BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

IN THE MATTER OF:

CASE 1637

TRANSCRIPT OF HEARING

JULY 16, 1959

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IN THE MATTER OF:

CASE 1637 (Rehearing) In the matter of the rehearing requested by The Atlantic Refining Company for reconsideration by the Commission of Case 1637 which was an application for an order combining the Allison-Pennsylvanian and the North Allison-Pennsylvanian Pools in Lea and Roosevelt Counties, New Mexico, and for the promulgation of special rules and regulations in connection therewith to provide for 80-acre proration units.

BEFORE:

Gov. John Burroughs
Murrary Morgan
A. L. Porter

TRANSCRIPT OF PROCEEDINGS

MR. PORTER: Take up next Case 1637.

MR. PAYNE: Case 1637. In the matter of the rehearing requested by The Atlantic Refining Company for reconsideration by the Commission of Case 1637 which was an application for an order combining the Allison-Pennsylvanian and the North Allison-Pennsylvanian Pools in Lea and Roosevelt Counties, New Mexico, and for the promulgation of special rules and regulations in connection therewith to provide for 80-acre proration units.

MR. PORTER: Mr. Bratton, how many witnesses do you

have?

MR. BRATTON: One, Mr. Commissioner.

(Witness sworn)

MR. BRATTON: Howard Bratton, Hervey, Dow & Hinkle, Roswell, appearing on behalf of the applicant, The Atlantic Refining Company. This case comes on for rehearing on the application of The Atlantic Refining Company for an order combining the Allison-Pennsylvanian and North Allison-Pennsylvanian Pools, and for the promulgation of special rules and regulations therewith to provide for 80-acre proration units.

In the application for rehearing, the applicant stated that additional information had been obtained by the drilling of additional wells in the area; that applic ant further had made calculations, material balance calculations, and volumetric calculations, and would present that evidence to this Commission upon rehearing.

Applicant is prepared now to present the evidence which it has obtained and the additional calculations and additional evidence which was not offered to the Commission at the first hearing. We are now prepared to offer that evidence at this time, to show that the two pools should be combined, and that 80-acre spacing and proration units should be established.

We have one witness, Mr. W. P. Tomlinson, who has already been sworn.

WILLIAM P. TOMLINSON,

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

DIRECT EXAMINATION

BY MR. BRATTON:

Q Will you state your name, by whom employed, occupation and address, Mr. Tomlinson?

A My name is William P. Tomlinson, employed by The Atlantic Refining Company as reservoir engineer in Rowell, New Mexico.

Q You are the same William P. Tomlinson who testified in the original hearing in this case?

A That's correct.

(Thereupon, Atlantic's Exhibit No. 1 was marked for identification.)

Q Mr. Tomlinson, referring to Exhibit No. 1, is that a new pool map showing the proposed boundaries of the pool?

A Exhibit No. 1 is a new pool map showing the boundaries that we suggested the Commission establish for the Allison Pool when it was combined with the North Allison. We presented maps similar to this at the original hearing. Since that time, operators in the southern portion of the field have asked that we extend the map to include some additional acreage. We've done so because we see no objection to bringing in that additional acreage. I would like to point out to you that the map has been brought up to date with additional wells drilled and completed since the first hearing. There are four of those. One is on the northeast flank of

the field located in the SW/4 NE/4 of Section 36. It's a dry hole, Cosden State No. 1 "C." It fell outside of our original proposed boundaries. Another well has been drilled and completed as an oil well in the area between the Allison and North Allison Pools. That well is located in the SE/4 of the SE/4 of Section 35. It is The Atlantic Refining Company's Federal Gulf No. 1, recently completed with an initial completion of 110 barrels per day with a small amount of water. Then, in the Allison Pool area, Cactus has completed the Sunray State "A" No. 2 in the SE of the NE/4 of Section 2. That well is an oil dual. The Cosden Petroleum Company has completed their Mills No. 1 in the NW/4 of the SE/4 of Section 11; it is an oil producer. At the present time, one well is drilling in the field that -- it is the Magnolia Petroleum Company's Cox Federal No. 3 located in the SE/4 of the NW/4 of Section 1. This development between the two pools definitely indicates to us that the pools should be combined.

(Thereupon, Atlantic's Exhibit No. 2 was marked for identification.)

Q Based on the new wells which have been drilled, have you prepared a new structure map, Mr. Tomlinson?

A Yes, we have.

Q That is Exhibit No. 2?

A Exhibit 2.

Q All right, sir. Will you refer to that Exhibit and explain what it shows?

A Exhibit No. 2 is a structure map contoured on ten-foot interval on the top of Bough "C" zone in the Pennsylvanian formation. That map is up to date with structure points from all of the additional wells that I have described. Principle changes in this map is that the structure is a little broader on the North end of the Field from what we showed it to be at the original hearing. Now, we completed The Atlantic Federal Gulf in the area between Allison and North Allison, and it confirmed our original structural interpretation in that area, in that there was no saddle shown that could be separating the Field. We think that is further confirmation that the two areas are a common reservoir.

Q Shown on Exhibit No. 2 is a red line, AA Prime, which illustrates your cross section?

A Yes, sir. The red line on Exhibit No. 2 AA Prime is a trace in the cross section from North to South in the Field. At the original hearing we had two cross sections, but we didn't think it was necessary to include an east-west cross section because no changes have occurred in development that affect it.

Now, Exhibit 3 is a cross section referred to on Exhibit 2. This has been brought up to date by the addition of one well, The Atlantic Federal Gulf No. 1, previously located on our maps. From the log of that well we have drawn connecting lines connecting the top and the bottom of the Bough "C" zone, and on the log of the well itself we have indicated the perforations that we made. The perforations can be seen to occur in an interval that correlates

with perforated intervals in wells to the North and South. This further leads us to conclude that the reservoir is continuous between the two pools, and that, in fact, in all places within the pool there appears to be continuity in pay.

Q That cross section runs from the North end of the North Allison Pool to the South end of the Allison Pool?

A That is correct. The first well on it is the Atlantic State "AD" No. 1, located in the North Allison Pool as a northernmost well. The Sun Mills No. 1 is the southernmost well in the Allison Pool.

Q And it shows continuity throughout that entire area?

A It certainly does.

Q Including the Gulf Well which has just been completed in the interval between the Allison and North Allison Pool?

A Yes, sir. The same Bough "C" zone appears in all the wells on this cross section and throughout the field. It is a common reservoir.

