BEFORE THE
OIL CONSERVATION COMMISSION
STATE OF NEW MEXICO
Santa Fe, New Mexico

September 18, 1957

TRANSCRIPT OF HEARING

Case 1293

DEARNLEY - MEIER & ASSOCIATES
INCORPORATED
GENERAL LAW REPORTERS
ALBUQUERQUE, NEW MEXICO
3-6691 5-9546

BEFORE THE
OIL CONSERVATION COMMISSION
STATE OF NEW MEXICO
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September 18, 1957

IN THE MATTER OF:	
Application of Amerada Petroleum Corporation for an order amending the Special Rules and Regulations for the Justis Gas Pool, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order amending the Special Rules and Regulations for the Justis Gas Pool provided by Order R-586, as amended, to provide for 320-acre gas proration units in the Justis Gas Pool, Lea County, New Mexico.	Case 1293

BEFORE:

Mr. A. L. Porter
Mr. Murray Morgan
Honorable Edwin L. Mechem

TRANSCRIPT OF HEARING

MR. PORTER: We will consider next Case 1293.

MR. COOLEY: Application of Amerada Petroleum Corporation for an order amending the Special Rules and Regulations for the Justis Gas Pool, Lea County, New Mexico.

MR. BUSHNELL: H. D. Bushnell, attorney for Amerada, appearing on behalf of the applicant, and we are ready.

MR. PORTER: Mr. Bushnell, how many witnesses do you have?

MR. BUSHNELL: I have three witnesses.

MR. PORTER: We will have them all sworn at once.

(Witnesses sworn.)

MR. BUSHNELL: Mr. Chairman, before proceeding with taking the statement, I would like to make a brief opening explanation. The Special Rules and Regulations covering the Justis Gas Pool were originally published in 1954. Those rules expressly provide that standard gas proration units should be 180 acres. In February of 1957, Amerada filed its application asking for an exception to those Special Rules for the purpose of forming a non-standard proration gas unit of 440 acres. That application was denied.

Since the date of that hearing, which was had in March in Case No. 1219, we have new evidence which we are bringing before the Commission today in this case in support of our application filed in this cause to amend the Special Rules and Regulations, or so much of the Rules and Regulations of the Justis Gas Pool as to permit the formation of 320 acre gas proration units.

R. S. CHRISTIE

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

DIRECT EXAMINATION

By MR. BUSHNELL:

Q Would you state your name and the company for which you are employed?

A R. S. Christie, Amerada Petroleum Corporation.

Q In what capacity? A Petroleum Engineer.

Q Have you testified before this Commission in prior hearings

in that capacity? A Yes, I have.

MR. BUSHNELL: If there are no objections, are his qualifications acceptable to the Commission?

MR. PORTER: They are.

Q Mr. Christie, I hand you what is marked Exhibit No. 1, Amerada's Exhibit No. 1. Is it not true that this is a plat of the area that covers the Justis Gas Pool? A Yes, it is.

(Marked Amerada's Exhibit No. 1, for identification.)

Q The area outlined in red there represents the horizontal limits of the Justis Gas Pool under Special Rules and Regulations of the Commission, is that correct?

A I believe that is correct. There is one half section that I couldn't find an order on, but I assume that it is covered in some other order. I believe that is the outlines of the pool at the present time.

Q Also shown on this plat are nine wells designated by red circles, and those represent the nine completed gas wells in this pool, is that correct? A That's correct.

Q Now, Mr. Christie, have you had an opportunity to re-examine the testimony that you gave in Case No. 1219 which was the hearing had on Amerada's application for an exception authorizing a non-standard unit? A Yes, sir.

Q As I recall, is it not correct that you were the sole

engineer who testified in that case, is that correct?

A Yes, sir.

Q And as the sole engineer witness, you testified to certain facts from which you concluded that three wells now completed in the Justis Gas Pool had produced gas in excess of 160 acres under each well, and that you concluded that one well would drain in excess or a minimum of 320 acres, is that correct?

A That's correct, yes, sir.

MR. BUSHNELL: Mr. Chairman, we would like for the record of this case to refer to Mr. Christie's testimony given in Case 1219. If there is no objection we would like to have that testimony incorporated in the testimony that he has given in this case as part of his testimony in this case today. Perhaps I should ask one other question.

