Andres, until we get to the west side. We go down and note that the Penrose again falls in this relatively common interval and the Schermerhorn No. 1 is an oil well in the Penrose, whereas back up structure the Schermerhorn Christmas No. 1 is a dry gas well in the Penrose. This Schermerhorn Weir No. 1 was the second oil well that was found on the east side of the Eunice-Monument structure. It was completed as an oil well.

Q Do you have any further comment on that exhibit?

A No.

Q Passing on to Exhibit No. 4 - -

A Exhibit No. 4 is a west-east cross section through Township 21 South. It is represented on Exhibit No. 1 by the red line that starts on the west side of the Eunice-Monument structure and

continues over into the neighborhood of the town of Eunice in the Penrose Skelly Pool, a distance of about 12 miles. To save work I went ahead and used this cross-section even though it is outside the area of study. Here each time as we get lower in the section the high stratigraphic unit becomes productive of oil; the last case it was the upper Queen, now we are getting into the lower Seven Rivers. On the exhibit, Charm, it is producing oil from the lower Seven Rivers and the upper portion of the Queen. 1,320 feet away, or one location if they are staked in the orthodox manner, the Shell State L No. 4 is producing oil from the upper portion of the Queen. The Charm Gulf State No. 4 apparently did not find any oil in the same horizon that the Shell State L No. 4 did, one location to the east, because they plugged back that portion that is producing oil in Shell State L No. 4.

Going on eastward to the Atlantic State K No. 1, this well is probably producing from the Grayburg. I think possibly we'd have to run samples to determine that. I am not sure then that you would come to an accurate determination.

Q You haven't attempted to pick out the Grayburg?

A No, sir. You notice that there is no Grayburg top and that was because in this particular area we were lost to find a bed that we could carry across what they thought was the same bed we had been carrying in the other areas, so we do not have a Grayburg top here. These wells are possibly producing in the Grayburg. I would say they are probably Grayburg. We will notice going up structure the Continental Meyer B8 No. 4 is a dually completed well, dry gas in the Eumont and oil in the Eunice Pool; that the lower set of perforations on the Continental well are in the same interval

that the Shell State L-4 is producing oil and also the Charm Gulf State No. 4 kind of overlapping there. They are withdrawing gas of the same zone with no apparent geologic barrier separating them.

Q What zone?

A The zone of the lower perforation in the Continental Meyer B8 No. 4. It is also perforated in the Yates and Seven Rivers for gas, but again we will note in this area that the Yates and Seven Rivers have considerably more porosity and permeability than we noticed on most of the other cross-sections in the area. We are getting further off structure and the sand tends to pinch out as we go up structure, the Yates and Seven Rivers sand.

Going on eastward to Texas Riddell No. 1, it is a dry gas well in the Penrose. They apparently attempted a completion a little deeper, they plugged back. I do not know why they plugged back. I have no information on that. The Neville G Penrose Alves No. 2 is also a plug-back well and producing gas from the Queen, mainly the Penrose portion.

Q Are any of the problems you mentioned in your initial statement illustrated by this exhibit?

A None, other than the possibility of this dry gas voiding considerably more reservoir space than the oil off structure and possibly causing the oil to move up structure.

Q Do you have any further comment in exhibit No. 4?

A No, that is all.

Q Mr. Montgomery, in Exhibits 1 through 4 will you state briefly what data was available to you and the others who prepared the exhibits?

A Well, Exhibits 1 through 4 were of a very comprehensive study. There were at least some 15 companies represented on the Committee. A great number of years of experience of working in the area and I myself do not believe that a better correlation could have possibly been adopted. Everyone was very conscientious and I think that they have made a contribution.

Q What type of data was used?

A Their experience in the area, electrical and gamma ray logs and sample logs, core data.

Q Mr. Montgomery, proceeding to Exhibit No. 5 - -

A No. 5 was prepared by Mr. Nutter, engineer for the Commission. It shows some of the problems that we spoke of today. It is illustrated on Exhibit No. 8 by the short blue line in Sections 34 and 35 in 19 South, Range 36 East. Shown on this cross-section is the Shell Foster No. 4, the Amerada Gaither No. 3 and the Amerada Gaither No. 1 and the Amerada Weir No. 3. We note again as we go off structure in this relatively common occurrence of oil that off structure in the Shell Foster No. 4, the well is completed for oil in the Penrose Section. I would like to, at the risk of being a little boring, read the potentials on these. Potentials on the Shell Foster No. 4, 747 barrels, G.O.R. 236. The potentials on the Amerada Gaither No. 3, 752 barrels, G.O.R. of 227. The initial potential on the Amerada Gaither No. 1 completed in the Grayburg, 724 barrels with a G.O.R. of 666. Potential on Amerada Weir No. 3 made 113 barrels of fluid, 3 percent water through half-inch choke. The Ameradas were completed back in 1936. The Amerada Gaither No. 3 were completed in the latter part of 1954.

Q Mr. Montgomery, there is a small plat contained in that

exhibit also. Will you explain what that is?

A Yes. This square represents Section 34 and it is an ownership map showing the Gulf lease in the northern portion, the Amerada lease outlined in red. The Sheldon lease, the western Sheldon lease, the 80 acres, is on the west side the Shell Foster, the south half and the south half. The Amerada acreage was outlined in red. The reason for outlining it in red was to represent the proration unit that is dedicated to Amerada Gaither No. 1.

Q Will you point that out in that proration unit?

A It is in the northeast of the southeast Section 34, 19, 36. The Amerada Gaither No. 1 is a dually completed well for oil in the Grayburg and gas in the Queen and very lower portion of the Seven Rivers. The Amerada Gaither No. 2 and the Amerada Gaither No. 3 are oil wells in the Penrose, all top allowable oil wells with a very low gas-oil ratio. In other words, at some point between the Amerada Gaither No. 1 and the Amerada Gaither No. 3 there is a gas-oil contact, referring just to that interval that is producing in the Amerada Gaither No. 3, which would probably make the gas-oil contact leaving the Gaither No. 1 actually something less than 80 acres that is essentially productive of gas. But the perforations that are in the lower part of the Seven Rivers and the upper part of the Queen, the gas-oil contact on that particular set of perforations probably lies somewhere to the west. I didn't stop to estimate, but possibly a mile or so further west.

Q That dually completed well is producing oil from the Grayburg?

A Yes. I had it colored to the base of the casing sheet, which is in the lower part of the Penrose, but I got some late information that I failed to pass on that there is a packer set in the open

hole there separating the Grayburg and the Queen.

Q Mr. Montgomery, what problems, if any, that you mentioned in your initial statement are illustrated by this exhibit?

A Well, this exhibit is getting possibly a little closer. We did skip one location before we got to the oil well off structure. It indicates that the dry gas well is getting closer to the gas-oil contact and possibly with unequal withdrawals that we will draw this oil upstructure and cause the dry sands to be wet by this oil, 80 percent of which is lost and never recovered.

Q 80 percent is lost by wetting the sands, is that correct?

A That is the round figure, yes, sir.

Q Any other problem that you wish to comment upon, if any is shown by this exhibit?

A For the point of making an illustration, assume that the Amerada Gaither No. 1 gas well produced all of 1954. It did not. It was not completed until the latter part of '54, to the middle part of '54, and also assume that the Amerada Gaither No. 3 produced all of 1954. It did not, it was not completed until November of '54. For the purpose of making an illustration here, assume that the Amerada Gaither No. 1 produced an average gas allowable for 160 acres, which would be roughly 800 M.C.F. per day or 292,000 M.C.F., giving to the operator an income of about $29,200, gas at 10 cents a thousand, voiding about 584,000 barrels of reservoir space. Those figures are using Mr. Stanley's estimates as to what space is immediately occupying the reservoir. I compare this with the No. 3 well. Assume that it produced top allowable for the year of 1954, 40 barrels of oil per day G.O.R. 600, that

would be 14,600 barrels of oil or $2.70 a barrel for 40 gravity, would give the operator an income of $39,420 plus 5¼ cents per thousand for the casinghead gas, or in assumed case, $876 for total income of $40,296. Compare this with the assumed income of the dry gas well of $29,200 and had 160 acres dedicated to it, whereas this well had only 40. Roughly $10,000 less if we put the oil on 160 acre basis as the gas well is, we will see an income of roughly $160,000 as opposed to dry gas well of about $30,000, 160 on to 30,000.

Another problem to be considered, will the oil be moving upstructure with this great difference in reservoir space voided? The gas will be getting considerably more than the oil and wetting the dry sands. Another problem will be the increased lifting cost and premature abandonment of the oil wells on the flanks.

Q Do you have any further comment on Exhibit 5?

A That is all.

(Recess)

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Continuation of Case 881 after the recess at 10:30 A.M.

DIRECT EXAMINATION (Continued)

By MR. KITTS:

Q Can we backtrack a moment and will you look again at Exhibits 1 through 4 and for the benefit of the representatives here, read off the Committee's number on these cross-sections?

A Yes, sir. Exhibit No. 1 is the sheet 1 of 10, Exhibit No. 2 is 4 of 10, Exhibit No. 3 is sheet 5 of 10, Exhibit No. 4 is sheet 6 of 10.

Q Turning to Exhibit 5, you commented that was not prepared by

you. Have you checked that for accuracy?

A Yes, sir, I have.

Q Proceeding to Exhibit No. 6, will you explain that exhibit? Was that prepared by you?

A Yes, it was. Again the red represents the interval of oil production; the green, gas production. The yellow color represents some of the major sands, the Seven Rivers and Yates formations. This is not complete, but it does show that the sands do tend to pinch out upstructure and become thinner. Some of the marker sands are present throughout the area.

Q What is the location?