Q Mr. Tomlinson, as presently defined, where is the northern boundary of the Allison Pool and the southern boundary of the North Allison?

A Would you like me to define it on the cross section or the map?

Q Show it on the map as to how --

A The northern boundary -- on Exhibit 1, the northern boundary is indicated by a heavy blue dashed line. That is the

northern boundary of the Allison Pool; it occurs along the Township line. I believe it's between Township 8 South and Township 9 South. There is no pool designation for the area included in the next half mile north of that. Then, after proceeding one half a mile North, we come to the -- there is the southern boundary of the North Allison Pool. It is shown on Exhibit 1 as a heavy blue line.

Q So it is presently defined there as a half mile gap between the two pools, and the Gulf Well is located in that half mile gap?

A Yes, sir.

Q And it shows continuity from the North Allison through the Allison?

A Yes, sir.

Q Do you have anything further to say with regard to those three Exhibits, Mr. Tomlinson?

A I believe not, except that they do confirm our interpretation of the structure and continuity.

Q In your opinion, it is conclusive that the two pools should be combined, that they are continuous?

A It is conclusive that they should be combined.

(Thereupon, Atlantic's Exhibit No. 4 was marked for identification.)

Q Turning now to Exhibit No. 4, Mr. Tomlinson, will you explain what that Exhibit is?

A Exhibit 4 is a graph showing reservoir performance of the Allison and North Allison Pools versus time. It is similar to the graph that we presented at the original hearing. It has been brought up to date through additional production information that we have. At the top of the graph is a curve drawn in a light blue line, which is the gas-oil ratio for both the combined production for both pools. That shows that the ratios are generally continuing on about the same trend that was observed at the time of the original hearing. The heavy blue line in the middle of the page shows oil production as a combined figure for both pools. It shows an increase since last year, due principally to the completion of some additional wells.

The second line from the bottom of the graph shows the number of wells in the Field, shows that some additional wells have been completed. The percent of water is shown on the bottom of the graph, and it shows that the water production is continuing on about the same trend that it had at the time of the first hearing. There is no significant change there. I might say that the conclusions that you can draw from examining this production data here is that this is not a water drive reservoir. Had it been a water drive reservoir, the normal course of the water percentage curve would have been upward, particularly since this pool is several years old. I believe that's about all I have to say on that one.

(Thereupon, Atlantic's Exhibit No. 5 was marked for identification.)

Q All right, sir. Referring to Exhibit No. 5, your bottom hole pressure graph, what additional information do you have there, Mr. Tomlinson?

A We have additional pressures on The Atlantic wells. We've also got an initial pressure for the Cactus State "A" No. 2 that I referred to as being one of the new wells recently completed. Both the Atlantic Federal Gulf No. 1 and the Cactus Sunray State No. 1 had initial pressures substantially less than the 3518 pounds that was the original reservoir pressure. The Atlantic Federal Gulf had an initial pressure of 2956 pounds at the field datum. Now, that, in my opinion, could have been caused only by removal of oil from the vicinity of that well prior to its drilling. There is no way to account for that pressure.

Q Now, refer back to Exhibit No. 2 and locate those two wells that have come in.

A All right, sir. Exhibit 2 -- on Exhibit 2 The Atlantic Federal Gulf No. 1 is located in the gap between the Allison and North Allison Pools in the SE, SE/4 of Section 35. It's diagonally offset -- it is a diagonal offset from the nearest production in the Allison Pool area and directly south of the nearest production in the North Allison area. The conclusion there would be that development or production of oil from the Allison area and possibly from the North Allison area has affected the pressure that we've observed.

Q Now, where is your Cactus Well, Mr. Tomlinson?

A The Cactus Sunray State is in the defined limits of the Allison Pool in the SE of the NE/4 of Section 2. It is directly north of the Ohio State "A" 2, and diagonally SE of the Cactus Sunray State "A" No. 1. Now, that well is in one direction at least half a mile from any other, and in the other direction it is on an 80-acre spacing pattern substantially better than a quarter of a mile away.

Q Both your Atlantic and Gulf Wells are on 80-acre spacing pattern from any other well, aren't they?

A Yes.

Q And your Gulf Well is a little further north from the majority of productions?

A Yes, sir.

Q And its bottom hole pressure came in a little higher than the Cactus Well, but both of them are substantially lower than the initial reservoir pressure?

A I would like to give the pressure on the Cactus Well. Let's see, 2408 pounds. We received that pressure a day or so ago. That is, oh, very much lower than the original reservoir pressure of 3518 pounds. It does fall near -- you were asking me then -- it does fall near to the principle production out of the reservoir, and consequently it does have a lower pressure at this time than it would have had it been located in a less drained area. I would like to show the Commission our original bottom hole pressure map so that they might get an idea of how these pressures fall in

with our original pressures that we had. Of course, they are not on the same survey. The first pressure map that we included in the first hearing was for a fieldwide survey that was taken in January and February. These were taken quite a bit later, and as a consequence we didn't feel we should contour these new pressures on this map, but they do have a similarity. They fit in our pattern of pressure distribution for the field and confirm our original interpretation.

Q This is referring back to what Exhibit introduced in the original hearing?

A I'm sorry, I don't know the number of that Exhibit. It is entitled "Allison North Allison Pools, December '58 and January, 1959, bottom hole pressures."

Now, first observe The Atlantic Federal No. 1. If it were shown on the original bottom hole pressure map that we presented at the first hearing, it would have been in the SE of the SE of Section 35, and it would have fallen between the 2900 and the 3000 pound contours on the bottom of the pressure map. In this case the pressure was 2956 pounds, so in that respect our ideas as to pressure distribution are pretty well confirmed.

Now, in the area of the Cactus Sunray State "A" No. 2, we found that the pressures have been drawn down a little more than we expected at the location of the Sunray State "A" No. 2. On the Cactus Sunray "A" No. 2 we showed a 2800 pound contour. Now, that well was completed, as I say, with an initial pressure of 2808

pounds at datum, it does confirm our idea that pressures had been drawn down in this area, but they had been drawn down more than we thought they would be. I'd say that all of those facts do confirm our original ideas that drainage is occurring in the Field and that there is continuity over wide distances.

Q As a matter of fact, your Cactus pressure shows that there has been more drainage from that area than you suspected?

A Oh, yes. There is even more than we thought there would be.

Q That's on 80-acre spacing pattern from any well?

