BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

IN THE MATTER OF:

CASES NOS. 1499 and 1500

TRANSCRIPT OF HEARING

SEPTEMBER 10, 1958

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BEFORE THE
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IN THE MATTER OF:

CASE 1499: Application of Sinclair Oil and Gas Company for a non-standard gas proration unit. Applicant, in the above-styled cause, seeks an order authorizing a 240-acre non-standard gas proration unit in the Tubb Gas Pool consisting of the SW/4 and the S/2 SE/4 of Section 26, Township 21 South, Range 37 East, Lea County, New Mexico, said unit to be dedicated to applicant's J. R. Cone "A" Well No. 1, located 660 feet from the South and West lines of said Section 26.

CASE 1500: Application of Sinclair Oil and Gas Company for a non-standard gas proration unit. Applicant, in the above-styled cause, seeks an order authorizing a 200-acre non-standard gas proration unit in the Blinebry Gas Pool consisting of the SW/4 and the SW/4 SE/4 of Section 26, Township 21 South, Range 37 East, Lea County, New Mexico, said unit to be dedicated to the applicant's J. R. Cone "A" Well No. 2, located 1980 feet from the South line and 660 feet from the West line of said Section 26.

BEFORE:

Mr. Daniel S. Nutter, Examiner.

TRANSCRIPT OF PROCEEDINGS

MR. NUTTER: The hearing will come to order, please. The first case we will consider now will be Case 1499 and Case 1500.

MR. PAYNE: Application of Sinclair Oil and Gas Company for a non-standard gas proration unit. Also application of Sinclair

Oil and Gas Company for a non-standard gas proration unit.

MR. BURTON: I am Horace N. Burton of Midland, Texas appearing for the applicant, and may we ask that these cases be consolidated for the purpose of the hearing?

MR. NUTTER: Is there objection to the consolidation of the Cases 1499 and 1500 for the purpose of taking testimony only? If not, they will be consolidated.

MR. BURTON: We will have two witnesses and about ten exhibits, Mr. Examiner.

MR. NUTTER: Will you please proceed, Mr. Burton?

(Witnesses sworn)

J. W. HODGES,

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

DIRECT EXAMINATION

BY MR. BURTON:

Q What is your name?

A J. W. Hodges.

Q And where do you live?

A Roswell, New Mexico.

Q By whom are you employed and in what capacity?

A I am employed by the Sinclair Oil and Gas Company as a senior geologist.

Q Have you previously given testimony in your professional capacity before the Commission?

A No, sir, I have not.

Q State briefly your training and experience as a geologist.

A I was graduated from Texas Technical College in 1950 with a B. S. degree in petroleum engineering. I was employed by the Baroid Oil Well Service for approximately two years, and approximately seven years for Sinclair.

Q How long have you worked in the Lea County area?

A I have worked in the Lea County area for approximately three and a half years.

Q Have you had occasion to become familiar,in general,with the Tubb and Blinebry gas fields?

A Yes, sir, I have.

Q Is that area under the supervision of your office?

A Yes, sir, it is.

Q Have you made a study and investigation of the geologic structure underlying the two proposed units which are the subject of these hearings?

A Yes, sir, I have.

MR. BURTON: Is there any objection to the qualifications of the witness?

MR. NUTTER: Mr. Hodges is qualified. Please continue.

Q Have you prepared a cross section and structure map of the formations?

A Yes, sir, I have.

Q Is this the Exhibit which is -- will you produce that Exhibit and identify it?

A Yes, sir. This top cross section is our Exhibit 1. It is a west-east cross section and accompanying structure maps contoured on top of the Blinebry and on top of the --

Q Just one second. Let him get those distributed over there. If you will -- first, will you indicate the outline of the proposed Blinebry unit?

A The proposed Blinebry unit is indicated by a red dashed line on the Blinebry structure map, and the proposed Tubb unit is indicated by a red dashed line on the Tubb structure map.

Q And where are the unit wells?

A The Blinebry unit well is located in the northwest of the southwest of Section 26. The unit well for the Tubb is in the southwest, southwest of Section 26.

Q Do you know the original -- are those wells dually completed?

A Yes, sir, they are.

Q And do you know the original completion date of the wells?

A Yes, sir. The No. 1 "A" Cone is a Tubb gas Drinkard oil dual, and the original completion from the Drinkard was November 16, 1946. The Sinclair No. 2 "A" Cone is a Blinebry gas Drinkard oil dual producer. The original completion from the Drinkard was completed May 23, 1947.

Q They originally drilled in 1946 and '47, which was before the promulgation of the Blinebry and Tubb Field gas rules, is that correct?

A I believe that is correct.

Q And the wells, then, have they been dually completed since that time or the last year or two in the Tubb and Blinebry zones?

A Yes, sir. The Blinebry completion in our 2 "A" Cone was dually completed with the Drinkard. The Blinebry section was completed on January 20, 1956. The Tubb gas, or the Tubb Drinkard dual producer was completed November 26, 1956.

Q All right. Will you proceed to state the -- describe the wells which are used in your cross section and relate what is shown by the Exhibit?

A Yes, sir. Exhibit 1 is a west-east cross section extending from the Humble No. 7 "B" Hardison eastward through the Sinclair 1 "B" Cone, Sinclair 1 "B" Cone, Sinclair No. 1 "C", and the Olsen No. 1 Owen. This cross section is indicated on either of the structure maps by a solid line, letters AA prime. The first solid line from the top of the page is the Blinebry marker, and the second solid line from the top of the cross section is a Tubb marker. The limits of production, as defined by the Commission, are indicated by dashed lines in both reservoirs.

Q What is shown on your structure map?

A The structure map shows the structural relationship of the wells in this area contoured on top of the Blinebry marker, using contour interval of twenty feet, and the top of the Tubb marker or the Tubb structure map is contoured on top of the Tubb marker, using a contour of twenty feet.

Q What do you find -- what did your Exhibit show with reference to the plain or dip formation of the structure?

A The cross section indicates that between the Humble No. 7 "B" Hardison and Humble "B" Owen there is an eastern dip of 67 feet and a dip of 66 feet on top of the Tubb marker.

Q Does that show a relatively flat formation in each zone?

A Yes, sir, it does.

Q Do you have anything else to point out on that Exhibit?

A I have also shown the completion data and the completion dates of each of the wells, the total depth perforations, and plug-back depth on each of the wells.

Q Now, is any one of those wells an oil well in the Blinebry?

A Yes, sir. Our Sinclair No. 1 Hill is a Blinebry oil producer.

Q What is your next Exhibit, Mr. Hodges?

A Exhibit No. 2 is a west-east cross section extending from the Humble No. 8 "B" Hardison eastward through the Sinclair No. 2 "A" Cone, the Gulf No. 1 Cone, and the Olsen No. 1 Cone. The information contained in Exhibit 1 is also reflected on this cross section.

Q Does it show the same eastward dip?

A Yes, sir, it does. The four well sections indicated that between the Humble 8 "B" Hardison and A "B" 1 there is an eastward dip on the Blinebry of approximately 39 feet, and Tubb Marker, a dip of 41 feet.

Q Does that indicate the same relatively flat picture of the

formation?

A Yes, sir, I believe that it does.

Q What do you find with reference to faulting in the area? Do you find any faulting?

A In my study of this area, I have found no faults, and I believe that the cross sections indicate that both the Tubb and Blinebry reservoirs are continuous throughout this area, and that there are no impermeable zones which might impede the flow of hydrocarbons.

Q Do you believe, or what is your opinion as to whether or not the proposed area in both zones may be considered a common source of supply?

A Yes, sir, I believe that the continuity of the reservoirs would indicate that the areas outlined would be considered a common source of supply.