A The location as shown on Exhibit 6 by the blue line - - is in the southern portion of Township 20, South, Range 36 East. Again one can see upstructure that these sands do tend to thin and some of the markers do carry out through the entire area. One of the best markers we have is what I referred to as the "twin sand", which is at the very base of the Yates, the base of the second sand being the top of the Seven Rivers. There is considerable difficulty as we get in the neighborhood of the Amerada White No. 1 in Section 35 and Amerada White No. 2 in Section 35, correlating the top of the Seven Rivers. The twin sand is not there, the dolomites have become sand and there is a certain amount of difficulty in picking these points. The reason that I have picked the Seven Rivers where I have, these wells further to the west, Charm Coll No. 1 and Atlantic Seale No. 1, was due to the thickening of the units off structure. It wasn't based on electrical logs, but correlating of a, quite a wide area from the isopachous map which I believe is the reasonable assumption for the top of Seven

Rivers. If I am wrong, I don't think that it will change anything, I will say here today; it will probably change the name of the unit that the wells will produce from, but it doesn't change the top. I still feel that it is a relatively accurate correlation.

Q Mr. Montgomery, as shown by that exhibit, there are some dual completions within the Eumont, are there not?

A Yes, sir, there is one dual completion within the Eumont, Amerada White No. 1 and southeast, southeast 34, 20, 36. It is completed for gas in the lower Seven Rivers and the lower Yates, excuse me, and the upper portion of the Seven Rivers for oil, to what I am referring generally as to the middle part of the Seven Rivers. You note that the sands tend to pinch out upstructure as we go on up. They are considerably thicker in the area of the Amerada White No. 1.

Q Is that line, broken line underneath that Amerada White No. 1, is that the top of the Queen there?

A This well did not penetrate to the Queen, but I have indicated by dash-lines the possible point that it would top the Queen, You would expect it to top the Queen if you drilled that deep.

We will note that Charm Coll No. 1, according to my correlations, is completed in the Yates formation for oil, initial potential of 350 barrels of oil per day. Drill stem test from 3891, 3903 and recovered some salt water.

As we go on westward to the Atlantic Seale No. 1, we note that the well, according to my correlation, is completed for oil in the oil portion of the Yates and the various top bed in the upper portion of the Seven Rivers. The Atlantic spent a considerable amount of money on this particular well. This well was before the

Commission for an application for an oil and gas dual, oil being above the gas. They did considerable perforating and testing. The interval of perforating a nd testing is indicated by rectangle here, with a long diagonal line. That happens to fall in the same, portions of it happen to fall in the same zone that the Charm Coll No. 1 is producing oil from one location to the west. The pipe was set and gave something like 10,000 gallons and they even recovered salt water in there. I still don't understand exactly why they got salt water; at least they spent considerable time and effort attempting to make a well and received no recovery. They went on down to the lower Yates and completed in the lower Yates and upper Seven Rivers.

Going eastward, we note that the Amerada White is producing oil from the middle Seven Rivers. Amerada White No. 2 is perforated in the lower Seven Rivers and the upper portion of the Queen for ~~a while~~ oil. Continuing eastward, Amerada White No. 1, Section 35, is perforated a little by the lower, the bottom perforation is a little lower in the Queen. Continuing on, the Humble Fopeano No. 6 has produced oil from the lower middle portion of the Queen, but has been since that time plugged back and completed as a dry gas well in the upper portion of the Queen.

Continuing further, we find the Humble Fopeano No. 3 is producing oil lower in the Queen section and the Humble Fopeano No. 1 is producing oil from the Grayburg. The casing is set about 50 feet above the Grayburg. They reported the top of the pay where I correlated the top of the Grayburg.

Eastward is Shell State K No. 1, completed in the Grayburg for an oil well. We will note on this particular cross-section that

upstructure the gas perforations are offset by oil perforations downstructure, as shown in Amerada White No. 1 and the Atlantic Seale No. 1 and the Humble Fopeano No. 6 and Amerada White No. 1 and Amerada White No. 2. Also the Humble Fopeano No. 1 is completed for dry gas in the upper Queen, the same situation here.

We want to mention that there are wells scattered throughout the entire area that are completed in various intervals for gas and oil.

Q Are there any of the problems that you have spoken of illustrated by this exhibit?

A Yes, sir. As I stated earlier, the Amerada White No. 1 is dual completion, Eumont dual. I would like to point out that the one I spoke about, the Humble Fopeano No. 6 being in the same zone as Amerada White No. 1, oil being in the White well and gas in the Humble Fopeano No. 6. If we move up to quarter-section just north of the Amerada White No. 1, northwest quarter of Section 34, Bay Petroleum is the operator of that quarter section, and they have four wells completed in almost the identical same horizon, but these portions of it are the same horizon as the Humble Fopeano No. 6, completed for dry gas. It is located in the northeast quarter section of 35. Remembering that they are completed in the identical same zones and taking actual production, the Bay Petroleum Corporation Federal 1, 2, 3 and 4, we get it on 160 acres, which is located in the northwest quarter of Section 35; during the month of February they produced 4,966 barrels of oil, 40 gravity oil would be $2.70 a barrel. The income would be $13,408 -- it is not gravity 40. The Humble Fopeano No. 6, this well here, which has 160 acres dedicated to it in the northeast

quarter and the quarter just to the east of the Bay wells completed in the same zone; dry gas well produced in February 29,970,000 cubic feet of gas. At 10 cents a thousand, income of $2,997.00 or about $10,000.00 less, but voided 60,000 barrels of reservoir space as opposed to 10,000 barrels of reservoir space for the oil and the oil had over four times the income.

Q You are giving your voidage figure? You are using the same figure Mr. Stanley used, that is 1 M.C.F. or 100?

A 1,000 M.C.F.

Q 1,000 M.C.F. for two barrels?

A 1,000 cubic feet.

Q 1 M.C.F.

A Yes, 1 M.C.F.

Q What data did you use in the preparation of that exhibit?

A The Commission files and the electric logs that I received from the Supply Service.

Q Proceeding to Exhibit 7, - -

A Exhibit 7 is a structure contour on top of the Yates formation.

Q Was it prepared by you?

A Yes, sir, it was. The points used for contouring this were taken only from radioactive logs and electrical logs. No attempt at all was used, we did not use scout tops or any sample logs for any points on this cross-section on this structure contour map. Of necessity, due to sparsity of logs in several areas, it is actually generalized and I have strong armed in many areas, which will be evident because all the points I used are placed on the map.

Q What is your contour interval there?

A 50 feet. The producing interval of practically all the

wells, at least the ones in the Eumont Pool, are indicated on the map by appropriate abbreviations, example being if the well is producing from middle Seven Rivers I would have "M-7", upper Seven Rivers, "U-7", lower Yates, "L-Y". The Queen wells are indicated with red-dashed line under the well. Generally, all these wells in this area are producing from the Queen and it goes in a narrow band on up the structure into this area in here, which is a concentration, and further north into this area, the northwestern portion of the Monument structure going on up here is the furthest north well. It is the Gulf State D-A, as I recall. It is in Section 14, 19, 36. Going around the tip of the structure and coming back down, the first oil well we run onto is the John Kelly well. It is in Section 16, 19 South, 37 East. The only other oil wells on the west side, two other oil wells on the east side, I beg your pardon, Schermerhorn Weir No. 1 in Section 1, 20 South, 37 East and the recently completed Cities Service Well in Section 2, 20 South, 37 East.

Q It is impossible to see the colors more than a few feet back. Can you state how many wells you show there producing oil from the Queen?

A Mr. Kitts, there are a few wells that I have a "Q" marked by that I did not total up in my total number of wells. I feel sure that they are producing from the Queen, but I did not take time to go in and check the total depths or the casing points on these wells. I do feel sure they are in the Queen. They are not in the total I am going to give you. 180 wells in my opinion that are definitely producing from the Queen. There are about 30 some wells I have a question mark by, but I feel they are in

the Queen. I have not confirmed them, but in my own opinion.

Q How many from the Yates and how many from the Seven Rivers?

A In the Yates, I have 7 oil wells in the Eumont area and in the Seven Rivers, I have 54. That would be 243 wells. Not all of these wells are producing. I have indicated on here wells, that have or are producing to date. That was for the specific purpose of my own in doing that. As of February, 185 of these wells were producing. That is still not counting the wells that I have the question marks by, nor that is not counting the Queen wells that are in the Skaggs Pool area, nor the wells in the Hardy Area which are on the east side of the flank. If we circled them in red, we would have a red ring around the complete field of Queen production.

Q Do you have any idea as to total number of gas wells?

A I do not have a total number of gas wells. There are 208 factors. I could have counted them, but I did not. 160 acres having a factor of 1. Many wells do not have 160, many wells are considerably more than 160. The present production, using February figures, converted to 30-day month, shows a total of 101,640 barrels of oil produced from Eumont wells. Those are wells--46 of those wells are presently classified as Eumont wells. The remainder will be classified when we get to the mechanics of doing it. They are within the vertical limits of the Eumont. That is still not using the wells that I was in doubt about. That will probably increase the production considerably. At $2.70 a barrel, a total of $274,428, $275,000 roughly, plus 1,215,390 M.C.F. casinghead gas, 5¼ cents per thousand for a value of $63,807. A total value income received from the Eumont oil wells would be $338,227, $340,000 roughly. The total dry gas in the Eumont for 1954 was 34,077,218,000

cubic feet of gas. I divided that by 12 to get an average monthly figure and get a figure of 2,839,768, at ten cents a thousand, a value of $283,976. I will repeat the total value of the oil, $338,000, roughly $338,000, to dry gas, $283,000.

Q Both monthly figures?

A Yes, sir.

Q Any further comment on Exhibit 7?

A No, sir, that is all.

Q Will you explain Exhibit 8? Was that prepared by you?