A Yes, sir. I might add that on Exhibits 1 and 2 for this hearing, there is a Magnolia well drilling to the East of us, but it has not been completed.

Q Do you have anything further you want to state in regard to your pressure graph?

A Well, the only thing I could think of that I would like to point out here is that we don't have a fieldwide survey at this time. We did take pressures on all of Atlantic's wells, but we felt that nothing would be gained by asking all the other operators to go in the field and conduct a fieldwide survey, so it -- just by way of explanation, why, we have prepared a bottom hole pressure map again. All presures shown here are Atlantic's wells with the exception of Cactus initial pressure.

Q The two initial bottom hole pressures?

A Yes, sir.

MR. PORTER: Let's have a ten-minute recess.

(Short recess)

MR. PORTER: The meeting will come to order, please. Mr. Bratton, will you proceed with your witness?

Q (By Mr. Bratton) Have you compiled additional basic data based on the additional wells drilled, Mr. Tomlinson?

A Yes, we have Exhibit 6 shown in our bound copies of the Exhibit. It is a tabulation of basic data which has become available to us -- additional data which has become available to us since the time of the last hearing. Much of this information was presented verbally at the time of the original hearing. However, we have expanded this tabulation to include some facts that we didn't present at that time. Other things here have been revised to reflect more complete information available from the field or other operators. This covers physical properties of reservoir rock, structural features, fluid characteristics, pressures and temperaturs, statistical data, well completion methods, area within recommended boundaries of the pool, what the operators are doing with the gas that they produce. The principle changes in basic information that we had at the time of the last hearing and presented are as follows: The porosity has been changed from one and a half percent to 5.15 percent. The change in porosity is the result of the inclusion of one additional core on the east flank of the field. I would like to show you where that core is. The Magnolia Cox Federal No. 2. Now, shortly before the last hearing,

Magnolia recompleted that well. It was originally a dry hole, and it had a core on it at the time. We didn't present it and include it in our average because we thought that it was a dry hole, and wouldn't justify including it in any average of any other cores for the reservoir. It has little porosity and permeability, so both factors have been revised downward.

Permeability is shown as 107.2 milladarcies; it was a little higher at the previous hearing. The factor of average net pay thickness shown under structural features on this tabulation has been added. It is8.94 feet. Now, at the original hearing, I testified that I thought the average would be no more than ten feet; in this case we have included an arithmetic average for all of the wells.

Q That's picked off of the five cores and all of the logs in the field?

A Yes, sir, we used that -- all of that information to get this average. The statistical data has been revised in respect to oil production rate, the latest available that we have, cumulative oil production and the well count. There are eighteen producing at the present time, one drilling and two dry holes.

Q Now, your basic data is based upon further calculations, and will be presented further in your testimony, is that correct?

A That is correct. We have performed various calculations following this,and much of this information is used in it. Exhibit 7 shown in your bound copy of the Exhibits is a summary of

core analysis for the five wells on which we have cores. Now, they are the Gulf Federal Mills No. 2 located in the NW of the NW of Section 11; the Gulf Federal Mills No. 1, located in the NE of the NW of Section 11; the Magnolia Childers Federal No. 1, located in the NW of the NE of Section 11; Magnolia Childers Federal No. 2, located in the NE of the NE of Section 11, and the previously mentioned Magnolia Cox Federal No. 2, located in the NW of the NW of Section 12. All of those cores are in a straight line. Now, I'm pointing to Exhibit No. 2. You can see that they are located in the heart of the Allison Pool in an east to west direction. We do not have any cores for the North Allison area. The reason for that is that we made two attempts to obtain cores in the pay. The first was in the Atlantic No. 1; it turned out to be a dry hole. In the North Allison Pool, or on the edge of the North Allison Pool, we felt that core was unusable in any kind of average. The other well that we attempted, in the North Allison was The Atlantic Federal Yates No. 1, and the reason we didn't get a core there was because the pay was so thin we missed it when we tried to core. So we felt like that core shouldn't be included in the Bough "C" average.

Now, the changes in rock characteristics that we obtained from those five cores from the previous hearing is that average porosity, 5.1 percent instead of five and a half, and the weighted average permeability of 107.2 milladarcies is a little lower than we previously had submitted.

I note here on this summary of core analysis that the weighted average permeability for the Magnolia Childers No. 1 and the Childers No. 2 are both fairly low. They are -- one is .7 milladarcy and the other is 6 milladarcies. Now, they are in the heart of the Allison Pool. That might lead a person to think that those wells would be pretty poor wells, but they are both top allowable and have made large quantities of oil. The Magnolia Federal Childers No. 1 has made over 234,000 barrels of oil. Magnolia Childers Federal No. 2 has made over 155,000 barrels of oil. At the present time they are top allowable.

Q So that even with those low permeabilities, there must be effective permeability in order to produce that much oil?

A That is correct. It must be considerably more effective permeability to the well than has been measured on those two cores. As a matter of fact, the 6 milladarcies is a pretty good permeability for most limestone reservoirs.

Q How about your net pay? I notice it is 7.7 feet.

A Yes. That net pay is lower than we found the average to be for the field for this reason: when coring, oftentimes small portions of the pay are missed, particularly in the thin pay, you may not get started to coring right away, and then if someone samples a rock to look at it, some portion of the core may be lost, and, of course, you can see that you don't have ten feet or less to start with; it doesn't take much to throw you off. We felt that logs, in general, were more accurate as to determining the quantity

of the net pay we had. However, this .7 feet is the average of what we had in these cores.

Q Exhibit No. 8 is nothing more than the actual core analyses of which this data in Exhibit 7-R was tabulated, is that correct?

A That is correct. I couldn't make any conclusion from examination of this that I haven't already made from the summary.

Q And those core analyses are not in the brochures which were distributed, but they offer substantially the information which is in the brochure?

A That is correct. We have one copy here that we would include in our Exhibits.

(Thereupon, Atlantic's Exhibit No. 9-R was marked for identification.)

Q Refer now to Exhibit No. 9-R in the brochure, which is the net pay by wells of all of the wells in the pool?

A Yes, sir. Exhibit 9-R in the bound copies of your Exhibits is net pay by wells in the Allison and North Allison wells. We have listed the wells, the operators, and the leases. And the net pay is shown on the column on the right for each, opposite each of the individual wells. The arithmetic average thickness of all of those net pays is 8.94 feet. Now, those were obtained, of course, for the most part,from logs. We used this information in preparing our calculations that we are going to present to you later. The reason that we didn't include an isopach

map is that there is not enough variation in thickness to offer the developed portion of the field to contour a map. Since we do not know the boundaries of the field, we felt like an isopach map would be meaningless, and, in fact, an arithmetic average thickness is much more accurate.