Q You mentioned that one of the wells used in the cross section shown on Exhibit 1 was an oil well in the Blinebry. Which well is that?

A It's the Sinclair No. 1 E. C. Hill located in the southeast, southeast of Section 26.

Q Do you have any explanation as to why that well is producing oil rather than gas?

A Yes, sir. I believe that the Blinebry reservoir itself has a gas cap with an oil rim and that the Hill Well is located in the oil rim.

Q Is the depth of completion, would that have anything to do with the fact that it might be producing oil?

A Yes. It's completed slightly lower on the flanges than some of the gas producers. However, I don't believe that it would indicate that it would be a gas or an oil well.

Q What is your opinion as to whether or not that well could produce gas in the Blinebry?

A I believe that without any question that the Hill Well could be made into a gas well by perforating higher in the section.

Q Now, have you had occasion to become familiar, in general, with the remainder of the Tubb and Blinebry gas fields?

A Yes, sir.

Q You have worked with other wells in that area?

A Yes, sir.

Q Do you think that the area of these proposed units is similar or dissimilar to what you would expect to find in the remainder of these reservoirs?

A I believe that the lithological characteristics in both of the Blinebry and Tubb reservoirs is very consistent with that found over the entire field.

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

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

MR. UTZ: I have some questions.

MR. NUTTER: You may proceed.

CROSS EXAMINATION

BY MR. UTZ:

Q Mr. Hodges, with reference to your cross sections, I believe it is Exhibit No. 1, you stated that the E. C. Hill was in the oil rim, did you not?

A Yes, sir, I believe that it is.

Q Where is that oil rim located in relation to the Olsen No. 1 Owen?

A I might indicate that in the completion of the Sinclair Hill which was in 1948. I am advised that our company made every effort to make this into an oil well since there was no great demand for gas at that time. And the Olsen No. 1 Owen is a gas well in this area, and I believe that this may be due to the difference in treatment of the formation. The Olsen Well was completed, naturally, and the Sinclair Well was completed after four thousand gallons acid, and with the less viscose fluids flowing through the formation, I believe that it would be more reasonable to assume that gas and distillate would be made from the Olsen No. 1 Owen rather than the more viscose oil.

Q You attribute it, then, to the manner of completion?

A Well, I think also it is quite possible that there might be a minor fluxation in this very localized area of oil rim.

Q Was the Olsen Well perforated higher than the E. C. Hill No. 1?

A The Olsen Well is perforated higher, yes, sir.

Q How about the lower part?

A There is one difference between the subsea of the bottom perforations on the No. 1 Hill and the No. 1 Owen.

Q Do you know from what perforation the Olsen Well produced?

A At the present time I don't believe it is reporting any distillate at all. In June and in August of 1957 it reported making distillate, I believe, as I recall, something in excess of two hundred barrels for that month. And in April of this year, well, between August of 1957 and April of this year, there was no reported distillate. And in April of this year they reported making some distillate, and for May and June they reported no distillate.

Q Are the other wells on your cross sections,"BB" prime and "AA" prime,all gas wells except this one well?

A No, sir. The Gulf No. 1 is a Drinkard oil well, and our No. 1 "B" Cone and our No. 2 "B" Cone are Drinkard oil wells, in addition to the Humble No. 7 "B" and the Hardison 8 "B" Hardison being dual completions in the Drinkard formation also.

Q The 8 "B" Hardison is a dual?

A Yes, sir, it is.

Q In the Drinkard and whatever --

A It is a Blinebry gas -- Drinkard gas oil dual.

Q What is the other one?

A The Humble No. 7 "B" Hardison, it is a Tubb gas Drinkard oil.

Q What is the situation as to other Blinebry units in the area covered by this application? Is this surrounded by units?

MR. BURTON: We will show that by our next witness, I believe, Mr. Utz.

MR. UTZ: You will also show the situation as to the Tubb with your next witness?

MR. BURTON: Yes, sir.

MR. UTZ: That's all I have.

MR. NUTTER: Any further questions?

MR. COOLEY: One question please.

MR. NUTTER: Go ahead.

QUESTIONS BY MR. COOLEY:

Q Mr. Hodges, in your direct testimony, I believe you testified that you find no unusual characteristics in the area of the proposed units with regard to the lithology of the two reservoirs?

A I don't find any unusual characteristics.

Q By that, I mean the characteristics are pretty well common --

A Yes, sir.

Q -- as opposed to the remainder of the two pools?

A Yes, sir, lithologically they are very similar.

Q Do you know of any dissimilarity?

A The -- no, offhand I don't believe I do.

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

QUESTIONS BY MR. NUTTER:

Q Mr. Hodges, are you prepared to go into the productivity of the various wells in the area,or will the other witness go into

that?

A Somebody else will go into that.

Q What is the present outline of the unit in the Blinebry gas pool assigned to your No. 2 Well?

A I believe it is comprised of the W/2 of the SW/4 of Section 26, and the SE of the SW of Section 26, and the SW of the SE of Section 26.

Q And you have requested the addition of a 40-acre, being the NE of the SW of 26 --

A Yes, sir.

Q -- to the existing unit?

A Yes, sir.

Q Now, in the Tubb Pool, what is the present limit of your unit?

A The present unit outlined is the same as that in the Blinebry.

Q The two units at the present time are identical?

A Yes, sir, I believe that is correct.

Q And you are requesting additional forty acres, being the NE of the SW and the SE of the SE?

A Yes, sir.

Q Two forty-acre tracts?

A Yes, sir.

Q By what reason is the Sinclair E. C. Hill No. 1 classified as an oil well? By virtue of the gas-oil ratio, or gravity of the

fluid it produces or just what?

A I believe it is the gravity of the fluid, although I don't know exactly what the gravity is.

Q Do you know what the GOR is on the well?

A It is around 5,000, as I recall.

MR. BURTON: Our next witness will answer all those questions, Mr. Nutter.

Q As a geologist, Mr. Hodges, do you believe that the Cone No. 2 Well located in the NW/4 SW/4 of Section 26 will efficiently and adequately drain the acreage which you have proposed be dedicated to the well?

A As I have indicated in my earlier testimony, the cross sections indicate that the Blinebry reservoir is continuous throughout that area and that there is no faulting and no impervious zones which would impede the flow of hydrocarbons, but I couldn't say how large an area a well here would drain.

Q Do you believe that a well will drain an area of approximately one hundred sixty acres?

A I am not qualified to say how large an area, really, that a well will drain.

Q I see. Do you feel that the Blinebry formation is productive of gas throughout the area that you have proposed to dedicate to the well, however?

A Yes, sir.

Q Do you think that the completion of the Sinclair 2 "B"

Cone Well in the same manner in which the E. C. Hill No. 1 was completed would result in an oil well in the Blinebry formation?

A No, sir, I don't.

Q Do you think that Mr. Olsen could complete his Owen No. 1 in such a manner to obtain an oil well?

A I think it is possible.

Q Well now, Mr. Hodges, if the gravity of the oil is the basis for which the well is classified as an oil well, the No. 1 Hill and the GOR is only 5,000 to 1, is the difference in the relative permeability as a result of treating one well and producing the other on a natural basis sufficient to cause one well to produce a gravity which would cause it to be classified as a gas well, and the other to produce a gravity which would cause it to be classified as an oil well?

A I believe that the interval from which our No. 1 Hill was completed, which is between a minus 2263 and a minus 2323 -- we do not have the section above this open for production, and the Olsen No. 1 Owen is completed between a minus 2184 and a minus 2324, --

Q Are those subsea --

A Yes, sir, they are.

Q -- perforations indicated on any of these Exhibits?

A No, sir, they are not. The perforations are indicated, but subsea data is not.