A Yes, sir, it was. Exhibit No. 8 is again a structure contour map on top of the Yates. It is an identical reproduction of Exhibit No. 7, but super-imposed on it with the dark-blue lines are the traces of the cross-sections and in the colored area represents the different producing horizons of the oil well. Red represents the zones of Queen oil production again, or possible oil production from the Queen. That is strictly on the west side; on the east side I have only indicated gas wells and oil wells, gas wells that do produce some oil from the Queen and the Queen oil wells. The Skaggs area, there are considerably more Queen oil wells and I have indicated only the ones I had a log on. In the Hardy I did not have any logs at all, but I do know that they are all from the Queen, and in the Arrowhead area, I did not indicate any specifically, but was interpreting following my contour lines and trying to keep in mind the thickness, which wells were producing from the Queen. They are considerably more than what I have shown. I did not have the accurate information to prove myself with each individual well. The basis for bringing it all the way down into the Arrowhead area was the drill stem test on the Gulf Ramsey No.

17 which recovered oil in the Queen section. Knowing the general occurrence of oil and the type of stratigraphy, I felt that the area was productive of oil. It is up to the engineer to get it out of the ground.

The yellow represents the actual Seven Rivers or in my opinion possible Seven Rivers production. You will notice in this general area here - -

Q Which area?

A The area of the middle portion of Township 20 South, Range 36 East. I have not colored it solid yellow, but have just used dashed yellow lines. I have a note the possible Seven Rivers oil production will be sporadic in this area due to the relatively thick dense section and the thin pay section. I have no proof of those pay sections, but my interpretation that they are probably there. In other words, we have a certain amount of interval to work with. If we can get from a minus 150 to roughly 350, and in some areas it is more and less, if we have a relatively thick section of porosity and permeability develop, we have quite an area to work with. If we have a thin permeability section and have thick dense sections, we can expect to find dry holes offset by production and then the dry hole being surrounded by production.

The green represents my interpretation of possible and actual Yates production that will exist throughout the entire area.

Q That is Yates oil production?

A Yes, sir. I want to apologize for the scratchy notes I had. I put it down with the intention of going in and printing it up later a little neater. I never did do it.

The boundaries are based on actual production and possible

production. The areas of possible production are based upon generalized interpretation of data and upon closer examination of specific areas. The boundaries may vary slightly.

Q Mr. Montgomery, does that exhibit show only the horizontal limits of the Eumont?

A Section 31, 21 South, 36 East is actually in the south Eunice Pool.

Q For the greater part - -

A For the greather part it is. I do not have the boundary of the actual pool on here, a portion of the area in 21 South, Range 36 East is in the Arrowhead Pool.

Q The southern portion?

A Yes. The portion is in the Hardy and portion in the Skaggs. The remainder is within the Eumont vertical and horizontal limits. Possibly the horizontal limits have not been extended out in portions of these areas. You will notice that I have my green continue on off the map. My base map did not go far enough west. I just heard this morning that the Shell well, I don't recall the name of it, it is in Section 21, 19 South, Range 36 East, is roughly a half a mile further west than what I have indicated here. They have run pipe on the well and they have been perforating; there still is nothing definite about a well, but it does look like the possibility of a well. It will be in the upper sand of the Queen according to my correlation and that will extend my line, depending upon the structure, at least in this case, a half a mile, a little further south, a quarter of a mile, but at least it will make it one or two locations wider than I have indicated on this map.

Q In what sections?

A It will be further west and about two locations further west following the contours as much as possible, than what I have indicated by the red color. The red color represents, after we pass roughly a diagonal through Township 20 South, Range 36 East, about this point, a diagonal through Township, Section 36 and Section 26, that is roughly a diagonal line in there which below the line is very difficult to pick the top of the Penrose because the entire section is essentially sand.

Further north, the upper part of the Queen becomes dolomitic as I explained earlier, and in there we can pick the definite Penrose, so from about Section 14 on north, the red color is based only on the Penrose.

Q Do you have any further comment you wish to make on Exhibit 8?

A I believe that the east flank will probably be developed as is the west flank in the near future. We have many indications of that; for instance, the Schermerhorn Virgilina No. 1 in Section 4, 19 South, 37 East, produced an average of about 25 barrels of oil per day and a relatively small amount of gas. They have plugged off the oil and tried to make out a gas well of it. They have the Gulf D-S well in the section which makes a small amount of oil. We have the oil well of John Kelly in Section 16, and then we have the Aztec No. 1 Burt which makes, well, they asked for 500 barrels of condensate a month, that is completed to the Penrose as a gas well and also on the Maxwell, Aztec No. 1 Maxwell, they asked for about 500 barrels for the month of April. Going on down to the Cities Service Well in Section 2, 20 South, Range 37 East, we have a very high ratio oil well. Ratio somewhere in the

neighborhood of 70,000 to 1. We have an oil well in Section 1, 20 South, Range 37 East, the Schermerhorn No. 1 Weir; its initial production was only 25 barrels a day. The well has been decreasing all the time. I do not feel that this condemns the area at all; Schermerhorn originally drilled this well with the intent of making a dry gas well. They set casing roughly at the top of the Yates and drilled down some 800 or so feet into the lower part of the Penrose and then they fractured with 10,000 gallons. Where the fracture went I don't know. There is some 800 feet of open hole; it did have a potential for 25 barrels of oil per day. I feel it was an engineering failure in that case. They expected to have a gas well but they got oil. Going on further south into 21 South, Range 36 East, the well in the northwest of the northwest makes a small amount of oil and the well in the southwest of the southwest makes a small amount of oil. They are essentially gas wells. I believe that there has only been one test that has actually been in the really good possible area for oil production on the east side. That being the Schermerhorn Weir No. 1, which was an engineering failure. Most of the wells that are making oil have barely got into the gas-oil contact zone or there was a dense section in there and the gas wells that do not make oil, as I recall most of them have stopped above where the probable gas-oil contact is in this area.

If my guess is correct we can possible expect to extend this red line to go diagonally through possibly Section 3 of 19 South, 37 East and on in a southerly direction on around the Skaggs Pool. That would be possibly some 300 locations in that area.

MR. NUTTER: Was the town of Monument on that Exhibit?

A It is roughly situated in this area here about Section 32, 19 South, 37 East. If my interpretation is correct probable production on the west side, there are probably an estimated guess of two to three hundred locations more to be drilled in the west side, of course, depending on the porosity and permability in the areas which we have under control.

MR. KITTS: We move the introduction of the Exhibits Nos. 1 through 8.

MR. MACEY: Without objection they will be received.

MR. KITTS: That is all.

MR. MACEY: Any questions of the witness? If there are no questions of the witness, the witness may be excused.

MR. SELINGER: I would like to ask him a few questions.

CROSS EXAMINATION

BY: MR. SELINGER:

Q Mr. Montgomery, I believe you said that you had approximately two hundred eighty units in the Eumont Gas Field?

A I should have said two hundred eight.

Q I believe you said that so far you have record of forty-six oil wells classified in the Eumont Gas Field but that there were many more that you haven't got classified as yet?

A Yes, I may have missed the forty-six a few.

Q Yes. In explaining Exhibit No. 8, you said that there would probably be two to three hundred more on the west side and about the same amount on the east side. A Yes, sir.

Q Then, as I understand your testimony, to bring it on down to a few words you are faced with a problem of dual completions

within the vertical limits of the Eumont Gas order and you are faced with how to treat the oil and gas wells in the vertical limits, for the Eumont Gas order, is that correct? A Yes, sir.

Q In order to take care of the second problem, it is not a physical one but merely one of trying to adjust the relative abilities and allowables and production between the oil wells and the gas wells in the vertical limits of the Eumont Gas order, is that correct?

A Did I understand you to say balance the production?

Q In order to equalize --

A (Interrupting) The withdrawals.

Q (Continuing)--the withdrawals or have some rateable take between the oil wells and gas wells between the vertical limits of the Eumont Gas order? A Yes, sir.

Q Physically you can't do anything about the wells as they exist now, can you? The oil wells that are drilled there, they are drilled there if the gas well is drilled there, they are drilled there. There is nothing you can do about that physically. I am not talking about dual completions. I am talking about the matter of providing a system of allocating oil and gas allowable to proration units within the pool.

A Well, there is something that could be done with them physically, yes, if the commission saw fit to be that drastic.

Q Would you recommend that they require the plugging of all the oil wells in the vertical limits of the Eumont Gas order?

A I am not making any recommendation.

Q Would you recommend or have any opinions as to what they should do with the gas wells within the vertical limits of the gas

order?

A There are many situations, circumstances involved. I know a few of them but I do not know all of them due to the investments and things that have gone on in the past possibly, I hesitate to make a recommendation.

Q Wouldn't it be a more practical way then to leave physically the wells as they exist and to try to work out some system of equitable or rateable take between the oil and gas wells within the vertical limits of the Eumont Gas order? A Yes, sir.

Q Mr. Stanley said that the reservoir space withdrawal between the oil wells and gas wells in the neighborhood of sixteen times in favor of the oil wells, is that correct?

A No, sir, in favor of gas wells.

Q In favor of gas, yes, excuse me. A Yes.

Q In explaining your Exhibit No. 6 in which you used the Bay-Federal [illegible] one, two, three and four, on the same one hundred sixty acres and comparing it with the Humble offset one well gas to one hundred sixty acres to the east, you said that the financial return of the oil wells was in the neighborhood of six times the gas well but that the reservoir space withdrawal was six times in favor of the gas well, is that correct? I believe you used thirteen thousand four hundred eight dollars for the four wells on a sixty acre and you used a value of two thousand nine hundred ninety-seven dollars for a gas well on one sixty acre.

A That must have been another example, Mr. Selinger.