Q Now, correlating your net pay, you have an Exhibit 10-R which is a core graph for one well?

A Yes, sir.

Q I believe this Exhibit is not in the bound volume, is that correct?

A That is correct. Exhibit 10-R is a reproduction of a microlog of the Warren Company's Federal Leo No. 1. Or course, that is now Gulf's Federal Mills No. 1. We shortened the logs somewhat and had them photostat, only the bottom portion, which is an expanded scale, and we included the top of the log. On the right side of the log is shown the Schlumberberger and microlog deflections to the left, which indicates porosity and it occurs generally in the interval between 9673 and 9679 feet. And there are some small streaks of pay below that in the vicinity of 9690 and 9694. We have core analysis over the interval -- have it plotted on this log over the interval from about 9671 to 9680, and from 9690 to about 9693. Now, those intervals are shifted slightly because of variation of measurement in the core and log, but we found that they measured up very well with the indicated porosity on the log. Now, the porosity on our core analysis opposite the

indicated porosity on the log varies between, about one, a little over three percent up to about eleven percent, and then back down to about one percent. That's the major zone of porosity in that well, and shows good correlation on our -- on that particular well, and leads us to conclude that logs generally in the field do give pretty good indication of porosity. And permeability is also plotted on this core. However, we make no claim that the microlog reflects permeability.

Q Based on the data which you have presented, have you made a new volumetric calculation for oil-in-place under a 40-acre tract under this pool?

A Yes, sir, we have.

(Thereupon, Atlantic's Exhibit No. 11-R was marked for identification.)

Q Referring to Exhibit 11-R, --

A Exhibit 11-R is contained in the bound copies of your report. On this Exhibit we have shown the basic formula for volumetric calculation and the factors that we put into it. We have explained where we got our porosity, and the net pay thickness, and we have made a calculation to cover an area of 40 acres. The interstatical water saturation used is 25 percent in this case. The calculated oil-in-place here is 58,841 barrels, and after applying a recovery factor of 30 percent, we found that recoverable oil will be 17,652 barrels. This is based on average thickness in the reservoir, and it is assuming that no drainage has occurred, that

that was the oil that was originally there. The wells in the field, of course, have produced considerably more than that, and we think that that is conclusive evidence that they are getting additional oil from areas a long ways from where the well is much more -- it would have to cover an area much more than 40 acres or even 80 acres.

Q To go along with Exhibit 11-R, refer to Exhibit 12-R and explain how that ties in to your volumetric calculation.

(Thereupon, Atlantic's Exhibit No. 12-R was marked for identification.)

A As I explained when I was talking about Exhibit 11-R, a lot of the wells have made much more oil than should have been in place under their 40-acre tract. Now, we thought that we'd better test the validity of the factors that we put into that calculation, so what we did was look at a well in the field that had made a lot of oil and might raise some questions as to where its oil would be coming from, and whether it could be coming from the 40 acres assigned to the well. So we made an additional volumetric calculation for the Gulf Mills No. 1 Well. What we wanted to find out is how much the various factors would have to vary, how much error we would have in them if -- to account for the oil that that well has made. So, doing that, we made several calculations, each one holding all factors in the calculations, but one constant, and solving to see what that particular factor would have to be to account for the oil-in-place of the net pay. We used 11 feet for the Gulf Mills No. 1. Now, that is the amount that we found on the

log for the well. Now, the required values,holding all of the values constant to account for the oil that it has made, you would have to have 106.4 feet. In porosity, we measured an average of 6.7 percent in core for that well.To account for the oil that the well has made, you would have to have 64.8 percent.

Now, the recovery factor was used as 30 percent, and we would have to have a recovery factor to have 290.3 percent. Of course, I'm not -- I don't want to convince anyone that you can get a recovery factor that high; that's an impossible number, of course. The water saturation was 25 percent. Now, we would have to have a factor of less than zero to account for it, and, of course, we could not have less than zero water saturation. The formation volume factors 1.821 taken from a fluid analysis, the formation volume factor would have to be 0.188. To allow that well to have as much oil as it has produced, all of those factors that we applied are measured except the water saturation and recovery factor. The water saturation usually occurs between 15 and 16 percent, but couldn't be less than zero, as I pointed out, and recovery factor normally occurs between 15 and 50 percent. So those two were estimated, but it is found that the range in which we could estimate wouldn't account for the oil that the well has produced. Thewell actually has produced 273, 437 barrels as of May the 1st. And volumetric calculation would show that if the well were completely depleted at this time, it would have produced 28,258 barrels of stock tank oil from this 40 acres. Our conclus-

ion is that there is an area much wider than 40 acres contributing to the production of this well, and also this, the fact that we would have to vary these factors so much validates our calculation that we have shown on Exhibit 11-R.

Q Your conclusion, therefore, is that the earlier wells in the pool have drained from extremely wide areas?

A That is correct.

(Thereupon, Atlantic's Exhibit 13-R was marked for identification.)

Q Referring now to Exhibit 13 as to the economics of drilling one well per forty acres in the pool, will you explain what that shows?

A It is a -- it is shown in tabular form. It shows the revenue that we would get from oil and gas, after paying severance taxes, shows the cost of development and operating, and shows a loss of 160,302 dollars per 40-acre well, if all of the wells in the field were drilled at the same time. In other words, what we have done, we have taken the 17,652 barrels of recovery oil from each 40 acres and said that if the field were fully developed and other wells got a start on the others, those wells would all suffer a loss of about this magnitude. Of course, all the wells have not been drilled. At the same time, a lot of them got a head start, and it accounts for the fact that some of them are profitable. I must emphasize, however, that this -- it is a basic assumption that you would fully develop the field on 40 acres at the

same time.

(Thereupon, Atlantic's Exhibit No. 14-R was marked for identification.)

Q Turn to Exhibit 14-R, Mr. Tomlinson, and tell us what is in there, the material balance calculation which you made?