Q Mr. Christie, from that testimony of the facts and the conclusions that you gave in 1219, is it your testimony today that the testimony that you gave in 1219 would be the same?

A Yes, sir, with the exception of one factor, and that was the porosity that we used in calculating the amount of gas in place. At that time we had no porosity figures for the Paddock Zone in the Justis Pool, and we used an average porosity figure from the Monument-Paddock Pool. Since that time we have calculated porosities from two electric logs and found that one of them had a porosity of 5.4% and another one approximately 8.2%, which would

give an average of slightly in excess of the 6% that we used in effect, carry through the reservoir, then the amount of gas in place would be slightly higher.

MR. BUSHNELL: If there is no objection, we could then proceed with the new testimony and evidence that we have.

MR. PORTER: In other words, your motion is to --

MR. BUSHNELL: (Interrupting) Incorporate the testimony Mr. Christie gave in 1219 as part of his testimony in this case with this qualification.

MR. PORTER: With the exception of this qualification that he has made?

MR. BUSHNELL: Yes.

MR. PORTER: Without objection it will be made a part of the record in this case insofar as it has a bearing on this case.

MR. BUSHNELL: It all has a bearing on this case. That's all I have from this witness at this time.

MR. PORTER: Does anyone else have a question of Mr. Christie?

MR. COOLEY: I have sent out for the record of 1219. I would like to dismiss Christie now and if we have any questions concerning his testimony at that time we can recall him for cross examination.

MR. BUSHNELL: That is agreeable.

MR. PORTER: You may be excused, Mr. Christie.

MR. BUSHNELL: I would like to call Mr. Wright.

R. T. WRIGHT

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

DIRECT EXAMINATION

By MR. BUSHNELL:

Q Would you state your name and the company for which you are employed?

A My name is R. T. Wright. I'm employed by El Paso Natural Gas Company.

Q In what capacity?

A I am in charge of the Permian Division, Gas Engineering Department in Jal, New Mexico.

Q Have you ever previously testified in prior hearing before this Commission?

A No, sir, I have not.

Q What school did you graduate from?

A I graduated from Texas A. and M. in 1948 with a B. S. degree in mechanical engineering.

Q How long have you been employed since you graduated from college?

A I have been employed with El Paso Natural for the nine years since.

Q During this nine-year period that you were employed by El Paso, has the nature of your work been such that you have either conducted or supervised the conducting of taking the numerous types

of tests on gas wells, or has the nature of your work been such that you must have had knowledge of the interpretation of such gas well tests? A Yes, it has.

MR. BUSHNELL: I submit Mr. Wright's qualifications, and ask that he be accepted as an expert witness.

MR. PORTER: His qualifications are accepted.

Q Mr. Wright, I hand you what is marked Amerada's Exhibit No. 2. Before testifying as to this exhibit, Mr. Wright, have you of recent date conducted a series of tests known as interference tests in the Justis Gas Pool? A Yes, sir, we have.

(Marked Amerada's Exhibit No. 2, for identification.)

Q Referring to Exhibit 2, what does it purport to show?

A Exhibit No. 2 is a tabulation of all of the data obtained during the interference test that we recently ran on the Justis Pool.

Q Was it prepared by you or one under your supervision?

A It was.

Q Does it report accurately the findings of the test that you recently made? A Yes, sir, it does.

Q What period of time does this test cover?

A It covers the period from July 15, 1957 until September the 13th, 1957.

Q Now, how many wells are covered by this data sheet?

A It covers all nine wells in the Justis Pool.

Q What two wells, and would you identify them by referring to Exhibit No. 1, are considered the observation wells?

A The observation wells are the West States Petroleum Corporation Carlson Federal No. 1-A located in the northwest quarter of the southeast quarter of Section 25, Township 25 South, Range 37 East. The other one is the R. Olsen Oil Company Wimberly No. 1 in the southeast quarter of the northeast quarter of Section 23.

Q Now, referring in particular to part one shown at pages one and two of this exhibit, what does it purport to show?

A Part one is a tabulation of all of the surface shutin pressures taken on the six wells that were shut in during the interference test.

Q Now, there are nine wells completed in the Justis Gas Pool, three of which were not shut in, is that correct?

A That's correct.

Q Would you, to complete the record, identify on Exhibit No. 1 and describe the excepted wells?