Q In other words, the Olsen No. 1 has an interval of per-

forations which is higher than the Sinclair No. 1?

A Yes, sir.

Q It also has an interval of perforation which is the same as the Hill No. 1 perforation?

A Yes, sir. The No. 1 Owen is perforated approximately seventy-seven feet higher structurally than the Sinclair No. 1 Hill.

MR. NUTTER: Thank you. Are there any other -- further questions of Mr. Hodges?

MR. STAMETS: I have a few questions.

MR. NUTTER: Go ahead.

QUESTIONS BY MR. STAMETS:

Q Mr. Hodges, is it your professional opinion that the NE/4 of the SE/4 of Section 26 is productive of gas in the Blinebry and Tubb zones?

A In the NE SE?

Q Right.

A Yes, sir, I believe that a well could be drilled at that location, and it could be safely anticipated that both a Tubb gas and Blinebry gas well could be obtained.

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

MR. NUTTER: Any further questions? If not, the witness may be excused.

(Witness excused)

MR. NUTTER: Let's recess the hearing until one o'clock

at which time we will reconvene with Mr. Anderson on the stand.

(Recess)

MR. NUTTER: The hearing will come to order, please. We will now resume with Cases Nos. 1499 and 1500.

MR. BURTON: Mr. Anderson.

R. M. ANDERSON

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

DIRECT EXAMINATION

BY: MR. BURTON:

Q State your name.

A Richard M. Anderson.

Q And where do you live?

A Midland, Texas.

Q By whom are you employed and in what capacity?

A Sinclair Oil and Gas Company as senior petroleum engineer.

Q Have you previously testified before the Commission as a petroleum engineer and given opinion testimony?

A I have.

Q Is the Lea County area, including the Blinebry and Tubb gas fields, under the supervision of your office?

A It is.

Q Have you made a study of the engineering data to consider pertinent to these hearings?

A I have.

Q Have you an ownership map of the area?

A Yes, I have prepared an ownership map of the area which

I have marked Exhibit 3 in each case.

MR. NUTTER: Let's see, we have Exhibit 3 for Case 1499 and Exhibit 3 for Case 1500, is that correct?

A That is right.

Q (By Mr. Burton) Please state what is indicated on your ownership map.

A I have indicated for each pool the producing gas wells by circling them in red. I've indicated the gas proration units as established by the Commission and as reported in the August 1958 Gas Proration Schedule by outlining said units in red. I've colored certain of these gas wells with green indicating the twenty wells in each gas pool that I have used in a presure decline study that I will refer to later in the testimony.

MR. NUTTER: Excuse me, you have some notes here. It is probably your exhibit. If you will give me another one.

A All of the Sinclair operated acreage is colored in yellow on these exhibits, as a matter of interest. The proposed Tubb and Blinebry units are shown on these exhibits, with a dashed red outline.

The Blinebry Pool, that red dashed outline, encompasses 200-acres consisting of three separate leases; Sinclair's Cone "A" lease, Sinclair's "B" lease, and the Gulf operated S. E. Cone lease.

In the Tubb Pool, the acreage described by the red dashed line, which is the proposed unit in the Tubb, consists of 240-acres

and four separate small leases; Sinclair's Cone "A" lease and "B" lease, Sinclair's Hill lease, and the Gulf S. E. Cone lease.

I might state in describing ownership that there are several working interest owners involved in both units. The Cone "A" and "B" leases, the working interest is owned by Sinclair and by J. R. Cone, who has a small, approximately six and a half percent interest. In the Gluf operated unit, Sinclair, J. R. Cone, and Gulf own portions of the working interest in that unit. Sinclair roughly has a three-eighths interest in working interest, and Gulf has five-eighths interest, with Cone having about six percent interest in the Sinclair Hill lease. In the Cone lease, Sinclair has a hundred percent working interest. You'll note by -- you'll observe from these exhibits, that in both pools all of the acreage offsetting the proposed units is dedicated to a producing gas well, with the exception of the 40-acres in the Blinebry. The Sinclair Hill lease, which was brought out in the previous testimony, is an oil well in the Blinebry by virture of being completed and perforated low in the section. You'll note another Blinebry oil well shown in this exhibit in Section 25. The Southwest of the Northwest of Section 25 has a 40-acre oil well which is operated by Olsen. I believe that's all.

Q Do you know what has been done with regard to pooling?

A Yes. There has now been executed by all parties, Cone, Sinclair, and Gulf, an operating agreement which provides for the production of gas from these proposed units. The agreement is

executed and it is dependent upon the action of this Commission in establishing the requested units.

Q Do you know whether or not the segregated ownership has been a problem and has delayed the development of this acreage?

A Yes, in my opinion that is what delayed the development of these properities in the proposed unit, along with the fact that they are small tracts, and examination of the proration schedule reveals very few small proration units in these pools, which indidates that other operators feel the same way concerning development of Tubb and Blinebry reserves. I believe there is one 40-acre Blinebry gas unit and only two 40-acre Tubb gas units in the field.

Q All right. Do you have a, prepared a report of the status of wells within the proposed non-standard units?

A Yes, I have prepared such a tabulation and I have prepared the same tabulation for use in both cases.

Q It is marked your Exhibit No. 4 in each case?

A Yes, I have marked that Exhibit 4 in each case, and it is an identical exhibit in each case. This exhibit shows the individual well information within the proposed non-standard gas units. There are six producing wells as itemized on this tabulation. I have shown the operator, lease, and well number, the completion date, the producing zone or zones, the producing interval in the various formations, I have shown the August allowable from the proration schedule, and I've shown the gas-oil ratio from the proration schedule. We see from that, that the proposed

unit well in the Tubb is the J. R. Cone "A" No. 1 Well, and it was completed in 1946 as a Drinkard oil well and was dually completed in December of '56 as a Tubb-Drinkard dual. The J. R. Cone "A" Well No. 2 is the unit well for the Blinebry unit and it was originally drilled in 1947 as a Drinkard oil well and was dually completed in December of '56 as a Blinebry-Drinkard dual. The E. C. Hill well was completed in August of 1948 in the Blinebry formation and it presently has an allowable of ten barrels of oil per day, which is a pumping allowable. The gas-oil ratio is 1,210 cubic feet per barrel.

Q Can you give the allowable and production history of the unit wells?

A Yes. As a matter of information, I prepared a tabulation on the proposed unit wells showing the allowable and production in the Tubb and Blinebry gas pools from the first production on these wells. The first production is shown on these exhibits on both wells to have been in March, 1957. The gross allowable listed in the second column on the page is the allowable assigned by the Commission each of those months and through April, 1958, including April. Both wells had an 80-acre allowable. As of May 1st, the allowable was increased to 160-acre allowable by virture of a hearing before this Commission, established a 160-acre non-standard proration unit for those wells. The unit consisted of the Cone "A" and "B" leases. They are jointly owned by Sinclair and J. R. Cone. You can see by an examination of these figures

that in the Tubb gas pool, the well is currently underproduced about forty million feet of gas, and in the Blinebry it is underproduced about forty-eight million feet of gas. Most of this underproduction has occurred by virture of the fact that these wells were both shut in completely during the month of May, June, and July. The gas purchaser had no need for the gas, I am advised, and he is accruing this back allowable to produce at a later date. At the last balancing period, that would be July 1st, neither well lost any allowable by virture of balance. In looking over the figures in the Tubb gas pool, we see the first month the well produced about thirty-three million feet of gas, and at the bottom of the page I have calculated, based on the twelve month production ending July 1st, 1958, exactly what a 240-acre average allowable would be. That would take into account seasonable variations in allowable, and we find it would be about twenty-two and a half million feet per month, or seven hundred and fifty-one MCF per day. I believe this well has demonstrated the ability to produce in excess of that gas, the first month it was in production, and we have not -- the purchaser has not pulled the well that hard since then because it only had an 80-acre allowable to keep up with. In the case of Blinebry well, with the same calculation, it gives the monthly allowable of twenty-seven million, two hundred fifteen thousand cubic feet per month, or nine hundred and seven MCF per day, and we see that, the way that wells are produced, that the well has produced in excess of that amount or slightly under that

amount for two months during its short life, July of '57 and February of '58. However, I believe that the well would have amply demonstrated its ability to produce had it had more than an 80-acre allowable during that time. The purchaser would have had to pull it harder to keep up with the larger allowable.