Q You used the four Bay wells on the Federal lease, four oil wells, the Federal one, two, three and four on the same one hundred sixty acres, and you used Humble offset to the east one well. You

said financially the four wells total thirteen thousand four hundred eight dollars for the month of February, 1955, and the financial return for the one gas well on one hundred sixty acres was two thousand nine hundred ninety-seven dollars, is that correct?

A Yes, sir, that is right.

Q That the reservoir space withdrawal of the four oil wells was ten thousand barrels and for the gas well was sixty thousand, isn't that correct? A Yes, sir.

Q So that would make the reservoir space withdrawal of the gas well sixty thousand compared to ten thousand for the four oil wells? A Yes, sir.

Q So you are faced with, economically the financial return is favoring toward the oil wells, but that the withdrawal of volume reservoir space is in favor of the gas wells?

A Yes, sir.

Q So the commission is faced on one hand with the economics and on the other hand with the reservoir space withdrawal?

A Yes, sir.

Q Would you be able to prorate the gas wells or the gas area without considering the oil wells in the same pool?

A It would be very difficult to prorate them.

Q Likewise it would be most difficult to try to prorate the oil wells and completely disregard the gas wells, isn't that correct?

A Yes, sir.

Q So that any method or system of proration in at least the Eumont Gas pool and any area within the vertical limits of the Eumont Gas order could not participate strictly speaking on a gas basis for proration or an oil basis for proration, could it? One

must partake of the other.

A If we forget the waste angle, yes, sir.

Q Now with respect to the waste angle, the more allowable you give the gas wells then the more waste will occur, in so far as ultimate oil recovery is concerned, wouldn't it?

A Yes, sir.

Q What recommendation do you have to the commission then as to how to meet this problem? You have given the facts, do you have after a careful study of all your exhibits and the problems involved, do you have any recommendations to make to the commission?

MR. KITTS: Objection. I believe Mr. Montgomery testified as a geologist. I believe he has also testified that he has no recommendation to make on a policy matter. Whether he has a right of opinion or not that he could express, if his was a policy making job. I believe that is --

MR. SELINGER: I don't want to get into an argument about it, if you recall the preliminary statement that Mr. Montgomery made listed four things, one of them was, number three was the system of allocating oil and gas allowable to proration units within the pool, pointing out that there is a definite problem of oil and gas wells producing from the same pool. If he didn't attempt to delve on that question I wonder why he brought it up in his direct testimony.

MR. MACEY: I possibly think he brought it up because he wanted to present the facts. I doubt very seriously if there is any one person in this entire room who could answer the problems that are involved in the Eumont pool. If he cares to express an opinion I think he could do so, if he didn't have an opinion he didn't have an opinion.

MR. SELINGER: I will ask the witness, do you have any opinion after making this exhaustive study as to how the commission should proceed with respect to dealing equitably and rateably between the oil and gas wells in the same pool? If you don't have any, say you don't have any and we will go on.

A Well, I have of course arrived at certain opinions, but one opinion will depend upon a policy decision of the commission and whatever way they decide to go, well, another opinion would be forthcoming. It is all kind of intermeshed when the commission makes its policy decision as to what to do then and only at that time do I believe that reasonable recommendations could be made.

Q But at any rate you are conclusive in your views that the gas wells in this pool could not be operated strictly speaking as a gas pool without considering the oil wells in that same pool, is that correct? A That is correct.

MR. SELINGER: That is all.

MR. MACEY: Does anyone else have any questions of the witness?

MR. STANLEY: I might clarify one thing in my calculations of volumetric withdrawals in that particular case I compared --

MR. KITTS: One sixty and forty acres.

MR. STANLEY: Yes.

MR. SELINGER: For times on the one sixty.

MR. STANLEY: Yes.

MR. MACEY: Anyone else have a question of the witness?

MR. CALLOWAY: I have a comment to make that Mr. Montgomery and Mr. Stanley may want to answer. I know --

MR. MACEY: Identify yourself.

MR. CALLOWAY: Mr. Calloway, Stanolind Oil & Gas Company.

I notice that they have attempted to evaluate the density of oil that would migrate up into the gas cap area on terms of reservoir area. There is a possibility that the effective pay thickness could vary between the oil rim and the gas cap area. If that is the case something should be, it might be difficult to tie that down. One other factor that might be considered also in this connection is the fact that the expansibility of gas and oil is somewhat different. Withdrawing an equivalent volume in terms of reservoir barrels from a gas zone would not cause the same decline in reservoir pressure as it would if you withdrew as many barrels of oil from an oil zone. That might have an influence for the oil to migrate up into the gas cap.

MR. MACEY: Anyone else have a question of Mr. Montgomery? If not --

MR. CAMPBELL: Jack Campbell of Roswell.

BY: MR. CAMPBELL: Mr. Montgomery, am I correct in my recollection that at the time some of the original hearings were being held in connection with the Eumont Gas pool that there was testimony on the basis of estimated reserves that the value of the gas in the reservoir was greater than the value of the oil?

A As I recall, that was the testimony, yes, sir.

Q Is your opinion different from that now or are you basing yourself solely upon present production and the value of the present production, that might make a difference.

A That is all I was basing it on. I can sit down and think, roughly what the values are.

Q I wanted to be sure that the original testimony as I recall it was that the estimated reserves of gas were greater value than the estimated reserves of oil. Which was one basis of establishing

it as a gas pool rather than an oil pool, or oil and gas pool, is that your recollection? A Yes, sir.

MR. STANLEY: I would like to continue on with Mr. Campbell's question, Mr. Montgomery. Since the hearing here about a year ago pertaining to gas prorations in the Eumont pool, you have not developed enough oil to the west side of the Eumont pool as we do have today.

A We did have it but most of them were old wells. I don't recall, possibly there were a few wells out there but most of the development was within the last year, of the new wells.

MR. MACEY: Anyone else have a question of Mr. Montgomery?

MR. STANLEY: There was one thing that I failed to mention on the evidence that oil was moving up structure. That was that the Gulf Oil Company State D A Number one was originally completed as a dry gas well. I am sorry I do not have the figures but it produced dry gas for a relatively short period of time and is now a top allowable oil well. Another example is the State Gulf D S Number one originally drilled as a dry gas well and produced no fluid for a short time and started producing oil. The ratio is still very high but they are relatively close to gas oil contact. So probably it will not continue to decrease possibly.

MR. MACEY: Do you have anything further?

MR. STANLEY: That is all.

MR. MACEY: If no further questions the witness may be excused.

MR. SELINGER: May I ask Mr. Stanley a question or two if you are through with Mr. Montgomery?

MR. MACEY: Yes, sir.

BY: MR. SELINGER:

Q Mr. Stanley, your testimony is in accord with Mr. Montgomery's with respect to the graveness of the situation of a number of oil wells producing from the same vertical limits of a pool as the gas wells, is it not?

A Yes, sir, that is correct.

Q Your testimony is in accord with his testimony with respect to the economics favoring the oil, and the reservoir space withdrawal favoring the gas? A Yes.

Q Do you likewise agree with him that the gas wells in this field cannot be operated purely and simply on gas rules without considering the oil wells?

A Well, I think that the operation and the withdrawal of gas from the Eumont Gas pool will ultimately effect the recovery of oil in the Eumont Oil pool.

Q Are you likewise of the opinion that the oil wells must of necessity be operated in conjunction with the gas?

A Yes, sir, I am.

Q In an attempt to seek the relative equality between the two types of wells can you use any basis of proration for either, other than an average factor?

A Of course this is merely my opinion. I did not make any recommendations.

Q I didn't ask you for your recommendation. I asked you for your opinion.

A All right. There is the possibility that I feel that should continue on an acreage basis.

Q Is that more or less in accord with your views that the gas wells in the Eumont pool cannot be operated strictly speaking

on gas rules generally?

A As they are right now?

Q Yes.

A I think they could be operated as they are right now.

Q Could they follow exclusively market demand nominations and disregard the oil wells?

A No, not exactly because it could be possible that you could withdraw so much gas that I feel that it might injure the reservoir in the oil field.

Q So generally you agree with his conclusion that both the oil wells and the gas wells in the Eumont Gas Field as defined within the vertical limits of the Eumont Gas order must be with respect to proration and withdrawal must be in connection with each others rights. A Yes, sir.

MR. SELINGER: That is all.

MR. MACEY: Anyone else?

MR. WOODWARD: We have a statement if no further questions of the witness.

MR. MACEY: Anyone have any further testimony they would like to give in the case? Any statements to be made in the case? Mr. Woodward?

MR. WOODWARD: Before we give that I think the commission staff should be commended on a very thorough and detailed study of the problems that faces the commission. One of the problems that the staff has dwelt on at some length is the theoretical possibility of a waste of oil through migration and saturation or dry sands up structure. As yet we have observed no tangible evidence of any wholesale migration or waste of oil from that cause. We

realize that such a possibility may exist and should require the close attention of the commission and bears continued watching. As a practical matter I don't know how you would prevent the migration short of shutting in the gas wells and in view of the immense expenditure and investment of money and gas completions at gas wells that has already taken place, and in view of the fact that there is very little if any tangible evidence of wholesale migration I think such a drastic move would be completely unjustified at this time.

One other problem they mentioned was the mechanical problem of handling duals from these various zones with different pressures and ratios. I think that is a technical problem and a separate one and could very well be given some separate study apart from this problem.

The primary problem we are left with here it seems to us is that of finding the fairest means possible of allocating gas to oil and gas wells completed in the same reservoir. To that end we would make these recommendations, that the vertical and areal limits of the Eumont Gas pool remain as they are. That no change be made in the gas proration units and that a gas allowable be assigned to those units. That a limiting gas-oil ratio of six thousand to one be placed on the oil wells and the production of casing head gas from those oil wells be deducted from the unit gas allowable in those instances where oil and gas wells are completed on gas proration unit.