A One of them is the Continental State A-2 No. 1, in the southwest quarter of the southeast quarter of Section 2. The second one is the Cities Service Hodges B No. 1 in the southwest quarter of the southwest quarter of Section 1. And a third one is the El Paso Natural Gas Company Justis No. 1 in the southeast quarter of the southeast quarter of Section 11.

Q So that to repeat the part one of this Exhibit covers all wells, the shutin pressures of all wells except for these three wells that you have just located, is that correct?

A That is correct.

Q Now, referring in particular to part two, beginning at page three, for the remainder of this exhibit, would you state what that purports to show?

A Part two is a tabulation that reflects the shutin surface pressure, bottomhole pressure, on the two observation wells, and also the flowing wellhead pressures and volumes on the seven remaining wells.

Q Mr. Wright, more specifically, this shows the surface shutin pressures on the Olsen and the West States Well and the bottomhole pressure and shutin surface pressure on the West States Well, is that correct?

A That is correct.

Q So that you do not have any report on the bottom pressure on the Olsen Well?

A We do not, no, sir.

Q Would you explain why?

A That was due to a mechanical fault of the wellhead of the well in question.

Q So that the only well in which you were able to take a bottomhole pressure was the West States Well, is that correct?

A That is correct.

Q In the course of conducting this test, did you find evidence of any liquids in the West States Well?

A Yes, sir. The first two times that we ran our bottomhole pressure bomb in the West States Well there was evidence of liquids in the bore, but thereafter there was none.

Q How many bottomhole pressure tests did you make in the West States Carlson Federal No. 1? A Seven.

Q The results of these seven tests are reflected in part two of this exhibit, is that correct? A That is correct.

MR. BUSHNELL: That's all the questions I have of this witness at this time.

MR. PORTER: Does anyone else have a question of Mr. Wright?

CROSS EXAMINATION

By MR. PORTER:

Q To your mind, are all these wells in the Justis Pool fairly old completions?

A No, sir. They are not all old completions. The ones in the south portion of the field are relatively new, Mr. Porter.

Q Drilled within the last year or two?

A Yes, sir. The ones in the northern part of the field are fairly old.

MR. COOLEY: We would like to dismiss this witness with the privilege of calling him for cross examination.

MR. PORTER: For the time being the witness may be excused.

(Witness excused.)

MR. BUSHNELL: Call Mr. Blackwood.

J. C. BLACKWOOD

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

DIRECT EXAMINATION

By MR. BUSHNELL:

Q Would you state your name and the company for which you are employed?

A I am J. C. Blackwood, employed by Amerada Petroleum Corporation as a Petroleum Engineer.

Q Have you testified before this Commission in prior hearings in that capacity? A Yes, I have.

Q Mr. Blackwood, referring to Exhibit No. 1, shown on there are some contour lines. Would you state what those contour lines represent?

A These contours are on a marker at about the top of the Yates formation. Contour interval is 25 feet.

Q Now, you do not have enough data to complete contour lines on the Paddock, is that correct?

A That's right, there are too few wells drilled into the Paddock formation in this general area to draw a complete structure map on the top of the Paddock formation.

Q Is it your opinion that the contours here on the top of the

Yates represents substantially the structure of the Paddock sand?

A Yes, that's right.

Q Now, I hand you what is marked, or will be marked, Exhibit No. 3, Amerada's Exhibit No. 3, which is a north-south cross section in this Paddock sand, is that correct?

A Yes, that's right.

(Marked Amerada's Exhibit No. 3, for identification.)

Q Now, would you identify by name and by description, the wells on this north-south cross section?

A The well on the south is the Gulf Oil Corporation Arnot Ramsey No. 3-F. That's in Section 36 of 25,37. The second well is El Paso Natural Gas Company's Carlson Federal 1-B in Section 25 of 25, 37. The next well is Tidewater Oil Company's Coates No. 1-C, in Section 24 of 25, 37. The fourth one is Western Gas Company's Eaton No. 1 in Section 12, 25, 37.

Q What does this cross section purport to show?

A It shows the electric log or radioactivity logs of these four mentioned wells, and has marked on it the top of the Glorietta formation and the top of the Paddock.

Q Does it show continuity of the Paddock sand?

A Yes, it does.