Q Do these past production figures show that the wells are definitely capable of producing the additional allowable that we would receive?

A I believe that these figures in the Blinebry gas pool would indicate that more so than in the Tubb.

Q Have you prepared an exhibit -- What is your next exhibit?

A I have prepared an exhibit which I have labelled Exhibit 6 which is a tabulation of the deliverabilities of the wells in the immediate vicinity of the proposed units. There are similar tabulations prepared for both pools. I have picked the direct offset properties going completely around the proposed units, and I have listed the operator, lease, and well number, and I have attempted to determine the relative deliverability of the Sinclair wells compared to the offset wells, and in order to get this information, which was not on record in the Commission's office, except for the Sinclair wells, I calculated that information from the back pressure test which is on file with the Commission's office, we contacted the purchaser of the gas from the wells on these lists. We obtained from him all of the necessary data to calculate the deliverability of that well against six hundred pounds, which

we feel is about what the line pressure is in this area. None of these tests that we got from the purchaser were against six hundred pounds. We corrected them to six hundred pounds by virture of obtaining from him all of these data that it takes to do that. I have tabulated those deliverabilities and I have shown the date of the test we -- when the data was obtained and some of them are more current than others. However, there is quite a range in time and that should be taken into consideration in examining this data, but it is the best data that I could get. I wish to observe from these tabulations that they show that the Sinclair Well, or Cone "A" No. 1 has approximately a hundred and fifty-four percent more deliverability than the average of the seven other wells in that exhibit. If you go a step further, we are requesting here--by enlarging the Tubb unit--we are requesting fifty percent more allowable for that well. In the Blinebry pool we could not get any data on the two Continental wells that offset the proposed Blinebry unit. There was no data available in the purchaser's file, but we were able to get data from the purchaser on the other four wells that offset the proposed unit. Here again I just make the observation that the Sinclair well has a hundred and thirty-four percent more deliverability than the average of the four wells that we have data on. In the Blinebry pool we are asking for twenty-five percent more allowable. Now, this --

MR. NUTTER: That would be one hundred thirty-four percent more than the four wells?

A The average of the four wells. The arithmetic average. I added them up and divided by four. I further would like to observe from this data that it seems to me reasonable to conclude that the Sinclair wells will be able to produce the increased allowables that we are asking for in competition with these offset wells down to, I would think, to the abandonment pressure. The deliverabilities, of course, are influenced by the amount of section open in the well and the type of treatment and thing like that, and these wells are subject to change from that extent. As the data stands now, it indicates to me that our well will be able to produce the larger allowable in competition with the offset wells.

Q Have you prepared an exhibit to illustrate or demonstrate the theoretical drainage pattern and competing drainage in the area?

A Yes, sir, I have prepared an exhibit which I have labelled Exhibit 7, which is strictly an academic exhibit, but I believe that in some way it does illustrate the principle of drainage and counter drainage. I have inscribed on these exhibits, circles of sufficient radius to enclose about the individual wells the acreage that is presently assigned those wells. Most of those circles enclose 160-acres. The circle about the Olsen well in Section 26 is an 80-acre, is a circle which encloses 80-acres. The circle in our Tubb pool exhibit encloses 240-acres which is the allowable that we are proposing here today, on the Blinebry

Pool, Sinclair's "A" Cone 2 Well encloses two hundred acres which we are asking for today. It is interesting to me to observe in the bottom left-hand portion of the Exhibit the relative sizes of the circles which you might call radiuses of influence or drainage areas. In the Tubb Pool circle, we see the 240-acre circle. The radius is only 22.4 percent larger than the 160-acre radius, although the acreage included in the circle is fifty percent more than the 160. In the Blinebry, we see that the radius of the 200-acre circle is only 11.8 percent larger than the 160-acre radius, whereas the acreage in the 200-acre circle is twenty-five percent more acreage than the 160-acres. Now, these circles necessarily assume many things in order to draw them this way. You must assume that the reservoir is uniform in all directions from the individual well bores. The thickness and porosity, permeability, the structural position and the saturation in that reservoir are the same and uniform in all directions. You also must assume that the fluid moving in the reservoir in all directions from the well bore is the same, whether it be oil, water or gas. You must ignore, of course, the interference from offset wells, and you must ignore the time factor, which wells are completed first and producing first. All those qualifications, taking them into consideration, we see that the radiuses of influence academically expressed as I have expressed them, of the offsetting wells in many cases lap over on to the proposed units, and likewise, the radius of influence of the Sinclair wells lap over on to the off-

set wells on the rounded proposed unit. I believe that this situation is analogous to a large pan or vessel containing a fluid with a certain amount of straws in it, and if each straw is permitted to withdraw at a rate comparable proportionally to that straw's interest in the surface area of the pan, why then, every one, assuming they start drawing at the same time, would empty the pan at the same time, and each would receive his fair share of the hydrocarbons under his acreage under his surface interest. And I believe that that is very analogous to the situation we have in this area, and I believe that, as a matter of correlative rights, that if these applications are granted that no offset operator's correlative rights will be impaired in any way, in that we are only asking for that fair share of the total reservoir hydrocarbons that we are entitled to by virtue of our surface acreage in this area. I believe, further, that if the applications were denied, if we were forced to produce at a reduced rate, and that the 40-acre tracts that we propose to add to our present unit were not developed, that the offset operators would drain and receive a portion of the hydrocarbons that are under those 40-acre tracts in addition to their fair share of the hydrocarbons in the reservoir. Therefore, the owners,which are Sinclair, Gulf and Cone, of those 40-acre tracts, their correlative rights, thus, would be impaired.

Q Are you ready to go on to your next Exhibit?

A Yes. I've prepared pressure history in the vicinity of the proposed Tubb and Blinebry units, which I have identified as

Exhibit 8. This Exhibit contains pressures -- all the pressures that were available to me from the New Mexico Oil & Gas Engineering Committee Publications on the twenty wells that are colored in green on my Exhibit 3. There are twenty wells in each pool. I attempted to take every well for several wells deep around the proposed units in an effort to get as much data together as possible along this line. The top portion of both of these Exhibits shows the number of producing wells at any particular time. You'll see that the first producing well in the Blinebry Gas Pool in this area started producing about the 1st of December, 1949. We have -- it was the only well producing up until the 1st of '53, and then for the next three years, why, there was several wells there added each year. And finally in 1957, three additional wells, making a total of the twenty wells that are colored in the Blinebry. The same thing is true on the Tubb curve except it did not start in the Tubb until the middle of '52, and was completed in the Tubb. All twenty wells were completed in October, '57.

MR. NUTTER: Now, these wells that you used on this pressure study are the ones that are indicated by the green coloring on Exhibit 3?

A Yes, sir. Yes, sir.

MR. NUTTER: Thank you.