A Yes, this is a material balance calculation. The results are shown in tabular form. It is not an actual tabulation in 14-R. What we did is take three wells in the Allison and North Allison Pools. One is the Atlantic Federal Yates No. 1 in the north -- northernmost well in the North Allison. Another is the Ohio State "A" No. 2 in the middle of the Allison Pool, and -- no, beg your pardon -- it is in the Allison Pool to the south. And the third one is the Cactus Sunray State "A" No. 1, which is near the northern boundary of the Allison Pool.

Now, what we wanted to do there was to find out what would be the minimum area that these wells could be draining if -- to have all factors agree with the measured physical data that we have, that is the pressure and production. First, we calculated the oil-in-place for an 80-acre tract by volumetric method, and that is shown on the first line. The next line we show the results of a material balance calculation to determine how much oil would have been forced into the well bore by expansion of reservoir fluids and rock above the bubble point. That is from 3518 pounds to 3150 pounds. And, of course, you can see the range of figures there. They range from about 1414 barrels down to 1588 barrels -- up to

about 1588 barrels. The next line shows the calculated production into the well bore by expansion of the reservoir fluids below the bubble point, and the results of that range from 1815 pounds up to 12,204 and -- change that pounds to barrels on it, 1815 barrels up to 12,204 barrels. And in each case we took the, as a pressure increment, from 3150 pounds down to whatever the reservoir pressure was at the time of the fieldwide survey. Now, the total calculated production from expansion from an 80-acre tract then would have ranged between 3,229 barrels up to 13,792 barrels. Actual measured production, of course, in all cases for all three wells was much more than that. The minumim was 14,653 barrels. Now, we concluded from our,results of our calculations that a lot of the production had to be coming from other areas, so we subtracted the production from expansion from the actual production and show that difference on the second line from the bottom of the tabulation. Now, that is the amount that was drained from other areas. Now, it's a very easy calculation to make,to compute the drainage area that each well is apparently draining there; that is shown on the bottom line. However, I would like to point out that that is the minimum area for each well which could contain the oil that resulted in the production from these wells. In reality, their drainage area could extend over a much wider area than that. That is because first, the reservoir is continuous in all parts, and second, all of the wells in the field are competing with one another for the oil that is in the reservoir. There is one other

fallacy here; it represents a cautious approach to this problem, and that is that some of these wells didn't start out, or none of them started out at 3518 pounds above the bubble point. All of them were -- had initial pressures less than that.

Q So that actually, even though those areas shown on the bottom line are exceeding wide areas, this study is still a very cautious approach, and actually the oil that has been produced must have come from even wider areas than that?

A It certainly did come from wider areas than that. That represents the minimum drainage area that they could have.

Q And these three wells, if the production had to date were coming from the 40 acres under these wells or even a limited area around there, the pressures would have had to drop extremely more than they have dropped?

A Well, yes, sir, they would. It would be much much lower and, as a matter of fact, you can see in Case 2 that the Ohio State "A" 2 has produced 112,000 -- has produced 110,607 barrels, and we calculated that that well only had in place a hundred and twelve thousand nine hundred and fifty-nine barrels originally, so that the pressure would be zero in that case.

Q Mr. Tomlinson, without going into them in detail in support of the result shown on Exhibit 14-R, you've attached Exhibits 15-R and 16-R, a sample calculation to substantiate your Exhibit 14-R, and the nomenclature which you have used in that calculation, is that correct?

A That is correct. The sample calculation simply applies to The Atlantic Federal Yates No. 1, and it's two types of material balance, one for the pressure increment above the bubble point to determine production during that period, and the other is for production below the bubble point. It is two types of balance used. They are conventional balance, and the nomenclature used in those is AIME standard nomenclature, I believe.

(Thereupon, Atlantic's Exhibit 17-R was marked for identification.)

Q Turn to Exhibit 17, Mr. Tomlinson, and explain what that is.

Q Exhibit 17-R shows the results of calculations made to determine what the recovery factor would be in this field under the various well spacing program. Two, of course, that we are interested in is 40-acre spacing and 80-acre spacing. Now, what we wanted to show here was how much the recovery factor changes with well spacing, and it is shown on the left side of the graph as a scale recovery factor percent original oil-in-place. The well spacing and acres per well shown across the bottom runs 1 acre and 160 acres, so the field extends something further. The logical use of this graph is to find how much additional oil you can get if you had an 80-acre tract and drilled it with one well, and recovered all of the oil that well could get, and then could redrill it under the same conditions with two wells, and produce it to determine how much oil you could get. Now, the original oil-in-

place for that 80-acre tract, for an average 80-acre tract in the pool, 117,682 barrels. Now, the recovery factor under 40-acre spacing is estimated to be 26 percent. The calculation that we use is 26 percent here, and on 80-acre spacing it is 25.97 percent, a difference of only three-hundredths of 1 percent. Now, that will change the recoverable oil from that 80-acre tract from 30, 700 and -- beg pardon, start over on that -- 30,597 stock tank barrels under 40-acre spacing to 30,562 barrels. Under 80-acre spacing the difference is 35 stock tank barrels. This, in my opinion, shows that practically no additional oil would be recovered under 40-acre spacing in the Allison and North Allison Pools.

Q You've called this a hypothetical reservoir, but actually you have used in your calculations all of the available data from the Allison and North Allison Pools, have you not?

A We've used all of it, and we did have to pick up some information from one or two other reservoirs. I think there was only two curves we used in our calculation from other reservoirs. That is a common procedure used in engineering work. When you don't have all of the information you need, you look around for a similar reservoir to obtain what you do need.

Q Now, Mr. Tomlinson, you denominated it as an estimated recoverable factor. Actually, it is a calculated recovery factor, is it not?

A Yes, sir.

Q And the method of how you have arrived at that cal-

culated recovery factor is set forth in Exhibit 18-R, is it?

A That is correct. I believe that there is an Exhibit in each of your bound Exhibits. It isn't bound up, it is loose -- wait a minute. Is that 18-R?

Q Yes.

A It is a discussion of how we made the calculations to arrive at this curve. They are very lengthy calculations, in general. What we started out to do was to find out how much the saturation would change in the reservoir under various well spacing. So, first we ran a material balance to find the saturation versus pressure in the reservoir at various pressures, and then, secondly, we made a solutuion of the radial flow equation to obtain pressure versus radius of drainage, and cross plotted those results from those calculations to obtain the information placed on Exhibit No. 17-R.

Q Now, your actual method is set forth in Exhibit 18-R, and attached to the original Exhibit 17-R, which you will introduce,are the actual calculations that went in --

A Yes, sir, that is correct.