Q Now, Mr. Blackwood, have you had an opportunity to examine the data sheet known herein as Exhibit No. 2 which was prepared

as a result of the recent interference tests conducted in the Paddock Pool? A Yes, I have.

Q Have you made a study of those facts and attempted to analyze the findings? A Yes, I have.

Q I hand you what is marked Amerada's Exhibit No. 4 which is a graph, and was this prepared by you or by one under your supervision? A Yes, it was.

(Marked Amerada's Exhibit No. 4, for identification.)

Q Now, this graph shows that on July 15 all the wells that were shut in were shut in on that date, is that correct?

A Yes.

Q That would be the six wells that Mr. Wright identified as being all the wells on the Paddock sand except for the three that he excepted by description, is that correct?

A Yes.

Q This graph shows that these six wells were shut in from July 15 to August 6, is that correct?

A They were actually opened, I believe, on August 7.

Q That's right. Now, would you show on this graph and explain the line which is identified West State Carlson 1-A which shows the first mark as being dated on August 6?

A Of course, all the information shown on this graph is taken from the tabulation Exhibit No. 2. It's just simply the information, a graphical presentation of the information that was

collected under the supervision of Mr. Wright and is set down in tabular form in Exhibit No. 2. The line you ask about, West States Carlson 1-A, connects the points representing the determinations of bottomhole pressure made in this well during this test period. The first test taken in this well was taken on August the 6th, the bottomhole pressure taken at 4880 feet below the surface and the pressure was 2144 pounds per square inch. This was taken on the 6th day prior to the date that the wells were opened up.

Q That is designated by the first dot shown at the top of that line marked West States Carlson 1-A, is that correct?

A That is correct. Then the subsequent determinations are shown by the other dots connected by this solid line.

Q Now the second test.

A The second test was taken on August 10th, at which time the pressure was 2010, or 2020 pounds, or 124 pounds below the pressure determined on the 6th of August.

Q So that this shows there has been 124 pound drop between August 6 and August 10th, is that correct?

A Yes.

Q That on August 7, the plat shows at the top that the wells were then open and put on production except for the two wells that are considered the control wells or observation wells, is that correct?

A Yes, that's correct.

Q Now, the third test --

A (Interrupting) The third pressure determination on this well was taken on August 13, and showed a pressure of 2010 pounds or 134 pound drop from the static determination.

Q And the plat shows that on August 24 the next test was taken, however, that should be shown actually as August 23, isn't that correct?

A That's correct. That is misplotted on that graph. The pressure was actually taken on August 23, the pressure was determined to be 2015 pounds. The next pressure was taken on August 27, pressure was determined to be 2037 pounds, or 107 pounds below the static pressure.

Q Two final tests made on August 30 and September 6 show that that pressure remained constant, is that correct?

A That's correct. Apparently it stabilized at 2037 pounds.

Q Mr. Blackwood, considering these bottomhole pressure tests, these seven tests in relation to the date the wells were shut in, and the date they were subsequently opened for production, what conclusion do you reach, or observation do you make?

A Well, from, just from the pressures of that well, it's apparent that the other wells in the pool are in communication with this well, the subject well, the West States Carlson 1-A.

Q That is shown by the rapid decline of the bottomhole pressure which is shown as being 124 pound drop between August 6

and August 10th, is that correct? A Yes, that's correct.

Q What do the dotted lines on the graph purport to show?

A The dotted line on the graph connects points designating the daily gas flow from these two wells that are shown. One is the El Paso Carlson Federal B-1 which is west of the West States Carlson 1-A, the observation well, and the other well is the Gulf Arnot Ramsey F-3 which is south of the observation well.

Q Now, referring to the dotted line covering production from the Gulf A Ramsey well, what does that show?

A Well, it shows that by August 10th, or on August 10th, the well was flowing at a rate of 1,600,000 cubic feet per day, and it flowed at about the same rate until about the 16th of August, and after that time on to the end of the recorded information there was a general decline in the amount of gas produced.

Q Now, referring to the line which represents the production from the El Paso Carlson Well, would you state what you observed when you plotted that information?

A Well, it shows on August 10th the gas production was about 2,100,000 cubic feet per day, and gradually increased over the length of the test until it reached a maximum of about 2,400,000 feet a day.

Q Now, Mr. Blackwood, considering the production data from these two wells as shown on the graph in relation to the bottomhole pressure test results as indicated on the solid line, what

observation do you make and what relationship exists there?