A Now, I have plotted all kinds of pressures that were available to me from the Committee Publication. On the Blinebry curve I have indicated in a round solid dot surface pressures that

I have calculated to datum. With a triangle I have plotted instrument pressures that were obtained, bottom hole pressures. The little plus signs are sonic pressures, and I have circled in red initial pressures on wells prior to production. Now, with the exception of the triangle that is circled in red on the left-hand side of this Exhibit, with that exception, all of the other red circles on both Exhibits were obtained from the Commission records in Hobbs, and were calculated to datum from four point or five point back pressure tests. I would like to make a further comment about those pressures at this time. I consider those rather good pressures in comparison with these others in that, usually, in running a back pressure test, the well is particularly free of water or distillate or fluid at the time that the shut-in pressures are ascertained, which is not as liable to be true, in my opinion, for the surface pressures that were calculated to datum, and the sonic pressures, which, of course, are calculated to datum. I do not know the method used in calculating the sonic pressures to datum. I know that they evidenced in this Blinebry Pool, which is the only pool which we had sonic only, they evidenced quite a spread in pressures, more so than the surface pressures that I calculated to datum. It is interesting to note in examining the Blinebry curve that the first red circle of pressure measured at bottom hole pressure instrument, which, of course, would look, in effect, like any fluid levels that might have been found in a test, a rather accurate test was 2372 pounds, and that all of the subsequent

pressures that were taken in other wells after production -- before production from those wells, are less than that pressure shown at the left of the Exhibit. From that, I conclude that the areas were drained prior to production from those particular wells. The second red circle from the left is a double circle. There are two wells there that were within eight pounds of each other, and they just plotted them as one point. In the Tubb formation, we found quite a few less points to plot from. I was at a loss to draw an average decline through those points, and the one that I have drawn I have calculated by the theory of less squares, which is the best straight line that can be drawn through that series of points. I have ignored the pressures that are circled in red in that they were, as I said before, from four point back pressure tests from the Commission's files at Hobbs and were prior to production, and the other points are all shut-in pressures calculated to datum from the Committee reports. The Blinebry pressure decline in this area indicates that the pressure is declining over a period of about ten years shown in this Exhibit, about fourteen and a half pounds per year, where in the Tubb we have a much steeper decline, about eighty-six pounds per year, and pressure history is much shorter in the Tubb. I just have pressures for five years in the Tubb.

Q Have you made an analysis of the spread in pressures?

A Yes, I have, and I have prepared an Exhibit which I have labeled Exhibit 9. I prepared this Exhibit to analyze the last group of pressures that I have plotted on Exhibit 8 in both pools.

In the Blinebry Pool, the last group, is a group of sonic pressures plotted in May of 1958, and with the exception of that highest sonic pressure, which is plotted there in May of 1958, I have ignored that sonic pressure because it is out of line and obviously it is in error. Also I have ignored that sonic pressure, also I think -- correction -- I believe that the sonic pressure -- the highest sonic pressure plotted in October of '57 was also in error as those two pressures were obtained on a well that has earlier pressures plotted on this curve -- earlier sonic pressures much lower and I can't explain an increase in pressure of that magnitude without -- except to say that there was a discrepancy in the measuring of that pressure, and that, I believe, is what explains the spread in pressures on both of my Exhibits and any inaccuracies involved in determining bottom hole pressures from surface measurements. However, that is the only thing that I could use in order to make a pressure study of this area. From this -- from Exhibit 8 -- to go back to Exhibit 8 for a minute, I have concluded that there is a trend shown, and by virtue of the pressures coming in lower rather consistently across the Exhibit, especially the newer pressures prior to production, I have concluded that this area is in some degree of pressure communication, and I believe that these Exhibits indicate that there is a, I would say a considerable degree of pressure communication throughout the area, especially in light of the fact that we are dealing with a compressible fluid here, and the pressure fluids are, in my opinion, rather limited;

they do not extend too far from the particular well bores. To get back to Exhibit 9, in the Blinebry Pool I have analyzed the five lower sonic pressures shown plotted in May of 1958. I have listed the operator and the lease and well number, the acreage assigned, and I have listed them in order of increase in pressure. I have tabulated the cumulatives as of the month that those pressures were reported in. also on this Exhibit, the top portion of this Exhibit. And I see from examination of that data, that if a well were draining a very small area in the neighborhood of, well, some small amount of acreage, then I would expect the cumulatives to vary inversely with the pressures. I would expect that the well that had produced the most would have depleted the reservoir in its area, and if there were no pressure communications, I would expect that pressure to be the lowest. And conversely, a well that had only produced a small amount, I would expect it to have a high pressure if there was no pressure communication throughout this area, and if the area were not in good communication. I do not find that to be true in examining the spread of data on this Exhibit. I find that the second well, for instance, from the top has about 318 pounds less pressure than the last well on the list, and yet it has produced less gas than that last well has produced. I also find that the second and third wells on the list have about the same pressure reported, about 18 -- 1982 and 1983, and yet the third well has produced two and a half times more gas than the second well has, both wells having about the same pressure. I believe that

that is an evidence of pressure communication throughout the area, and the ability of a well to influence a larger area and draining a large area. Now, I certainly would expect in a reservoir of that nature, where a well is influencing a large area, I would expect the cumulative to be proportionate to the age of the well and to time, and we do find that that is true, that the older wells have produced the most gas, and I have listed these same five wells on the bottom half of the Exhibit in order of age with the oldest well first. And we find by looking at the cumulative that the oldest well has produced the most gas and the newest well the least. There is a very good correlation there between time and cumulative. Looking at Exhibit 9 in the Tubb Gas Pool, the same general comments apply. I have taken the last point there where I had six points, that was in August of '56. Those were surface shut-in pressures that I calculated to datum, and I've listed those in the order of increase in pressure, and I have listed their cumulatives as of that time. And here, too, I find that the well with the lowest pressure has almost the same cumulative withdrawal as the well with the higher pressure, and there is 618 pound spread in those pressures, and there is very little difference in their cumulative withdrawals. So, that leads me to believe that the area is extensive in that it had -- the well with the higher pressure had considerably less withdrawn, and the well with the lower pressure, why, then, I would possibly have to assume that it was only influencing a small area. There, again, that 618 pound spread in pressure, I

believe can be attributed to the fact that we don't have any better way of ascertaining the reservoir pressure than what I have used, and calculating from surface pressures is best a hit or miss operation, in my opinion, but I felt that I had to do something, make some sort of a pressure analysis of these areas in order to base my opinion on whether a well could drain the proposed units that were assigned them. From these pressure curves and from the geology in the area where we have tests whereby our geologist has indicated that the reservoirs are continuous throughout both proposed units, and are readily correlatable from well to well, and find no evidences of faulting or impermeable barriers in the area. And with that information and with this pressure analyses, it seems to me very reasonable to assume that a well can drain an area 200 acres in the Blinebry and 240 acres in the Tubb.

Referring back to Exhibit 9 in the Tubb once more, note that the average pressure of those six listed is 2,071, and the average cumulative is 420,000 MCF. In looking up the list, we find the third well on the list has got a pressure of pretty close to the average pressure, 2,077, and we see that it has about half of the cumulative withdrawal on the average well on the list, so there, again, we see we have no correlation. The same comments on the correlation of time versus cumulative apply. I have listed the wells in order of their age and their cumulatives, and they show the older wells have produced more than the newer wells.

Q Do you know of any precedent in the orders of the Commission

for non-standard units in these two fields of a size equal to the ones we are applying for now, or having acreage dedicated to a unit well at a distance equal to or greater than the distance involved in these cases?