That would permit the operator of the gas proration unit to make up the deficit between the production of casing head gas and the gas allowable from his gas completion. This recommendation is based, of course, on the notation that you have a reservoir produc-

tive of both oil and gas and that the fairest method of allocating the gas production is to give each one sixty or sixty-four on tract or each tract on an acreage basis an equitable or rateable share of the total pool allocations.

In practical operation it would probably be necessary to take the casing head total cumulative casing head figures for the preceeding two months and figure it from the total field allowable and then divide the balance among the dry gas completions. This recommendation attempts to steer between several extreme positions which we feel would be unwarranted at this time.

A shutting in of the gas wells was already discussed, a strict limitation on the simultaneous dedication of acreage would of course destroy the existing investment in dual completions and in view of the fact that each operator is entitled to an oil allowable and gas allowable for his acreage in this pool, if he has both, that would be no reason that those operators could not make up the deficit in any gas production on any tract in the pool.

MR. MACEY: Anyone else have a statement?

MR. HINKEL: Mr. Clarence Hinkel, representing Humble Oil and Refining Company. The Humble, reiterates the recommendation previously made in several of the hearings for the adoption of special field rules, for the prevention of waste and protection of correlative rights can only be effected by the early adoption by the commission of a proration formula in Lea County associated oil and gas reservoirs which will stabilize production for oil wells and will prevent underground waste.

MR. WALKER: I am reasonably sure someone is going to mention continuance but I haven't heard anything about it. Are we going

to continue this case until next month?

MR. MACEY: I haven't heard a motion.

MR. WALKER: I would like to make a motion that the case be continued and give us a chance to study the testimony and come up with some evidence to help solve the problems.

MR. MACEY: Anyone have any objection to continuing the case to the next month? If no objection, we will continue the hearing to the month of May, however, I would like to comment on Mr. Woodward's suggested procedure, it isn't that there are a number of wells, Mr. Woodward, on the west side of Monument that are not connected to a gasoline plant, which would virtually shut off any possibilities of accurate gas rather, in fact most of the wells that are not connected to a gasoline plant are in that locality. Some of them do not make any gas. The Warren plant has not seen fit to extend their facilities. I don't know what the status is down south, but we have thought of that particular suggestion that you made, in fact we suggested that in one instance in the Atlantic Seale dual completion where we wrote the order in such a manner that the gas volume would be deducted. It makes a very, very difficult accounting problem. We not only have a difficult accounting problem with the present dry gas, it would really complicate that situation, unless we could work out some satisfactory method of reporting gas production.

MR. WOODWARD: We recognize that there are a large number of administrative problems that are inherent in any solution to this problem. As the thing now stands of course there has been production of gas from the oil wells and at the same time some acreage production of gas from the gas wells. To accurately check the produc-

tion of gas in each one of these units, whether or not it is connected to a gasoline plant or not is admittedly a difficult problem, the solution that we offer we realize is far from perfect but we advance it as being something better than what you have now, for the reason you have at least some control in the area. There is some mechanism by which the total take from one hundred sixty acre tract can be limited. With respect to those situations where you do not have plant connection the same considerations for enforcing a gas-oil ratio largely the operator's own integrity and the presumption that he will abide by the commissions regulations is about all you have got to go on at the present time. We realize that. I think very possibly that an accounting form could be devised for reporting these unit productions where you have gas and oil completions on a gas proration unit. That situation to some extent may be temporary.

I don't know how many of those units you would be faced with but I think that such a reporting procedure leaving the actual preparation and reporting of the forms to the operator with spot checks by the commission is probably the only practical way to get that dope.

Let me point out this, that the absence of these connections and any kind of equalization or production is going to be subject to that same defect. You are going to have the same trouble getting the information.

MR. MACEY: Anyone else have a comment to make or statement to make? Mr. Montgomery?

MR. MONTGOMERY: I made a mistake when I referred to Gulf State being a top allowable. I said it is capable. The last I heard that it was penalized fifty-five thousand five hundred fifty-

five so it is now penalized as a seven barrel a day well.

MR. MACEY: I want to ask a purely information question, how far along are you on the reclassification of all the wells in the area?

MR. MONTGOMERY: With the information I have here and checking the questions I am in doubt about, it possibly would take about a week.

MR. MACEY: If no further comment we will continue the case until next month. We would like to dispense with the matter at the May hearing. We would like you to come prepared to make any suggestions, suggested rules that you might have. The next case is 880.

STATE OF NEW MEXICO)
: SS.
COUNTY OF BERNALILLO)

I, ADA DEARNLEY, Official Reporter for the New Mexico Oil Conservation Commission, do hereby certify that the foregoing and attached transcript of proceedings was taken before the New Mexico Oil Conservation Commission at Santa Fe, New Mexico and is a true and correct record to the best of my knowledge, skill and abiltiy.

IN WITNESS WHEREOF I have affixed my hand and notarial seal this 30th day of April, 1955.

My Commission Expires:
June 19, 1955

Ada Dearnley
Notary Public, Court Reporter

BEFORE THE

Oil Conservation Commission

SANTA FE, NEW MEXICO

IN THE MATTER OF:

CASE NO. 881

TRANSCRIPT OF PROCEEDINGS

ADA DEARNLEY AND ASSOCIATES

COURT REPORTERS

605 SIMMS BUILDING

TELEPHONE 3-6691

ALBUQUERQUE, NEW MEXICO

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
May 18, 1955

IN THE MATTER OF:

Application of the Oil Conservation Commission upon its own motion for an order amending and revising the Special Rules and Regulations for the Eumont Gas Pool, as set forth in Order R-520 to provide for a system of allocating oil and gas allowables to proration units within the pool; to provide special rules and regulations for dually completed wells within the Eumont Gas Pool and assignment of allowables thereto; to promulgate any other rules and regulations in order to prevent waste and protect correlative rights.

Case No.881

BEFORE:
Mr. E. S. (Johnny) Walker
Mr. William B. Macey

TRANSCRIPT OF HEARING

MR. MACEY: The next case on the docket is Case 881, which was continued from April. Does anyone have any testimony they would like to give in Case 881?

MR. WOODWARD: Mr. Woodward, Amerada. Amerada made its recommendation at the hearing last month. The proposed changes in our R-520, which have been circulated, merely to show one way in which these changes could be incorporated in the order.

We do not propose at this time, to repeat our statement that we made a month ago, but we do invite comments and criticism of this proposal by the other operators present who are disposed to make

such comments.

MR. MACEY: Does anyone have any comments or statements to make in Case 881?

MR. SELINGER: We have had an opportunity of reading the proposed changes, as indicated by Amerada Petroleum Corporation in modifying Order R-520, insofar as they apply to the Eumont field. We think from a practical standpoint these suggestions are well taken and we would recommend the adoption and the correction of the Order R-520 insofar as the Eumont Field is concerned in accordance with the proposed changes of Amerada.

MR. MACEY: Anyone else?

MR. MALONE: Ross Malone, for Gulf. Gulf is of the opinion that the Commission should not permit the concurrent assignment of the same acreage to two different wells in the same pool. The precedent, as we view it is highly undesirable. Gulf also feels that the Commission should provide for rules in the Eumont Gas Pool, which would prevent dual completions within the vertical limits of the same reservoir. It would recommend the continuation of the present ratio limit for oil wells producing from the vertical limits of the Eumont Gas Pool, because it feels that it gives the oil well an adequate advantage on a volumetric withdrawal basis, to ultimately serve to deplete the oil in the reservoir.

It is felt by Gulf that the Commission should require a sufficient continuing bottom hole pressure tests and gas-oil ratio surveys, in order that the performance of the reservoir can be closely followed and the promulgation of any changes in the rules that might be indicated, can be promptly made.

MR. MACEY: Does your company's statement, pertaining to bottom hole pressure, pertain solely to Eumont, or does it include the Eunice-Monument?

MR. MALONE: Just the Eumont.

MR. SMITH: In the interest of brevity, on behalf of Stanolind, the position stated by Mr. Malone on behalf of Gulf is the position Stanolind would like to take in the same case, with respect to the Eumont Field.

MR. LYONS: V. T. Lyons with Continental, Continental Oil Company believes the oil produced on the flanks of the Eumont gas pool can be handled under the provisions of the existing rules governing oil wells completed within the vertical limits of the Eumont gas pool. We would be opposed to any allocation system which would result in a double allowable or simultaneous dedication of acreage for wells producing from a defined common source of supply. Although the proposed rules submitted by Amerada are a definite improvement over the present situation we would prefer rules which would provide that acreage allocated to an oil well may not also be allocated to a gas well producing from the same vertical limits of a defined oil or gas pool. Continental has previously expressed its opposition to dual completions within a common source of supply and still abides by that position.

MR. TOMLINSON: W. C. Tomlinson for Atlantic Refining Company. We wish to adopt the statement offered by Continental, insofar as it applies against the present rules and insofar as it applies to the dedication of acreage to gas and oil wells.

MR. MACEY: Anyone else?

MR. DEWEY: R. S. Dewey, on behalf of Humble Oil Company. We feel that the Amerada has made a sincere effort and a very worthwhile recommendation to cure a situation that needs to be cured. We feel that the Commission should take some positive steps in the

immediate future to allocate the oil in such a way to prevent waste and to protect correlative rights. We feel that the Amerada has made a very worthwhile suggestion and the Commission should give it serious consideration in the immediate future.

We also feel that the Commission will need to review whatever action they take from time to time to correct gas-oil ratios at the limitations that are placed in this field, and also to perhaps curtail the nominations of gas, in order to prevent waste.

MR. MACEY: Anyone else?