A Well, it appears to me that there is rather a definite relation between the quantity of gas being produced from the Gulf Ramsey F-3 and the results of the bottomhole pressure in the West States Carlson 1-A. You'll notice that as the gas rate in the Gulf Ramsey Well declined over the length of the test that the pressure gradually built up from its minimum in the West States Well, gradually built up and apparently stabilized.

Now, the pressure stabilized in the West States Carlson 1-A Well at 2037 when it might appear that if the pressure were solely dependent on the gas withdrawals from the Gulf Ramsey Well it might have built up to a higher pressure and not stabilized at that point. From the fact that it stabilized and did not exactly follow the production from the Gulf Ramsey Well, I would infer that it is also, the pressure in this well is also subject to withdrawals from other wells in the pool.

Q You are concluding, therefore, that the results of the bottomhole pressure tests in the West States Carlson 1-A Well are affected by the production from both the Gulf Ramsey Well and the El Paso Carlson Well, and perhaps also by the production figures of the other wells in the pool, is that correct?

A Yes, that's right.

Q Now, Mr. Blackwood, referring again to Exhibit No. 2, does it not show that during the period of this test the shutin tubing

pressure in the West States Carlson 1-A built up for a total of six pounds, or a maximum of six pounds at its maximum amount, and then settled back two or three pounds, is that correct?

A During the period in which the other wells were flowing?

Q That's right.

A Yes, that's right. On August the 10th, the tubing pressure on the West States Carlson Well as shown on the tabulation is 1723 pounds. The pressure gradually built up to 1729, the end of the test, or a matter of some six pounds.

Q That was the maximum buildup, is that correct, to six pounds?

A Yes.

Q That was a buildup of surface pressure on one of the observation wells, the well from which the bottomhole pressures were taken, is that correct? A Yes.

Q What significance do you attach to that finding?

A Well, the first thing I notice about it, of course, is that the tubing pressure does not reflect the changes in the bottomhole pressure.

Q What explanation do you have for that?

A Well, I'm satisfied that it fails to reflect it because of changes in the amount of liquid in the well bore or in the tubing.

Q Now, Mr. Blackwood, considering the findings that have been made by this interference test, what conclusions do you reach concerning the communication in the Paddock sand?

A Because of the rapid drop observed in this interference test, I conclude that communication within the reservoir is good. At least in the area where we tried it.

Q Would you, in your opinion, state what area would be drained as shown from the evidence on this graph?

A It appears that since the West States Well reflected the behavior or the withdrawal from the Gulf Ramsey Well, that at least we can be sure that there is effective communication and drainage over the distance between those two wells, which is 2640 feet, or a half mile.

Q So is it your opinion that one well in this area would drain an area of a circle that has a radius of 2640 feet?

A Well, yes.

Q On the basis of the test information and its results, is it your opinion, Mr. Blackwood, that one well will drain a minimum of 320 acres in this Paddock sand? A Yes.

MR. BUSHNELL: That's all the questions I have of this witness at this time.

MR. PORTER: Does anyone else have a question of Mr. Blackwood? Mr. Cooley.

CROSS EXAMINATION

By MR. COOLEY:

Q Would you repeat, Mr. Blackwood, for my benefit, the method at which you arrive at the 2600 and some feet of drainage influence,

I missed that last step?

A I believe that the graph shown here indicates that the pressure in the West States Carlson 1-A was directly influenced by withdrawals from the Gulf Ramsey F-3. Since these two wells are some 2640 feet apart, I would conclude that we have shown drainage or communication over that distance.

Q How can you be sure that the major portion of the drop is not caused by the El Paso well?

A Because of the variation in the pressure. In other words, if the bottomhole pressure in the West States Carlson was dependent on the withdrawals from the El Paso Carlson B-1, then during the course of the observation period the bottomhole pressure should have continued to go down since the volume produced from the El Paso well went up.

Q Isn't it natural for them to stabilize after a point like that even though it is dependent on one well?

A I don't think it would be natural for it to stabilize as long as the gas volume being produced from the El Paso well continued to increase.

Q Was that a very sharp increase?

A Well, it is not a very sharp increase, no.

MR. PORTER: Mr. Nutter.