Q -- to get the result?

A Shown are material balance forms and graphs and other physical calculations involved in this work.

Q Those are too voluminous to include in each bound volume, but they are attached as a part of the original Exhibit 18-R?

A That is correct.

(Thereupon, Atlantic's Exhibit No. 19-R was marked for identification.)

Q Turning now to Exhibit 19-R, Mr. Tomlinson, and explain what that is.

A Exhibit 19-R is a logical extension of the results of Exhibits 17-R and 18-R. It shows that the additional cost to develop Allison and North Allison Pools on 40 acres, 29 additional wells would be required, if the pool were fully developed, and would cost $5,991,400, based on recent drilling cost figures. The additional recovery we would get would be 1,015 stock tank barrels, based on the results from Exhibit 17-R.

(Thereupon, Atlantic's Exhibit No. 20-R was marked for identification.)

Q Refer on the wall to Exhibit 20-R, Mr. Tomlinson, and explain what that plat shows.

A Exhibit 20-R is a development plan for the Allison Pool area. The plan covers the area included on our proposed boundaries for the Allison and North Allison Pools. The plan shows that 80 acres can be assigned to each well in the pool, and that there is substantial room for additional development on 80 as well as 40. In this case we ran the extended proration units, for the most part, in the north-south direction. However, under our rules, they could be extended in either direction.

Q Have you discussed this plan of development with the

other operators in the pool?

A Yes, sir, we have. We have discussed it with all of the operators. None of them have expressed opposition, to my knowledge, of the idea of assigning each well 80 acres.

Q Do you have available some letters, Mr. Tomlinson, in that regard?

A Yes, sir. Some of the operators have written us expressing approval of that plan. And I have letters here.

Q Let's not bother with them at this time. If you will explain who they are from --

A I'll name the companies that sent them to us. Skelly Oil Company, who owns an interest in each of the areas included in the North Allison Pool. Ada Oil Company, who operates a well in the Allison Pool. Ohio Oil Company, who operates two wells in the Allison Pool, and Gulf, who operates two in the Allison Pool and has an interest in the North Allison Pool. Cactus Drilling Company also agreed to the idea of assigning 80 acres to each well, and they operate a well -- two wells in the Allison Pool. Now, we have contacted all of the other operators, and all of them have been favorable to the idea of assigning each well 80 acres.

Q Mr. Tomlinson, in summation, what does the evidence which you've presented here today prove, in your opinion?

A It proves conclusively that wells in the Allison Pool have the ability to drain wide areas, and, in fact, have already drained wide areas. It shows that no waste or practically negligible

waste will result if the field is developed on 80 acres. It shows continuity between the two reservoirs as well as continuity between various wells in the area.

Q In your opinion, is the evidence conclusive proof that one well will efficiently drain 80 acres?

A Yes, sir, it does.

Q At this point in the development of the pool, can a well be economically drained on 40 acres in that pool?

A You mean economically drilled?

Q Drilled -- excuse me.

A No, sir, I do not believe it can. I assume by that -- you say economically drilled, you mean if it were drilled to recover only that oil occurring under its 40 acres?

Q That is correct. And, in your opinion, would the granting of the application of Atlantic in this case prevent waste and protect correlative rights?

A Yes, sir.

Q In your opinion, would the drilling of this pool on 40-acre spacing result in the drilling of unnecessary wells?

A Yes, sir.

Q Were Exhibits 1-R through 20-R prepared by you or under your supervision?

A Yes, sir.

MR. BRATTON: We would like to offer Exhibits 1-R through 20-R in evidence, and also the letters from the other opera-

tors to which Mr. Tomlinson referred.

MR. PORTER: Without objection, the Exhibits will be admitted.

(Whereupon, Atlantic's Exhibits Nos. 1-R through 20-R were received in evidence.)

MR. PORTER: Anyone have a question of Mr. Tomlinson?

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Tomlinson, you have used, in making your estimates of reserves in this pool, an average net pay thickness of 8.94 feet, is that correct?

A Yes, sir.

Q Is that what your idea of the average thickness for the entire proven area is at this time?

A In the observable area that is the average.

Q There is quite a variation, though, isn't there, for net pay thickness from one well to another?

A Quite a bit of variation percentagewise from one well to another. However, the magnitude of the pay itself is small, the amount of the pay zone is small for most of the wells. The best well that we have seen to date is the last one completed, the Atlantic Federal Gulf No. 1. It seems to be a little thicker in that area.

Q Now, your 8.94 feet is based on logs or on cores?

A For the most part, on logs. We didn't have enough

cores to cover the entire field, and in addition, I suspect that some of the core analyses did not reflect all of the pay.

Q You think that's the case there in that Magnolia Childers No. 1? It seems to be offset by a well to the west with 11 feet, and a well to the east with 0.2 feet, --

A Yes, sir.

Q -- but it only has --

Q That was measured in the core, the 4.5 feet. However, the log appears to have -- the log indicates that the well has about 7 feet of pay.

Q So this may be a case where the core didn't reflect, the coring tool couldn't catch all the core?

A That's right. We would think that the error introduced -- when you compare cores and logs -- the error introduced by the logs, if any, is a little bit on the side of, including more pay.

Q I think even in your direct testimony, Mr. Tomlinson, didn't you mention that when you have a thin pay like this, it is very difficult to catch the core for the entire interval?

A It certainly is. We missed one entirely in one of our wells. We thought we were at a correct place to put a core barrel and tried to catch a core, and found we missed it entirely.

Q So, these cores that we have on five wells may not be representative of the reservoir, actually, is that correct?

A I think they are pretty representative of the reservoir.

They are the best information that we have.

Q They are representative of the part of the reservoir that was cored?

A That's correct.

Q Now, have you used the cores that you had in determining how much thickness you had on the electric logs, have you correlated the logs with the electric logs?

A Oh, yes, we correlated to see if the logs would reflect porosity, and found that they do. As I explained before, the logs, in our opinion, would tend to reflect more pay than the core; that's why we relied, for the most part, on the logs for net pay figures.

Q But you used a questionable source of information, being the cores, to attempt to determine how much pay you have on the electric logs, is that correct?

A I don't think it is questionable. We have certainly measured -- and the results from the core analyses are measured results, they are positive figures that cannot be discounted, in my opinion.

Q I see. Well now, on your Exhibit 11-R, you've calculated that the reserves under a 40-acre tract would be 58,841 barrels?