MR. WOODWARD: We would like to make a brief statement, not for the purpose of covering any ground we have discussed before, but to state that when the matter was first called we considered a number of possibilities directed toward correcting a double withdrawal of gas from oil and gas completions on the same acreage. What we ultimately came up with was based on the facts that we found.

At the time that the Eumont was classified as a gas pool, few oil wells were producing from the rim and there were many gas wells up-structure. The pool was treated as a gas pool. Based on the independent nominations of the oil and gas purchasers, separate and independent oil and gas allowables were granted for oil and gas wells in the same common source, but no effort was made at that time to equalize the withdrawals of gas from the oil and gas area.

Now, one of the proposals that we considered most seriously was a rule that would prohibit a simultaneous dedication of acreage for oil and gas allowable purposes. After studying this proposal we rejected it in our own thinking for a number of reasons. In the first place we think such a proposal rests on extremely shaky grounds

that is, as a defensible proposition.

The Statutes of this State, in defining correlative rights, state that term means the opportunity afforded, so far as it is practicable to do so, to the owner of each property in a pool to produce without waste his just and equitable share of the oil and gas, or both, in the pool, being an amount, so far as can be practically determined, and so far as can be practically obtained without waste, substantially in the proportion that the quantity of recoverable oil or gas, or both, in the pool, and for such purpose to use his just and equitable share of the reservoir energy.

Now, given a situation where an owner in the pool has both oil and gas underlying his property, and the situation where the Commission has allocated and permitted the production of both oil and gas from that pool; we can foresee great difficulties in telling this operator who has completed his wells in both the oil and gas zones that he can not offset his neighbor's gas well, if he chooses to offset another neighbor's oil well, and vice versa.

In other words, he is, under the Statute, afforded an opportunity to produce the oil and gas under his land. Any rule which conditions his recovery of oil, upon foregoing his production of gas, I feel rests on shaky grounds itself.

I think, quite apart from the Statutes, you are faced with a problem of confiscation. It is perfectly true that the man who has both oil and gas has the superior natural opportunity for recovery, which is what the Statute guarantees him. When the Commission, in promulgation of Rule 520 afforded each owner an opportunity to

recover the oil and gas underlying his land, they couldn't give him no more than an opportunity. They couldn't give him the oil or gas that wasn't there. Each was given the equal opportunity to produce the substances, if it could be done on the property that they maintained.

There is a second objection that we had for non-simultaneous dedication of acreage and that is the possibility of waste that we feel definitely exists where you have separate and independent and whole emulated nominations, demands and takes of gas and oil by the oil and gas purchasers. It is quite possible to visualize the situation where you have a 160-acre unit on which four oil wells have been completed, and an offset gas 160-acre unit. If there is to be no simultaneous dedication of acreage and no effort is made to see that the oil unit withdraws at least as much as the offset gas unit, there are circumstances where you have your low ratio oil wells and during great seasonable demand for gas, that a high pressure area in the oil unit and a relatively lower one in the gas unit could be created, with a possibility of migration and saturation of dry sands.

There is also a very difficult administrative problem. As the Commission is well aware, it has a number of units in which there have been both oil and gas completions. There may be one well, 240 acres; the well located very near the sand. It is quite possible, under the circumstances, if the oil completion is a vital one, that 40 acres around the well will be dedicated as an oil unit. If the balance of the acreage is to be operated as a gas unit, you have a doughnut shaped affair which we feel is very unsatisfactory. It also

would obviously entail the additional expense of drilling on this doughnut shaped unit, if there is no completion located on it. Ultimately, what the take of gas would be from that unit, you can not say at this time. It is quite possible, if an independent gas allowable is permitted on the gas unit, that it would exceed the same gas allocation with a deduction for the casinghead produced from the same acreage.

We would also like to point out that in limiting the production from the oil area, the gas withdrawals from the pool are not diminished as long as nominations are maintained at their present level. The gas that would be produced from the oil area is simply produced further up structure, which we think creates a risk of waste.

Lastly, and possibly the least important from a waste standpoint, but certainly of great concern to the operators, is the confiscation of the investment in the duals that have already been made, and the gas completions that have been made in reliance upon an allowable of both oil and gas.

We have worked for over a year now in putting together gas units. These units have been unitized for gas, but not for oil. Very apparently, where you have the unit well producing both oil and gas, those units are going to have to be revised. I think that the work of a year would largely be restored in the revision of units that would result from a pooling, that no simultaneous dedication of acreage were permitted.

We urge the Commission to continue to give the problem its utmost study. And, in the meantime, we feel that this is the fairest way of eliminating the possibility of waste and recognizing

correlative rights.

MR. SELINGER: If the Commission please, I have sat here and listened to several of the companies saying that they are opposed to the proposal on the grounds that it amounts to assignment of acreage twice. While it amounts to an acreage assignment to both oil and gas wells, I am sure they didn't intend to imply to you that there is a double allowable, or more of an allowable, as far as gas is concerned, than the normal assignment of the surface acreage. For example, you have 160 acres upon which there is one gas well and three oil wells, what difference does it make if you produce your oil wells on a 40-acre basis, assign 40 acres to each of the three oil wells, produce your oil allowable under your gas-oil ratio limitation and assign the remaining 40 acres to your gas well. Under that circumstance you still only get the maximum of 160-acre gas allowable; or if you have one gas well and your three oil wells, you assign the 160-acre gas allowable and you deduct therefrom the amount of casinghead gas produced from the three oil wells. There is no such thing as a double allowable.

In my opinion, I believe upon study you will see that there is very little difference in the total amount of gas. As long as you limit the amount of gas that can be taken from that 160 acres, the assignment of acreage, true, the same acreage to the oil and gas is immaterial, it is not the assignment of the acreage, that there should be any opposition to. It is whether or not there is any difference in the amount of gas withdrawn from the reservoir. When you come right down to it, there is hardly any difference in the amount of gas taken, the amount of space displaced in the reservoir. Obviously an operator can produce the oil wells on the 40-acre basis,

and produce the gas well under the 40-acre basis, or he can produce the gas well on the special gas unit from which the total amount of gas from the gas unit is still restricted to the approximate same amount of a similar gas unit. So, I say that I don't want the Commission to get the idea that because you use the same surface acreage that you are permitting any difference in the total volume of gas produced, or the total amount of reservoir space displaced.

MR. CAMPBELL: Jack Campbell, Roswell, New Mexico. I would like to request that the Commission either continue this case until the regular hearing, or permit operators to submit written statements in connection with the suggestions that have been made here today. I think this is a matter of considerable seriousness, not only in the Eumont Pool, but other pools in Lea County which are probably next in line. Because, I can visualize situations under the proposal of Amerada, where operators with three oil wells, marginal oil wells perhaps, in approaching the dividing line between oil and gas wells, are still producing a commercial amount of oil, and a gas well on a single 160-acre unit, that the adoption of the rule would put the operator in a position of shutting in either oil or gas wells, depending on the economics of the situation, what he was getting for the casinghead gas, and might result in loss of oil up-structure, by virtue of not being able to produce the oil wells at a ratio, and with sufficient amount of gas to make it economically justifiable.

I think that the matter requires considerable study on the part of each operator, as well as the Commission, to determine what the effect would be on his operation. I request that it be continued,

or that ample opportunity be given for statements of position by interested operators.

MR. MACEY: Does anyone have anything further?

MR. HOWELL: Ben Howell, representing El Paso Natural Gas. We would like to concur in Mr. Campbell's statement.

MR. : Shell would like to concur in Mr. Campbell's statement.

MR. SMITH: Stanolind would like to concur in Mr. Campbell's statement.

MR. MACEY: We will continue the case to the regular June 28th hearing. I would like to ask you a question, Mr. Woodward. As I understand your proposal, Amerada's proposal, every unit, every gas proration which had a gas well, and at least one oil well within that unit area, would be called a special gas unit under your proposal?

MR. WOODWARD: Correct.

MR. MACEY: The total casinghead gas produced by the oil well would be added to the production of the well, and also deducted from the allowable to that particular unit. That volume would, in turn, be turned back into the pool and be added to the nominations in order to distribute it back over the pool and make the pool balance?

MR. WOODWARD: That is correct. As we visualize the way this would work, we would add to your regular dry gas the amount of casinghead produced in the last available report period, two months back. This total allowable would then be divided among the gas units in the field, special and regular units. You could expect then

if your production of casinghead gas were approximately the same as it had been two months before, that the total casinghead nominations would be met by the continued production of casinghead gas which would be deducted from the total unit allowable assigned to that special unit. The effect of that would, automatically, of course, grant a proportionately higher part of the dry gas nominations to the dry gas units.

At no time under this rule would you have a pressure disparity in favor of the dry gas area, as between special and regular gas units, because in addition to the casinghead they would be permitted to make up the difference, so that as the gas allowable varies, so would the difference between the amount of casinghead and the fixed gas allowable vary, take up that slack. This would continue to insure a slight advantage to the oil areas, because they would be producing the same amount of gas, plus the oil displaced. We feel there would be no danger there, or no substantial danger there of creating a pressure disparity which would result in migration and saturation of the dry sands.

MR. MACEY: Your rule contemplates that this Commission would have to obtain accurate figures as to the casinghead gas production on a per unit basis?

MR. WOODWARD: I think that is true, and they would also have to obtain that same data whether they were working on a non-simultaneous or volumetric. In other words, if you are going to limit the relationship in the production of gas from the oil and gas wells, you have to find out how much gas you are producing. I think you have that situation, and so far as we know, the operators are diligently

trying to get these things hooked into the plants where the production is reported, and as soon as it is practical to do so, I feel confident that some reporting system can be worked out for the few instances where that hook-up would be possible.

MR. MACEY: There is also the problem where you have Eumont wells and Eunice-Monument wells going into the same tank battery that is metered as one unit.