By MR. NUTTER:

Q Mr. Blackwood, you stated that you thought that the pressure

buildup on the Carlson 1-A Well was on account of the reduced withdrawals from the Ramsey F-3 Well, is that right?

A I believe that's correct, yes.

Q That well is further away from the Carlson 1-A Well than the Carlson B-1, is it not? A Yes.

Q Why would a well further away have more effect on the bottomhole pressure in the Carlson 1-A Well than a well close to it would?

A The perforations in those two wells are not in the identical same zone of porosity. The perforations in the, maybe I had better consult my notes on that, the perforations in the West States Carlson Well cover an interval from 4820 to 4880, the perforations in the El Paso Well start up at 4614 and continue down to 4820. The elevation on these two wells are almost identical within two feet of one another, so it is apparent that the perforations on the El Paso Well come down to a point 4820, and that's the bottom of their perforations, whereas on the West States Well the top of the perforations are 4820.

Q So that you maintain that the difference in structure position and the difference in the perforated interval of the Carlson B-1 and the Carlson A-1 is so much difference that the two wells are not comparable for the interference test?

A I believe that there is communication there, but it's slow because of the different perforated interval. The fact that

they are not in quite the same interval.

Q How far apart are those wells?

A 1320 feet.

MR. PORTER: Mr. Cooley.

By MR. COOLEY:

Q Then if the West States Well had the south half of 25 dedicated to it, it is your opinion it would not adequately drain it?

A Maybe I had better get that question again, please.

Q I believe you just testified in answer to Mr. Nutter's question that due to the difference in perforation interval between the southeast quarter of Section 25 and the southwest quarter of Section 25 where the West States and El Paso Wells are located, made drainage very slow? A That's right.

Q Then, if the entire south half, if there were only one well in the south half of Section 25 which would be 320 acres?

A Yes.

Q Do you feel that it would adequately drain the south half?

A Yes, I do. This pressure change here is an extremely rapid thing, and we're drawing our conclusions on that and we're talking about whether the well would drain over a long period of time.

Q I'm talking about effective drainage. I have heard testimony in the drainage cases, one well will drain the whole pool if given a hundred years, but I don't think we have a hundred years.

I mean the effective drainage pattern, would this well drain the south half within a reasonable length of time?

A Yes.

Q But still the production from the El Paso well would not affect the West States pressure nearly as much as one 2600 --

A (Interrupting) Not so rapidly, but I believe in the period, it was production from the El Paso well that eventually caused the pressure to stabilize on the West States well. Instead of building back up as it might have done if it were related only to withdrawals in the Gulf well, it stabilized, because of the influence of the El Paso well.

Q Tell me how this curve would look if the Ramsey well were not there at all.

A If the Ramsey well were not there at all I suppose it would have taken a good many days for interference to have shown up and the drop wouldn't have been quite so large.

Q What information do you have that makes you believe that the Paddock zone will conform to the contours of the Yates formation?

A Well, I don't know that it's going to conform exactly. That is an interval of about 2500 feet from this contour interval that we're using on the map. Certainly it wouldn't conform exactly, but in general I think it gives a picture of the Paddock structure.

Q Do you have anything to base that opinion on?

A Well, of course, I don't know the completed Paddock picture,

but as far as we can tell from these wells, why it appears to reflect it.

MR. COOLEY: That's all I have.

MR. PORTER: Anyone else have a question? Mr. Utz.

By MR. UTZ:

Q Mr. Blackwood, the fact that you think that communication is less between the West States Carlson 1-A and the El Paso Carlson 1-B which is 1320 feet, than the communication between the West States Carlson 1-A and the Gulf Ramsey F-3 which is 2640 feet, would that indicate to you that the permeability was quite lenticular in this pool?

A No, I don't believe that's true. The perforated interval on these wells, I presume, was selected by the individual and doesn't necessarily cover the entire porous interval in the Paddock formation.

Q You don't have any idea why they perforated the El Paso well where they did?

A No. I couldn't say why they did that. Certainly it's productive there and covers at least a substantial part of what they thought the pay was.

Q Nevertheless, your testimony is, isn't it, that you had more communication from the well further away from the shutin well than you did from the one that was closer to it?

A Yes, that's right.

MR. UTZ: That's all.

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

By MR. COOLEY:

Q Do you feel that if the maximum limit of efficient drainage in the range of 2640 feet or something like that, that this would be sufficient to justify 320 acre spacing?