A Yes. I felt that the matter of precedent might be involved, and I have made a study of the ownership maps and proration schedules and Commission orders, and I was -- I selected four examples in each pool. I might mention that -- and I have listed them on an Exhibit which I have identified as Exhibit 10, and it is an identical Exhibit for each case. This Exhibit shows non-standard Tubb and Blinebry gas proration units that are in existence at the present time. For purposes of comparison, I have listed the proposed unit first in the Tubb Gas Pool, and I show that we are asking for 240 acres, and the maximum distance from our well to the furthestmost point of the proposed unit is 4,667 feet. Then, I have listed similar examples that the Commission has seen fit to adopt and approve in the past, and this seems to me to be of some interest in that it is my opinion from my general familiarity with the Tubb and Blinebry Gas Pools that the reservoir in the vicinity of the proposed units are in no way, that I can see, different than any other portion of the Tubb and Blinebry reservoirs except for the, possibly for the position on the structure, and that is a rather flat structure with a very gentle tall slope. I believe that what is true, what could be true in one area of this pool without making an extensive study of the entire reservoir, like I

have done in this proposed unit area, I believe, generally speaking, that what is true in the proposed unit area would be true, generally, throughout the entire reservoirs, so I have listed these examples just for the convenience of the Commission, and I find here that in the Tubb Gas Pool there are two 240-acre non-standard gas proration units in existence. There is one 320-acre non-standard Tubb Gas Pool unit in existence. It is interesting to note that the 320-acre unit was established by Commission Order R-545 for Ohio Oil Company's Wortham No. 9 Well. At the time that was established, the maximum distance from that well to the furthest point in the proration unit was 5,365 feet. Approximately a year and a half later, in 1956, Ohio came back and had a hearing of which resulted in Order R-796, and at that hearing they added their Wortham Well No. 11 to this 320-acre non-standard unit, and the furthest distance, then, from that well to the furthestmost point is 3,750 feet. The 320-acre non-standard unit was maintained at this hearing in that wells 9 and 11 are on the same governmental quarter section. It is impractical to assign them each separate proration units of 160 acres. And in the Blinebry Pool, there is one other, there is one 240-acre non-standard unit in existence, the Skelley Baker "B" Well No. 15, and the distance from the well to the nearest proration point is 3,848. There are three units that are "L" shaped, or consist of the S/2 of the S/2 of a section, or some such description, and have rather a great distance from the well to the furthestmost point in the proration unit.

Q As a matter of fact, three of them shown on the tabulation are at distances, including acreage, at distances considerably greater than we are requesting here today?

A Yes, sir, three of them do, and one of them has acreage at that same distance that we are requesting now.

Q Those orders, at least some of them, have been granted since adoption of the field rules providing for standard units, have they not?

A Yes. The 320-acre unit for Ohio, Order R-796, was published in 1956 sometime. I don't have those dates right here. I do have copies of those orders, however, with me. I could look them up.

Q The order will reflect the dates. Based upon the data that you have discussed and your study, what is your opinion as to whether or not the unit well on the Blinebry will drain all of the acreage to be dedicated to that well?

A I believe that the unit -- the Blinebry unit well can effectively and efficiently drain the 200 acres that we propose to dedicate to that well.

Q And with respect to the drainage by the unit well in the Tubb, what is your opinion?

A My opinion, likewise, with respect to the Tubb formation is that, that the unit well can effectively and efficiently drain the 240-acres that we propose to assign to that well.

Q Considering the ownership and the problems of ownership,

and considering the existing wells and economics, do you consider this the most practical proration unit?

A Yes. I've had approximately four years' experience here -- the last four years in putting together Tubb and Blinebry, Eumont, Jalmat units throughout southeast Lea County as well as similar units in Texas. It is my opinion that it is not practical to attempt to further subdivide leases in order to develop them by assignment. I believe that working interest ownership is very important, and whenever there is acreage in the area that is contiguous and is -- and can be drained and produced by a well, that the operator should attempt to assign that acreage to his well. I believe these proposed units are a good example of why it is impractical to attempt to form too many units in -- attempt to put together units unnecessarily. We have had to pool royalty interests in all of these tracts involved, we have had to agree on -- among the working interest owners on operating agreements, terms and conditions of operating agreements. The Gulf operated Cone lease is a unit in itself, it was formed from a 25-acre tract and a 15-acre tract, and that operating agreement which had been in existence for a long time had to be amended. And in order to prevent -- in order to permit the pooling of the Tubb and Blinebry zones with this other acreage that we have requested here today, and all of that takes a considerable amount of time, and, as is evidenced by my Exhibit, this acreage is the last acreage in the area to be developed, and the reason it is, is because it is made up of small

tanks. I believe that this is the most practical solution to this problem, and I believe that it is of considerable importance. Any time that an operator can assign acreage that he holds to his own well, I believe that that is the simplest, most direct and most practical way to do it. That is the way we are attempting here, and even that way, of course, has had considerable delays in getting these units put together.

Q In your opinion, is the formation of standard units for this acreage impractical?

A Yes, in my opinion it would be impractical to attempt to form two standard proration units in the S/2 of this section.

Q Is there any other well located on the proposed unit acreage that might be used for a unit well for a separate unit or unit of lesser size that could be used without resulting in waste or economic waste?

A No, sir. As I have stated before, in my opinion, the unit wells will adequately, efficiently and effectively drain the proposed units, and I consider it would be economic waste to dually complete or twin, as the case might require, wells on these other -- these 40-acre tracts that we are proposing to add, in that the hydrocarbons under those tracts can be produced from the existing wells. We have a problem with the Gulf operated tract. There is one well producing from the Drinkard formation; it could be dualed conceivably in the Tubb and Blinebry zones, but it might be impossible to get a triple completion permit on that well from the regulatory body.

There would certainly be obstacles to attempt to develop that 40-acre tract from that standpoint.

Q And would result in additional costs?

A Yes, the costs of developing that tract in that manner would be considerable, and, in my opinion, unnecessary, and would be economic waste. Likewise, on the Hill lease, we have a Blinebry oil well, it is possible that we could enter that, but it will have to be plugged and deepened. It has already been drilled through the Tubb formation, so it is possible we could clean it out. I would hate to guarantee that we could do that job, and possibly we could then make an oil over gas dual on our Hill lease. However, that, again, would be considerable expense, and there would be danger of physical waste in that we could have trouble and lose that well through such an extensive workover procedure. Of course, that is in the Gulf 40-acre also.

Q You have already discussed the effect of granting or denial of these applications on correlative rights. Will you restate your conclusions as to how correlative rights will be affected?

A Yes. I believe that the granting of this application will in no way adversely affect the correlative rights of any operator in the area or royalty owner. However, I do believe that the denial of these applications will adversely affect the correlative rights of Sinclair, Gulf and Cone, and their royalty owners, in that their hydrocarbons under the proposed 40-acre addition would be in part drained and produced by offset operators, and those off-

set operators would then produce more than their fair share of hydrocarbons that are in place in these reservoirs. So, therefore, I believe that it is in the interest of the protection of correlative rights to grant these applications.

Q Have you made an effort to contact the offset operators and obtain waivers or ascertain their position?

A Yes. I directed a letter to all of the offset operators on August 14th, asking them for a statement of their position concerning our application here.

Q Do you have waivers that you wish to introduce?

A To date, I have received statements of "no objection" from three of the operators offsetting the proposed unit. I have a waiver from Pan American, Greenbrier Oil Company and Humble Oil & Refining Company. And I would like to --

MR. BURTON: We'll offer those in evidence, Mr. Examiner, unless you have received letters from these companies?

MR. NUTTER: No.

MR. BURTON: We have, I guess, only one copy from each.

A I have several copies of it.

MR. BURTON: I would like to have them marked as an Exhibit in one case or the other.

MR. NUTTER: These are waivers of objection in both cases, are they?

A Yes, sir.

MR. BURTON: If you will mark them as our Exhibits to be

numbered 11, 12 and 13 in each case.