MR. WOODWARD: I think some of the proposals that have been circulated on estimating tankage on such matters would serve as a basis for estimate.

MR. MACEY: Anyone have anything further in this matter? If not we will continue the case until June 28th.

STATE OF NEW MEXICO)
: SS.
COUNTY OF BERNALILLO)

I, ADA DEARNLEY, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings 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 6th day of June, 1955.

Ada Dearnley
Notary Public, Court Reporter

My Commission Expires:

June 19, 1955

BEFORE THE

Oil Conservation Commission

SANTA FE, NEW MEXICO

June 28, 1955

IN THE MATTER OF:

CASE NO. 881

TRANSCRIPT OF PROCEEDINGS

ADA DEARNLEY AND ASSOCIATES
COURT REPORTERS
605 SIMMS BUILDING
TELEPHONE 3-6691
ALBUQUERQUE, NEW MEXICO

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
June 28, 1955

IN THE MATTER OF:

Application of the Oil Conservation Commission upon its own motion for an order amending and revising the Special Rules and Regulations for the Eumont Gas Pool, as set forth in Order R-520, to provide for a system of allocating oil and gas allowable to proration units within the pool; to provide special rules and regulations for dually completed wells within the Eumont Gas Pool and assignment of allowables thereto; and to promulgate any other rules and regulations in order to prevent waste and protect correlative rights.

Case 881

BEFORE:

Honorable John F. Simms
Mr. E. S. (Johnny) Walker
Mr. William B. Macey

R E G I S T E R

NAME	REPRESENTING	LOCATION
Mr. Earl Ainsworth	Permian Basin Pipeline Co.	Omaha, Nebr.
F. Norman Woodruff	El Paso Natural Gas Co.	El Paso, Texas
Ben R. Howell	El Paso Natural Gas Co.	El Paso, Texas.
R. G. Hiltz	Stanolind Oil & Gas	Ft. Worth, Tex.
L. G. Truby, Jr.	Pacific Northwest	Albuquerque, N.M.
A. R. Ballow	Sun Oil Co.	Dallas, Texas
H. M. Gernir	Shell	Hobbs, N. M.
R. F. Montgomery	O. C. C.	Hobbs, N. M.
W. C. Harrington	Gulf	Roswell, N. M.
E. W. Nestor	Shell	Midland, Texas

R. S. Dewey	Humble	Midland, Texas
C. D. Borland	Gulf	Roswell, N. M.
Clarence E. Hinkle	Humble	Roswell, N. M.
E. H. Foster	Phillips "66"	Amarillo, Tex.
Jason Kellahin	Lowry Oil Co.	Santa Fe, N. M.
Ray E. Seifert	Amerada	Midland, Texas
J. M. Park	Rowan Drilling Co.	Midland, Texas
W. G. Abbott	Amerada	Monument, N. M.
J. D. Albright	Cities Service	Hobbs, N. M.
R. E. Adams	Cities Service	Bartlesville, Okla.
J. H. Vickery	Atlantic	Midland, Texas
J. T. Lyon	Continental Oil Co.	Ft. Worth, Texas
R. C. Lannen	Continental Oil Co.	Eunice, N. M.
E. T. Adair	Texas Pacific	Ft. Worth, Texas
R. W. Hines	Texas Pacific	Ft. Worth, Texas
J. A. Moore	Continental Oil Co.	Roswell, N. M.
Robert J. Leonard	Leonard Oil Co.	Roswell, N. M.
Patrick Leonard	Leonard Oil Co.	Roswell, N. M.
Ross L. Malone	Gulf	Roswell, N. M.
S. J. Stanley	O. C. C.	Hobbs, N. M.
W. D. Gerand, Jr.	North Potash Co.	Hobbs, N. M.
Quilman B. Davis	Aztec Oil & Gas Co.	Dallas, Texas
Prentice R. Watts, Jr.	Aztec Oil & Gas Co.	Hobbs, N. M.
Guy Sinclair	Gulf Oil Co.	Ft. Worth, Texas
Don Walker	Gulf Oil	Ft. Worth, Texas
J. Abendschan	Aztec Oil & Gas Co.	Farmington, N.M.
J. W. Gurley	Oil & Gas Comm.	Santa Fe, N. M.
Warren Mankin	Oil & Gas Comm.	Santa Fe, N. M.

C. M. Rieder	O. C. C.	Santa Fe, N. M.
John A. Woodward	Amerada	Tulsa, Okla.
R. S. Christie	Amerada	Tulsa, Okla.
A. F. Holland	Lowry	Albuquerque, N.M.
C. C. Arnold	N. M. O. C. C.	Aztec, N. M.
S. V. Roberts	N. M. O. C. C.	Aztec, N. M.
Elvis A. Utz	N. M. O. C. C.	Santa Fe, N. M.
R. T. Wright	El Paso Natural Gas Co.	Jal, N. M.
Dewey Watson	R. Olsen Oil Co.	Jal, N. M.
Jack M. Campbell		Roswell, N. M.
D. S. Nutter	O. C. C.	Santa Fe, N. M.
P. T. McGrath	U. S. G. S.	Farmington, N.M.

TRANSCRIPT OF HEARING

MR. MACEY: The first case on the docket is Case 881. Does anyone have any statements they wish to make in Case 881? I have a telegram from Sinclair Oil and Gas Company pertaining to Case 881. I will read it into the record. "Regarding Case 881 concerning revision of Order R-520 only as applies to Eumont Gas Pool. This is to advise that Sinclair Oil and Gas Company has reviewed all of the testimony as presented in said Case 881 to date and that Sinclair concurs with Amerada Petroleum Corporation's proposals as submitted in the hearing of this case on May 18, 1955. Signed J. T. Reeves, Division Superintendent."

I also have a letter from Ohio Oil Company. "It appears, after considering the proposals made by Gulf and Amerada at the previous hearings in this case, that neither of such proposals would cause a

reduction in the volume of gas withdrawn from the Eumont Gas Pool and that the net effect of either proposal would be to redistribute to some extent the total dry gas allowable for the Pool as fixed by the Commission so that all or at least a greater portion of such allowable would be taken from the gas wells on acreage which has not also been developed for oil. Apparently neither proposal will actually result in the prevention of waste, but both proposals would definitely affect and to some extent protect correlative rights.

Because of the facts and circumstances of this particular situation and in view of the complexities of the area involved, The Ohio objects to any change which would prohibit the dedication of the same acreage to a gas well and to an oil well in determining the allowable production from such wells. If after giving due consideration to the existing inequities and the rights of the interested parties the Commission considers that some action must be taken at this time to protect correlative rights, The Ohio does not object to amending the rules so as to require the deduction of casinghead gas production from the dry gas allowable where the same acreage is allocated to a gas well and to an oil well for proration purposes. Signed J. O. Terrell Couch, Ohio Oil Company."

Does anyone have anything further in Case 881?

MR. NESTOR: I have a copy of a statement;"Re: Eumont Gas Pool and Eumont Oil Production.

Shell appreciates that the Eumont problem is now more apparent than at the time when the Commission rendered its first Eumont orders. The most significant change has occurred in the relationship of the ratio of the gas portion of the reservoir to the Eumont oil reserve which is now represented by about 230 wells presently

classified as Eumont oil wells, or within the Eumont limits as presented in the Commission's exhibit at the April hearing. The uncontroverted testimony of the Commission's witnesses is to the effect that the Eumont oil and gas comprise essentially a common source of supply and therefore, if the withdrawal rate of gas is high relative to that of oil, the result would be certain inefficiencies in the operation of the reservoir mechanism with consequent decrease in ultimate oil recovery. Needless to say, we would be interested in any progress toward a solution and wholly cooperative in any program tending ultimately to reduce inefficiency. We also recognize that, due to existing large investments made by oil and gas operators and gas transmission and processing companies in the gas reserve of this area prior to the recognition of the very significant oil reserve involved, progress toward the end of allowing increased efficinecies in the operation of the oil reservoir mechanism might require a gradual and moderate approach. It appears that the best possible solution might require considerable time in attainment in order that the commission might avoid introducing inequities with respect to existing subdivisions of interest in the pool which subdivisions have formed the basis for the considerable investments already made.

Even though it is realized that imminent waste is the major concern of the Commission, at the same time because of the problem of maintaining equities of all interests involved, it does not seem fair to limit production only from gas cap wells on just those lands having a gas oil contact beneath them. If the inequities of any of the operators who have drilled gas cap wells and made commit-

ment for gas from the gas cap are to be protected to the extent of not restricting production from the gas wells, even though such production will cause some waste of oil, that protection should extend to all those who have made investments and not only to just a part of them. Those particular operators who have completed a gas well under lands where the gas and oil are in contact have made an investment in a gas well equivalent to that invested in a gas well higher on the structure and, to the extent that any investment equity is to be considered, all investment equities should be given equality of treatment. Shell therefore, recommends that no gas well allowable be charged with gas produced from oil wells located on lands within the gas well proration unit. Any action to the contrary would not significantly prevent underground waste and would not give the owners of such a well the same investment protection accorded to owners of gas wells higher on the structure.

We feel that the Commission staff has made an excellent beginning on the Eumont studies, and suggest that the Commission might wish to hire more help in order to speed the solution of the problem thus minimizing further complexities which could result from additional capital investments. To that end Shell offers complete cooperation with the Commission's efforts by offering any available data and committing itself to gather additional data as requested by the Commission. Further, we feel sure that all of the companies involved are equally interested in arriving at the ultimate solution of this problem as soon as possible, consistent with good judgment.

MR. MACEY: Thank you, Mr. Nestor. Anyone else have anything further in Case 881?

MR. WOODWARD: I wonder if Mr. Nestor would answer a couple of questions about his position, so that we might understand it a little better?

MR. MACEY: I think so.