A Yes, I do.

Q Where would you suggest that the well be located in the 320, from the standpoint of the long ways to drain the furthermost points in the proration unit?

MR. BUSHNELL: Mr. Cooley, in our application we are only asking for amendment to the Special Rules as to the size of the unit, we are not asking for an amendment to the location of the well.

MR. COOLEY: Yes, but if the radius of drainage is only 2640 feet, it is quite obvious that even a well location in the center of one quarter section would not drain to the other end of this proration unit.

A I don't believe, at least I didn't mean to testify that the drainage would be limited to 2640 feet. We show, I think, by this interference test drainage to that distance within a short period of time. I don't believe that that limits the distance of drainage. Certainly if you were setting up in your question as a limit, as a condition of your question 2640 feet, why it should be drilled

somewhere near the center of the 320 acre tract.

Q But there's nothing evidenced by the tests in question here on the West States Well that the drainage area is substantially in excess of 2640 feet by any stretch of the imagination, is there?

A Well, yes, I think so. I believe, well, there was apparently some testimony given previously that indicated there had been drainage from substantially larger areas than that, and the radius of 2640, I think is a minimum distance because we got such rapid reflex in the bottomhole pressure in the West States Well.

MR. PORTER: Does anyone have a question of Mr. Blackwood? You may be excused.

(Witness excused.)

MR. PORTER: Mr. Cooley, did you wish to call one of the other witnesses now?

MR. COOLEY: Just a minute, please.

MR. BUSHNELL: I would like to offer Amerada's Exhibits 1 through 4 into the record. That is all the witnesses we have, and I understand there are statements however to be made.

MR. PORTER: I believe, Mr. Bushnell, that you indicated that these witnesses indicated that the exhibits were prepared by them?

MR. BUSHNELL: I thought that I did on each instance make that statement.

MR. PORTER: Without objection the exhibits will be admitted.

Mr. Christie, would you take the witness stand again?

R. S. CHRISTIE

recalled as a witness, testified further as follows:

CROSS EXAMINATION

By MR. COOLEY:

Q I heard that you stated these figures on the Paddock in the two tests that you made, you got one test of 5.4 and another of 8.2, giving an average of 6%?

A It would be a little better than six for those two wells.

Q How did you say this compared with your estimated porosity that you testified to Case 1219?

A Well, the average of 5.4 and 8.2 would be slightly greater than 6%, which of course would give you a slightly larger volume of gas in the reservoir initially.

Q Larger than what?

A Larger than the volume that I testified to I believe at the last hearing, or in Case 1219.

Q Mr. Christie, either you are in error or the reporter is in error. I quote from your testimony in Case 1219, in answer to question "What fact are you using as a basis for reaching this conclusion?" The conclusion was that "One well would drain 440 acres. Unfortunately we have very little reservoir information in this particular area, and since we haven't drilled our own well, we have to use other information from other sources not knowing what the

exact porosity, permeability and so forth are underneath this tract. I have used alternate methods of attempting to determine what the drainage area might be. We have assumed, or it is not, actually not an assumption, we have estimated that the average pay thickness underneath this tract is 20 feet of net effective pay. We have used a percent of porosity of eight and a half which is the porosity based on an analysis in the Paddock and Monument Pool, which is to the northwest of the Justis Pool."

A I stand corrected. I say we have eight and a half. I say we have 6%. So that would give you a less volume of gas.

Q Approximately how much less?

A Well, the percentage that eight and a half bears to the average of 5.4 and 8.2.

Q That would be nearly 25% less?

A No, it wouldn't be that much.

Q I believe it would be.

A Well, I'm satisfied if you are at 25%.

MR. NUTTER: It is 20% less.

A Average of 6.8 compared to 8.5 would be less than 2%.

Q It would be less than what?

A Two percent less, the average would be 2% less.

Q Twenty percent less?

A Well, I'm talking about the values themselves, 6.8 against 8.5.

MR. COOLEY: That's all. Thank you.

MR. PORTER: Mr. Woodruff.

MR. WOODRUFF: John Woodruff, representing El Paso Natural Gas Company.

By MR. WOODRUFF:

Q Mr. Christie, would not the lower porosity indicate that the wells would have to be drained from an even wider area to get the amount of gas that has been produced?