MR. NUTTER: Pan American's letter is being marked Exhibit No. 11. The Greenbher waiver is Exhibit No. 12, the Humble letter is Exhibit No. 13.

A I've also received a letter from Continental Oil Company refusing to execute our waiver.

MR. PAYNE: Did you want to introduce that, Mr. Anderson?

MR. BURTON: You have a copy of that, I believe, Mr. Examiner.

MR. NUTTER: Yes, sir, we have a letter from Continental.

A They indicate they sent the Commission a carbon copy.

MR. BURTON: Would you read the letter that you have received from Continental? I think it --

A It is a short letter. "With reference to your letter of August 14, 1958, in which you request waivers for the formation of a 200-acre Blinebry gas proration unit and a 240-acre Tubb gas proration unit in Section 26, 21 South, 37 East, we regret to advise that we are unable to execute this waiver. It has been Continental's practice in the past to oppose the formation of any gas proration units in these two pools in excess of the standard unit size of 160 acres. Your very truly, Signed by H. L. Johnston. Fort Worth, Texas."

MR. BURTON: We don't offer it in behalf of our case, but we have no objection to it being shown as stating the position of Continental.

MR. NUTTER: The letter that was read into the record is identical to the letter that the Commission has received in this case.

A I have not been advised as to whether Continental is here to oppose this application or not. They don't state in the letter that they are going to oppose.

MR. COOLEY: If I may interrupt at this point. The rules of the Commission permit appearance by letter, and this letter will be considered an appearance by Continental in regard to the two cases.

MR. BURTON: That is all of our direct examination.

CROSS EXAMINATION

BY: MR. NUTTER:

Q Mr. Anderson, referring to your Exhibit No. 4, wherein you have shown the allowable for the month of August for several wells that are located on the same acreage as the proposed units, could you tell me whether these were -- are making their allowables or not?

A With regard to the Sinclair wells, it is my understanding that they are making their allowables. We have made every effort to reduce the allowables in the capacity wells with the Commission, at their request, and I believe these represent the current producing capabilities of the Sinclair wells.

Q You made an analogy and dwelt quite extensively in comparing the pool to some form of a pan. Carrying this analogy

a little bit further, Mr. Anderson, supposing the pan covers a great many acres and each of these individuals has a straw in the pan and the pan rules said that you can have 160-acre allowable out of the pan. If somebody has 240 acres, do you think that it is more justifiable for that man to receive a 280-acre allowable through his straw or to go get another straw?

A My opinion is -- now, to answer your specific question, I believe in that case, if the pan were to say that the maximum withdrawal were 160-acre allowable, then I believe that there would be some questions then as to whether one of the straws should be permitted a greater withdrawal rate than that. However, it is my understanding that the pan has ruled that the allowable will be in proportion to its surface area.

Q So you think that the pan rules have no provision, then, for requiring an additional straw, if you have an excess of 160-acre allowable?

A On the contrary. I believe that they provide for and as is evidenced by the exceptions to the rules, they provide for permitting larger withdrawal rates, larger allowables.

Q One more question, Mr. Anderson. You stated that you felt that it would not be practical to communitize these tracts in the S/2 of Section 26, is it --

A Yes, sir.

Q Yes, sir, 26, to form standard units. Has any effort been made to form such standard proration units?

A No, sir. It was not made because it is considered by myself and my management to be impractical to contribute Sinclair owned acreage to another operator for him to produce our hydrocarbons when we have available in the area a well, suitable well that can do the same job. So no effort has been made by Sinclair, and conversely no effort has been made by any other operator, other than Gulf, Sinclair, and Cone to form any kind of units in the S/2 of Section 26.

Q Olsen made an effort, successfully, I might say so, to form an 80-acre unit in the Blinebry and Tubb, did he not?

A I do not know.

Q He has 80-acre units?

A He has 80-acre assignment. I don't know whether that was by virtue of 240-acre tract.

Q I mean to form an 80-acre proration unit, I don't mean communication unit.

A Yes, he has formed an 80-acre unit in both tracts.

MR. NUTTER: Any questions of Mr. Anderson?

MR. UTZ: Yes, I have one.

MR. NUTTER: Go ahead.

QUESTIONS BY MR. UTZ:

Q Mr. Anderson, you stated in regard to your Exhibit, the pressure -- Exhibit No. 8, that surface pressures taken in both of these pools were somewhat erratic. Do you have any suggestion as to how to take more accurate pressures?

A It is my belief that the Commission has specified, I believe they have done so in writing, that prior to taking these shut-in pressures, that the well be produced in such a manner as to clean the well bore and prevent as much as possible the accumulation, blow out any accumulation of liquid that might exist in that well bore, and I believe that in most cases that is done. However, I don't -- the only conclusion I can come to from analyzing that data to the extent that I have, is that it must not be done in all cases, and I believe that if you are going to attempt to determine the reservoir pressure from surface pressure measurement, I believe it is absolutely necessary that that be done in a reservoir such as these that produce distillate.

Q You would recommend that they be done hereafter?

A I would recommend that in the interest of getting the best possible data that they be done in that manner.

MR. UTZ: That's all I have.

MR. NUTTER: Any further questions of the witness? Mr. Stamets.

MR. STAMETS: I have some questions.

MR. NUTTER: You may proceed.

QUESTIONS BY MR. STAMETS:

Q I believe in answer to Mr. Nutter's question about forming other units, standard or at least more standard, you said it hadn't been tried because you didn't want Sinclair gas necessarily to be produced from other wells. However, in the Blinebry, one

could imagine the communitization unit between R. Olsen and Gulf S. E. Cone lease, and Sinclair gas would not be produced through the Olsen well at all, isn't that correct?

A I am sorry, I don't follow the question. Would you give me that again, please?

Q Take Exhibit No. 3 for the Blinebry Pool, --

A Yes, sir.

Q -- in the N/2 of the SE/4 R. Olsen has an 80-acre unit currently?

A Yes.

Q He could possibly combine that with the Gulf S.E.Cone unit, 40-acre unit, and have a 120-acre non-standard unit, and no Sinclair gas would be produced through the Olsen Well and both units would be standard in size or sub-standard?

A No, that would not be true, in that Sinclair has approximately three-eighths interest in the Gulf-operated well, and also the Sinclair E. C. Hill lease could not be added. I assume, in forming 160-acre unit, you intended to include it, and it is an oil well.

Q That would be 120?

A Yes, sir. No, sir, there is Sinclair gas in the Gulf-operated unit.

Q In the event that these applications were denied, would you recommend to your management that they should look into forming a new unit including R. Olsen, including their well?

A You want my recommendation?

Q Yes.

A I recommend we come back up.

MR. STAMETS: That's all.

MR. PAYNE: Mr. Anderson, in your proposal for 240 and 200-acres in the Tubb and Blinebry, if there were no proration units in either one of these pools in the area at this time -- what I am getting at is, is your proposal based to a large extent upon the fact that you are going to completely develop this entire area by these units?

A That, of course, is a factor, but I believe that prior to Olsen's development, his 80-acre well, it might be practical, then, to attempt to form some sort of a standard unit prior to development in the area. However, now that the area is developed, I consider Sinclair at a disadvantage in attempting to negotiate for a unit with an operator that has a well.

MR. PAYNE: Thank you.

MR. NUTTER: Any further questions?

MR. COOLEY: I have some questions.

MR. NUTTER: Go ahead.

QUESTIONS BY MR. COOLEY:

Q Mr. Anderson, were special rules and regulations, which are presently in effect in the two pools in question, in effect at the time the subject wells were recompleted in the Tubb and Blinebry Pools respectively? I know that they were drilled initially prior to the --

A Yes, the special rules were in effect at the time that the --

that these wells were dually completed in the Tubb and Blinebry, and I might add that that recompletion was a necessary first step to forming these proposed units. Due to time involved in getting these units, in getting the instruments circulated, we found it is advisable to first know that you have a well, and that you are going to have something to talk about. So that was the first step in forming these non-standard units, the development of these wells.