A Yes, sir.

Q And you used the recovery factor of 30 percent, and came up with 17,652 barrels?

A Yes, sir.

Q Now, would two times that 17,652 barrels represent the amount of recoverable oil under an 80-acre tract, if you had the same recovery factor?

A Yes, sir, on an average 80-acre tract.

Q Well, would two times that amount pay for a well?

A Well, I think we can turn over to Exhibit 13-R and see if it would. The total gross revenue after paying severance taxes for one well on 40 acres would be $47,710, and if we used the same amount of recovery for, or double that amount of recovery, and double that amount of gross revenue, you would see that you'd have, oh, about $94,000, $95,000 in gross revenue. Now, the cost for drilling is $206,600, so it wouldn't pay for that.

Q So an 80-acre well is not going to pay out?

A It wouldn't.If all the wells on the field were drilled at the same time on 80-acre spacing, you couldn't make monay.

Q But these calculations back here on Exhibit 11 were based on the original amount of oil-in-place before any drainage occurred, correct?

A Correct.

Q Then you contend that up in this north end there has been substantial drainage from that area?

A That is correct; I'm sure there is.

Q So right now there is less than the original amount of oil in the north area, and even under the original conditions,

an 80-acre well shouldn't pay out?

A That is correct.

Q But you are continuing to drill on 80-acres up in the north end?

A We are continuing to drill there, or I should say, in the north end, because we feel that the reservoir, as a whole, has enough oil in it to pay for the well now, pay for those wells which we are drilling, when it is divided up among the wells now existing and the ones we plan on drilling. We have not --

Q Do you think this will be drilled on 80 acres?

A I doubt very much that the reservoir will be drilled on 80 acres. I don't believe the operators can make any money doing that. Now, it may seem confusing that we are asking for 80-acre spacing here when it looks like we ought to be asking for something much wider in order to make money, in the order of 160 acres. Had we had an opportunity to plan our development in this reservoir and asked for the spacing we would like to have when the well was first -- when the field was first discovered, we would ask for 160-acre spacing or something wider. Now, the way development has taken place in the reservoir, at this time, you can't assign more than 80 acres to some of the wells. If we could assign more than 80, we'd be asking for wider spacing.

Q I see.

A It's the best compromise.

Q Is this, the Sun ~~Cosmic~~ Cosden Well down here in Section 11,

a completed well, Mr. Tomlinson?

A Well, yes, sir, that's the Cosmic Mills No. 1. They got that acreage on farmout from Sun.

Q Now, has that well been drilled since the last hearing?

A Yes, sir.

Q What was its potential?

A It pumped 124 barrels of oil and 173 barrels of water, and it was completed on June the 19th.

Q Now, back to that 11-R. You used a recovery factor of 30 percent, but in your calculations of recovery factor, you came up with 26.00 percent for 40 acres, and 25.97 percent for 80 acres?

A Yes, sir. That is due to the timing that we had in preparing these Exhibits. We felt that 30 percent would include all of the recoverable oil. When we had time to run through a calculation to determine exactly what the recovery factor would be, it came out two and a sixth percent, a little less.

Q Mr. Tomlinson, as a practical engineer and notwithstanding the supposed validity of these calculations that indicate there is a difference of thirty-one hundredths of one percent difference in recovery factors for the area, as a practical man, do you think that there is going to be 35 barrels difference of recovery on 80-acre spacing versus 40-acre spacing?

A I think that we may have left out some things that could cause it to be even more favorable for 80-acre spacing. For example, you go out to operate two wells to get the recovery factor down that low, and the chances are pretty good that you might operate one well a little more economically than you could two. So, from the practical standpoint, I think that that figure is in the magnitude of the difference -- 35 barrels, in the magnitude of the difference you would have under 80 and 40-acre spacing.

Q But you have enough confidence in the calculations there -- the recovery factors there, to believe that the difference would be in the range of 35 barrels?

A Yes, sir, I have that confidence.

MR. NUTTER: Thank you.

QUESTIONS BY MR. PORTER:

Q Mr. Tomlinson, pursuing this matter of reserves a little farther, I believe you testified that there were 17,652 barrels of recoverable oil-in-place under the average 40-acre unit?

A Yes, sir I believe that was it.

Q That was under original conditions?

A No, sir, the figure I used is --

Q Recoverable oil?

A Recoverable oil, yes. 17,652.

Q Would you say that your proposed pool boundary pretty well represents the productive area?

A Mr. Porter, I don't believe it does. The productive

area could extend -- refer to Exhibit 2-R. Productive area has not been defined to the south, to the west, or not very much on the east side of the field. The southeast side is still open. Now, in our studies we found that the oil that is being produced from the field could not be contained in the area that we have outlined.

Q This is what I was getting at. According to your unit, you propose here, I believe, thirty 80-acre units which would make sisty 40-acre units?

A Yes, sir.

Q Now, in multiplying that out, I found the oil-in-place under those 60 40-acre units would be a million fifty-nine barrels, something -- a million fifty-nine thousand and a hundred and twenty barrels?

A Yes.

Q You might check those figures, 60 times 17,652.

A I imagine they are about right. I believe there is 29 units, though, instead of 30.

Q Well, it would be fairly close, the figures?

A It would be, then, 58 units times 17,652 will be roughly a million barrels.

Q Makes me wonder where this 998,553 barrels has come from, and there are still a lot of wells in the pool producing top allowable?

A We wonder too. I might point out that we've been

drilling wildcats; not real close to this field, but we think probably there is room for wildcats around here, and probably there will be more wells drilled some day. I feel that the productive area extends considerably beyond our proposed boundaries, of course.

QUESTIONS BY MR. NUTTER:

Q Mr. Tomlinson, is there a possibility that there is some oil coming from within the same area that is not included in this 8.94 feet of net pay?

A Very little possibility of that. You are thinking some is coming from some zone above or below?

Q Is there any oil in-place except in the net pay area?

A No, sir, the Bough "B" has been examined and tested several wells by us, and we couldn't find any oil in that zone. It is barren.

Q And Bough "C" is the only productive zone?

A Yes, sir, that's the only one. I might amend that to say that the San Andres is about 5,000 feet, and had a few oil shows in it, but not enough to justify completion. However, this Bough "C" zone is around 9600 or 9700 feet deep.

MR. PORTER: Mr. Payne.