A Yes, it would.

Q So instead of 440 it would be something larger than that, would it not?

A Yes, sir.

MR. WOODRUFF: That's all I have.

MR. PORTER: Does anyone else have a question of Mr. Christie? You may be excused. Pardon me, Mr. Utz, I didn't see you.

By MR. UTZ:

Q Mr. Christie, I take it that you calculated the reserve on the base, basis of the figures that you now have?

A No, I have not. I assume, well, I didn't assume, I just didn't do it.

Q I gather from your answer to the question Mr. Woodruff, the El Paso attorney asked you, that you were making a comparison between reserves and production, production that has already been produced in this pool, is that correct?

A Yes.

Q Is that a correct assumption? A Yes, sir.

Q What would you use for reserves in order to make that comparison?

A My testimony in Case 1219, I used 7,000 M.C.F. per acre.

Q 7,000 M.C.F. per acre? A Yes, sir.

Q That would be decreased now by approximately 20%?

A Yes, sir.

Q I wonder if you have the original data at hand to clarify the record as to the reservoir factors that you did use.

A The factors would be 20 feet average pay thickness.

Q 20 feet?

A And 6.8% porosity and an estimated water saturation of 20%, and the pressure that we used initially was 2,000 pounds reservoir pressure.

Q Did you have any permeability data?

A No, sir.

MR. UTZ: That's all.

MR. PORTER: Mr. Nutter, did you have another question?

By MR. NUTTER:

Q Mr. Christie, I wonder if you would put in the record the names and location on which you used the porosity figures as calculated from the logs? A Yes, sir.

Q Please.

A I'm pretty sure I have that somewhere. I am pretty sure it was the Carlson Federal B No. 1 and the Tidewater Coates C No. 1.

Q Both of which are located within the horizontal limits of the Justis Gas Pool, correct? A Yes, sir.

MR. NUTTER: That's all, thank you.

MR. PORTER: Mr. Cooley.

By MR. COOLEY:

Q Mr. Christie, are you of the opinion that this field may be a water drive field?

A The indications are that it is.

Q If that is the case, what effect would it have upon the calculations that you have just mentioned?

A Well, it has quite a serious effect on it. Those calculations wouldn't hold strictly on a water drive field. If you remember the testimony I presented in Case 1216, I used another method of, in Case 1219, excuse me, in arriving at those drainage areas.

MR. COOLEY: Thank you.

MR. PORTER: Does anyone else have a question of Mr. Christie? The witness may be excused.

(Witness excused.)

MR. PORTER: Do you wish to recall Mr. Wright?

MR. COOLEY: No, sir. That's all we have.

MR. PORTER: Does anyone have anything further to say in this case?

MR. KASTLER: Mr. Chairman, Gulf Oil Corporation is an operator in this Justis Gas Pool and we concur in the application.

MR. PORTER: Anyone else? Mr. Woodruff.

MR. WOODRUFF: John Woodruff, representing El Paso Natural Gas Company. El Paso fully concurs in Amerada's conclusions and recommendation and urges the Commission to grant their application consistent with our position in other fields, we do not feel the fact that some operators, including ourselves, have drilled wells under 160 acre spacing, we do not think that fact should preclude the Commission from establishing a wider spacing unit when it has been shown that one well will efficiently drain such wider acreage or area, and that the establishment of a larger unit will prevent the drilling of some unnecessary wells.

We are also authorized to say on behalf of West States Petroleum Corporation that they concur in this application subject to the Commission's finding that one well will efficiently drain 320 acres.

MR. PORTER: Mr. Tomlinson.

MR. TOMLINSON: Mr. Tomlinson for the Atlantic Refining Company. We have an undeveloped lease in the vicinity of the area tested by the interference test. We made a careful examination of the data presented by Amerada, and we believe that

107 pound pressure drop is a fairly large pressure drop to occur on such a short interval of time. To us it indicates that the drainage area larger than 320 acres could be expected in this pool for one well. We therefore concur with Amerada in their application.

MR. PORTER: Any further statements? If not we'll take the case under advisement. The applicant in Case 1309 has requested time to post some exhibits, so we'll take a short recess.

(Recess.)

C E R T I F I C A T E

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 7th day of October, 1957.

Ada Dearnley
Notary Public-Court Reporter

My commission expires:

June 19, 1959.