MR. WOODWARD: It is your recommendation, pending an ultimate solution of this problem, to permit the oil and gas wells in the same unit to produce an allowable of gas from the gas wells and an allowable of oil from the oil wells, and the amount of casinghead gas within the gas-oil ratio necessary to produce that oil?

MR. NESTOR: Yes.

MR. WOODWARD: You would then have a production of casinghead gas from the oil well not charged against the gas allowable, a full allowable of oil and such allowable of gas as would be assigned to the acreage?

MR. NESTOR: That is correct.

MR. WOODWARD: What is your recommendation to offset acreage and investments made hereafter, in the event that offset acreage has only an oil well or only a gas well, would they be accorded that same opportunity?

MR. NESTOR: Actually we aren't prepared to go into that because we feel, as we have said before, that we really haven't reached the solution to this problem. We think that any juggling of our present situation is possibly nothing more than that. Until we can see the facts, the complete facts, we feel that very definitely there is a waste angle involved in the Eumont between the some 230 wells now completed as oil wells in the Eumont in the gas cap. We feel that until we understand the problem thoroughly and re-evaluate

the position that to make any partial steps would be possibly only introducing new problems.

MR. WOODWARD: How long would you anticipate a complete and adequate study of the things that you have outlined would take?

MR. NESTOR: I think it would depend on a large amount how many people get to work on it.

MR. WOODWARD: What minimum time would be necessary for a completion of this?

MR. NESTOR: I should think it could be done in six months.

MR. WOODWARD: In the interim, is it your suggestion that no further allowables be assigned to oil and gas wells subsequently completed? In other words, if you have a gas unit and an oil well is completed on it, or vice versa, what proposal would you have during this interim six months period?

MR. NESTOR: I would suggest that they go on as we have. If we are only making a partial step, it is possible we might make one in the wrong direction.

MR. WOODWARD: You would accord such subsequent completions the same treatment as now exist?

MR. NESTOR: Yes.

MR. WOODWARD: Just as we have before?

MR. NESTOR: Yes, for an interim period.

MR. WOODWARD: For the six months period?

MR. NESTOR: I would hope it would be six months?

MR. WOODWARD: Or whatever period develops is necessary. Your suggestion, as I understand it, would be to follow the practices that have obtained to date, until a study is completed?

MR. NESTOR: Maintain a status quo and work as rapidly as we can toward a final solution.

MR. WOODWARD: You are not suggesting that they freeze this --

MR. NESTOR: (Interrupting) No. Everyone will have to take his chances with investments from here on I should think.

MR. WOODWARD: That is all I have.

MR. MACEY: Anyone have anything else?

MR. HINKLE: Clarence Hinkle, Roswell, representing Humble Oil and Refining Company. The Humble has three brief suggestions and recommendations in connection with Case 881. First, Humble recommends that the Commission reclassify the wells in Eumont-Eunice Monument area so operators will be able to tell what wells are oil wells and what wells are gas wells in the pools in which the wells are situated. There seems to be some confusion with regard to that at the present time.

Second, the Humble would like to concur in the proposal made by the Amerada in the May hearing as to suggested rules recommending that a gas-oil ratio of 6,000 to 1 be placed on oil wells, and that the production of casinghead gas be deducted in computing the allowable, from any unit having both oil and gas wells. The 6,000 to 1 gas-oil ratio is in keeping with the limiting gas-oil ratio established in the Eunice Field and reduction from 10,000 to 6,000 will tend to control waste.

Third, the testimony of the Commission's staff, Mr. Stanley and Mr. Montgomery introduced in April, which is so far uncontradicted, clearly shows that there is a condition existing which needs immediate action on the part of the Commission, in order to prevent waste.

We believe that a temporary order should be entered immediately and that there should be real gas proration in this area, not simply on the basis of ratable take of nominations, but actual proration of gas so as to prevent waste.

MR. MACEY: Anyone else have anything further in Case 881?

MR. WOODWARD: If the Commission please, I am a little hesitant in raising another series of alternate similar to those that we discussed at the last hearing. I do think we have an immediate practical problem which has been pending for some four months. I can explain the nature of this problem a little bit by reminding you of some history of which I am sure you are familiar.

When gas prorationing in this area was first introduced as a subject for the Commission's consideration, a great number of wells had already been completed at a number of intervals in the Eumont area. The problem was one of assigning the acreage to these existing wells and such prospective gas wells as would be drilled in the next few months. Toward that end, all the operators in the State got busy trying to put together acreage, using existing wells. Some of the operating agreements and communitization agreements were predicated upon the existence of a well. The investment was already made, the well was there, it was simply a problem as to which well they would use as the unit well. That was the basis on which a great number of these agreements were made.

Another of the bases was the existence of acreage within the gas unit on which an oil well had been drilled, perhaps in another location. Some of those oil wells are located on 40-acre tracts right in the center of existing gas units. In the last 13 or 14

months, I think all of the operators have made a lot of progress in trying to account for all this acreage in the field and give it some kind of participation. The task is by no means finished. There are a great number of unitization agreements and future units to be formed. Perhaps 70 percent of the acreage has already been accounted for.

Some four or five months ago the Commission questioned the practice of allowing a full -- for the same acreage, a full allowable of oil. The casinghead gas was necessary to produce the oil and an additional gas allowable.

Recognizing the problem, we suggested that since the Commission had fixed one allowable for gas and one allowable for oil, the operator should be permitted to produce that one allowable of gas and one allowable of oil as he saw fit. He wanted to use the gas to produce his oil, that was fine. Since that matter has been brought up, the situation has remained in more or less a frozen condition.

We have some six or eight communitizations hanging fire with other operators, some of which are represented here. We think it highly inadvisable to continue to freeze this situation until any long term study can be made. Mr. Nestor estimates that possibly six months would be necessary. We feel at least six months would be necessary, and possibly more, but in the interim you have a problem of setting out some kind of a policy by which the operators can go ahead and complete these communitizations.

As we see it there are only three alternatives that have been suggested. First, you can leave things as they are. In other words,

the full allowable of oil and gas and the casinghead, which is the undesirable situation which I purported instituted this series of hearings. You can provide for a non-simultaneous dedication of acreage. The effect of that is to turn the clock back some 14 or 16 months. It is going to break up a number of units that have already been formed and will confiscate to a great extent, an investment that has already been made in duals.

It is apparent you can't continue to operate under those agreements and those units where a piece of the acreage, possibly in the center, is going to have to be drawn out as oil acreage. All of the effort and money that has been spent in some 14 months to account for the acreage is going to be wasted or at least a large part will be wasted.

The third is to grant as an interim measure, or permanent solution, depending on the outcome of future study, assigning allowable of oil and gas, leaving it up to the operator to decide how he will take that allowable.

I think these three alternatives have a fourth, which is the most undesirable of all, that is simply freezing the situation and continuing as we have for the last five months, leaving in abeyance all of these many agreements, the disadvantages and defects of such a course of action are obvious. A great part of the pool is operating under one set of allowables and another part of the pool that has not yet been communitized and the units have not been formed are at a very decided disadvantage.

I think the worst thing that could happen would be to continue the whole matter for six or 12 months, freezing the situation. I think possibly the fairest solution would be to follow the directives of

the rules themselves in granting a single oil and gas allowable, but the least objectionable alternative to that would be merely to continue the policy that has been in effect up to four or five months ago. In other words, at their own risk, allow operators to go ahead making dual completions and drilling their new oil or gas wells and giving them the three allowables.

As you know, Amerada is the principal beneficiary of the situation that existed prior to four or five months ago, before the rules were ever put into effect we pointed out that did not seem to be an equitable solution to the problem. As things have worked out, we are a principal beneficiary of it. We haven't any axe to grind in suggesting a fair situation. We think that freezing the situation is dangerous. Certainly a non-simultaneous dedication of acreage is a step backward.

MR. MACEY: Mr. Campbell?

MR. CAMPBELL: Jack Campbell, Campbell and Russell. I do not, as I have stated before in this case, represent any interest in the Eumont Gas Pool. However, because of the effect that the policy established by the Commission may have on other gas pools in Lea County, I would like to observe that in any situation where there are at least four alternatives, and probably more, it has been my observation that the thing to do is to leave it alone.

The history of the changes that the Commission has undertaken from time to time in connection with gas prorationing has been that whenever a change is made it creates four or five additional problems, all due to the fact that we are dealing with an area that is some 25 or 30 years old, and historically it does not lend itself to the ideal application of gas prorationing which you would use if the

field were started yesterday.

I would like to urge the Commission to proceed with caution in making any changes which could seriously effect, not only procedures that have been followed up to this time with reference to pooling agreements, but, procedures with reference to production in the future that has heretofore been allowed, and upon which investments have been made in this area.

MR. MACEY: Anyone else have anything further? Mr. Howell?

MR. HOWELL: Ben Howell, representing El Paso Natural Gas Company. El Paso Natural Gas Company, of course, has made considerable investment in facilities designed to market gas from the pools of Lea County. It appears to us that the adoption of a rule which under the circumstances, which have grown up over these years of development, would result in refusal to permit a gas well to produce because of the existence of oil wells, would be a taking of ours and others investment.

We believe we could live generally with the suggestion submitted by Amerada, which would be that of a single allowable and charge the gas allowable with the amount of casinghead gas that was taken there; either that or maintaining the present status quo. But, we would be bitterly opposed to any rule which would prevent a simultaneous dedication of oil and gas well on the same acreage.

MR. MACEY: Anyone else? If nothing further, we will take Case 881 under advisement.

STATE OF NEW MEXICO)
: SS.
COUNTY OF BERNALILLO)

I, ADA DEARNLEY, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings 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 29th day of June, 1955.

Ada Dearnley
Notary Public, Court Reporter

My Commission Expires:

June 19, 1959