QUESTIONS BY MR. PAYNE:

Q Mr. Tomlinson, isn't most of Atlantic acreage in the north end, and that you say it is one pool there?

A We operate this acreage. However, it is an operating

unit that we operate for Gulf, Magnolia, Atlantic and Skelly.

Q Now, did you testify that you feel that there has been some drainage from the north end to the south end --

A Yes, sir.

Q -- during the life of this pool?

A Yes, sir.

Q Now, if your application here is granted, the allowable for those wells in the south end is going to be considerably higher, is it not?

A Yes, sir.

Q So that your acreage in the north end will be drained even more than it is under existing conditions?

A We are busy developing it.

QUESTIONS BY MR. NUTTER:

Q But those are non-commercial wells, Mr. Tomlinson?

A If they were non-commercial, we wouldn't be drilling on those. We feel we have got enough of a start of development in the field, as a whole, to pay these wells out. Our contention is that some development can occur profitably, but if you try to develop the entire field on 40 acres, why, we are not going to make a profit on those additional wells that we drill.

Q You wouldn't be able to make a profit if you develop on 80 either, would you?

A No, sir.

Q So what are you going to do, stop before you get to the

end of the pool?

A We are going to stop before it gets fully developed, I am pretty sure. I say "we." There is always a matter of opinion there. Some other operators might wish to drill a little longer than we do. We don't have control of development all over the pool.

Q Do you plan any well in the NE/4 of Section 35 besides the one that is there now?

A Northeast of 35?

Q Yes, sir.

A We have none scheduled to drill right now. Our management has not approved anything for that location at the present time.

Q Would you recommend that a well be drilled there?

A I probably would not.

Q You included the pool boundaries that you suggested --

A I suggested the pool boundaries because I think it is productive.

Q Does Gulf operate the S/2 of Section 35?

A No, sir, that is in the unit that we operate, and Gulf is the original leaseholder there.

Q I see. Do you think a well there would be productive?

A In -- where, now?

Q The W/2 of the SE/4 of Section 35?

A I think it would -- it would be productive.

MR. NUTTER: I believe that's all.

MR. PORTER: Anyone else have a question of Mr. Tomlinson?

QUESTIONS BY MR. MORGAN:

Q Mr. Tomlinson, is there any significance in the fact that you -- in your Exhibit 1-R, you show the E/2 of the SW/4 as the pool boundary, and then you show the proposed boundary in that same tract on Exhibit 20-R, and you didn't show it?

A 1-R, you are talking about the E/2 of the SW/4 of Section 1, I believe, --

Q Yes.

A -- being left out of our spacing? That tract is included in the present boundaries of Allison Pool, and our proposed boundary would leave that out. The hashed line cuts it off. The hashed line around the boundary of 1-R is our proposed limit. We didn't put it on here on 20-R. We would have no objection to extending that pool as far as the Commission would want to in any direction.

MR. MORGAN: That is all.

MR. PORTER: Anyone else have a question? The witness may be excused.

(Witness excused)

MR. BRATTON: After the statement, I would like to make a concluding statement, Mr. Porter.

MR. PORTER: Anyone have any statement to make in this

case?

MR. KASTLER: I am Bill Kastler from Roswell, New Mexico, appearing on behalf of Gulf Oil Corporation. Gulf believes the evidence is clear and convincing that the Allison Pennsylvanian and the North Allison Pennsylvanian Pools should be combined in that the oil from these pools is being produced from common reservoirs. We further believe that one well can efficiently drain the 80 acres, and that if less than 80 acre proration units are set up, economic waste will result because of -- it would tend to require the drilling of unnecessary and unprofitable wells. We, therefore, concur in Atlantic's application, and we urge that the Commission adopt appropriate orders, rules and regulations to combine the Allison Pennsylvanian and the North Allison Pennsylvanian Pools, and to establish 80-acre spacing as a common pool.

MR. PORTER: Anyone else have a statement to make in this case?

MR. BRATTON: Mr. Examiner, I didn't participate in the original hearing on this case, so I came into it somewhat cold when the application for rehearing was filed. I know that the Commission was sincere and conscientious when it turned down our original application, and we went on the assumption that it was because we didn't present every scrap of evidence that could be obtained. So when we started out to prepare this case for rehearing, I told Atlantic to prepare every iota of evidence that could be possibly obtained pertaining to this thing. When they

came back to me with the evidence and the drainage areas, the size of the area that is necessary to contribute the oil that has already been recovered from the pool, and is still being recovered, my reaction was just like that of the Commission, as demonstrated by some of their questions. "There is something wrong here, where is the fallacy?" "There must be more pay or there must be something else," and I want the Commission to believe that we have sincerely and conscientiously tried to determine if there is any possible miscalculation on any of the factors that have gone into computing the oil that is in-place under one of those tanks, and we can't come up with any other conclusion other than that this pool -- there is oil coming into this area from tremendously wide sources. That is the only possible conclusion that can be reached. We have tried every way we know to legislate the oil-in-place under a 40-acre tract in this pool because it's just so completely out of proportion with the oil that is being recovered, but we just haven't been able to come up with any other answer. Every bit of information that we have been able to obtain, and we have tried to present it all here to the Commission today, shows absolutely that under a tract in this pool, there just isn't enough oil to pay it out on 40 acres, and that that oil is coming over a wide area. Now, if somebody were to, in my opinion, act foolishly and start a 40-acre pattern in that pool, it could result in severe economic loss to these operators because as further wells are drilled in this pool, there is an economic limit to how much oil can come into this area, and somebody is going to

start losing a lot of money. As Mr. Tomlinson said, actually, from information we have points to drainage over a tremendously wide area much larger than 80 acres. But 80 acres is the best you can do in that pool at this time, and that's what we've asked for, and we sincerely and conscientiously believe that our application is justified, and we have tried to present every bit of information we could to the Commission to show what exists in that pool, as we know it. Thank you.

MR. PORTER: Anyone else have anything to offer in this case? Take the case under advisement and recess the hearing until one-fifteen.

STATE OF NEW MEXICO)
) ss
COUNTY OF BERNALILLO)

I, J. A. Trujillo, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Proceedings before the New Mexico Oil Conservation Commission was reported by me in Stenotype and reduced to typewritten transcript by me, and that the same is a true and correct record to the best of my knowledge, skill and ability.

WITNESS my Hand and Seal this, the 5th day of August, 1959, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

Joseph A. Trujillo
Notary Public

My Commission Expires:

October 5, 1960