Q I just wanted to clarify the point. In your direct examination, I believe it is your direct examination, the statement was made the wells were drilled prior to the promulgation of the rules. I wanted to make clear that while they were drilled to another horizon prior to the promulgation of the rules, they were completed in the subject horizon after the existence of the present rules and regulations.

A We saw fit to bring that out,in that the finding on some of these orders that I had tabulated on my Exhibit 10, found that the applicant's wells were drilled to another formation prior to the establishment of Tubb or Blinebry, as the case might be, rules, and felt that if it were necessary for the Commission to make that finding, we would present the necessary evidence that they could make such a finding from.

Q Mr. Anderson, on Exhibit 6, in each case, I would like to point to the fact that the deliverabilities of the subject wells were in the case of the Blinebry Pool 134 percent of the highest --

A Of the average.

Q Of the average;134 percent of the average deliverability of the wells in the area, and in the Tubb Pool 154 percent?

A Yes.

Q The average deliverability of the wells in the area. Why do you feel that the deliverabilities of these wells are in excess of average, to this extent, Mr. Anderson?

A I believe that it is a matter of -- due to the fact that Sinclair wells were more recently completed than the other wells, and we fraced our wells upon completion, and we have increased the deliverability on our wells due to our completion practice.

Q Do you think that,aside from completion practice, that the initial pressure in these wells, or the deliverabilities in these wells would still be in excess of average?

A No, sir.

Q Do you think that they are attributable to the completion practices?

A Yes.

Q What were the initial pressures of these two wells at the time they were drilled, Mr. Anderson? Referring to Exhibit 8 in each case, will you pick the point in time? And they aren't plotted on Exhibit 8, are they, the wells in question?

A Yes, sir, both wells are plotted on Exhibit 8.

Q Would you please point them out?

A In the case of the Tubb Gas Pool, the last red circle going from left to right is plotted at 2,313 pounds, and represents

the pressure in the Sinclair Cone "A" 1 Well prior to producing that well other than the production that the well experienced during the four or five point back pressure test. That is a pressure that was calculated reservoir pressure from surface shut-in pressure of the back pressure test. Likewise, the red -- the last red circle, going from left to right, the right-hand red circle on the Blinebry Exhibit is plotted at 2,211 pounds, and it is the Sinclair Cone "A" 2 Well.

Q How do these initial pressures compare with the initial pressures of the other wells which were completed on earlier dates?

A Looking, again, at the Tubb Exhibit, reading backwards to the left from the Sinclair pressure point, we find the next pressure is plotted at 2,340 pounds, and the Sinclair well, therefore, is some 27 pounds less than that well was prior to its production.

Q Just group the other three.

A The other three are plotted at about 2,475 average, and we see that the Sinclair Well has what, 162 pounds possibly less than that group of three wells, indicating that the acreage immediately around the Sinclair Well had been drained, and the pressure had declined to that extent prior to production, and indicating that there is an excellent, I think, pressure communication throughout this area.

Q Well now, how does the initial pressure of the J. R. Cone No. 1, taking the Tubb first, compare with the pressures of the

other wells, at the time the J. R. Cone was completed?

A We are now comparing pressure calculated from four point tests to a pressure of other wells that was ascertained just from shut-in surface pressure. It was ascertained and reported by the New Mexico Engineering Committee, and we see that the --

Q First, is such a comparison worth while to make?

A It is the only pressures that I have worked with, and so I was forced to see what they would demonstrate. And the fact that those pressures spread as much as they are, indicates to me that there is some discrepancy in calculating the reservoir pressure.

Q Let's put it this way. From your knowledge of the Pool, and your expert analysis of the Pool thereof, how did the J. R. Cone No. 1 initial pressure compare with what you think the pressures of the other wells were at the time it was completed? Was it about the highest in the Pool, or was it higher than anything else?

A It was about as high a pressure as we had reported at about that time in the Pool.

Q Is that also true of the J. R. Cone 2 in the Blinebry?

A No, sir. It represents approximately an average between the shut-in surface pressure calculations, and the sonic pressure reports. It is plotted about -- well, it happened right about on the average line that I drew across this Exhibit.

Q Of tests taken in the same manner, however, it is as high as any of them; in other words, excluding sonic tests?

A No, sir. The next test of that type that we see back to

the left was 2,267. The Sinclair pressure is 2,211. There is a difference of 500 -- of 56 pounds less than the next pressure. Then, if we go on to the left of the Exhibit, we see two points plotted. The next red circle is two wells, and they are average, about 2,270, so the Sinclair well is about 59 pounds less than those wells. Carrying the thing on back to the very left-hand side of my Exhibit, the Sinclair Well pressure is approximately 190 pounds less.

Q In other words,there are about three or four wells as high or higher, and about ten or eleven that are lower, isn't it, in that '56 '57 period?

A Not necessarily wells. Some of these --

Q Tests --

A Yes, some --

Q -- are the same?

A -- had several tests, that is correct.

Q Mr. Anderson, you expressed an expert opinion that the subject well would be capable of draining efficiently and economically the proposed units, and stated as a basis for that opinion, your pressure analysis as shown on Exhibits 8 and 9, and subsequent Exhibits. Was there any other basis?

A Yes, the geological test that we presented.

Q Well now, the geological test wouldn't go affirmatively to prove, just shows the absence of anything that would deter, so to speak?

A In the opinion of our geologist, I believe the record will reflect that his study of the area, based upon his qualifications as a geologist, indicates to him that there were none of those faulting or impermeable barriers present.

Q That is the point I am trying to make. His test only established the absence of factors which might further deter rather than affirmative proof that it would drain it. I think he pointed or refused to answer on the ground that he wasn't qualified to do so, on the ground whether it would or would not drain it. I believe, according to your own testimony, in your own words, I believe you said that the accuracy of tests such as you have had at your disposal -- we understand, of course, that you didn't take the test, and the data available was not of your own making, but I believe your analysis of the data was more or less a hit or miss proposition?

A No, I believe that I have made an analysis of the best data available in the area.

Q And now, let's evaluate what the best -- the evaluation in your own words of what the best data available was, was that such pressures were more or less a hit or miss proposition? I believe I recall your using that terminology.

A I meant to infer that more -- that it would be possible possibly to secure better pressure data. However, these are dual completions; most of these wells are in the annulus, and it is rather difficult to measure bottom hole pressures. And so in another field and another reservoir where you could measure them

with an instrument, I would have much better data to work from, and I feel that the data would more fall in line and more tend to be conclusive. I have attempted to make the best analysis that I am able to make from the data that is available.

Q We understand that, Mr. Anderson. We are just trying to make an evaluation of what data you did have at your disposal to make this study. In your opinion as an engineer, what of the factors such as permeability, porosity, pressure and various reservoir characteristics is the most important in ascertaining the area which one well will efficiently drain?

A Well, I believe that there are several important factors, possibly --

Q I would like for you to give us your opinion, which is the one that carries the most weight? Is it not permeability?

A I would think that permeability probably would be one of the most important factors.

Q Isn't it permeability, for the most part, that will determine the pressure differential between the pressure in the well bore and the outer periphery of the drainage area?

A Yes.

Q -- and that pressure, when calculated down to abandonment pressure at the well head, will tell you how much gas was left in place as a result of the pressure differential?

A Yes, sir. Viscosity and permeability are two of the most important things that go into that type of calculation, and, of

course, in this case we are talking about a gas that is not very viscous. It flows readily through reservoir rock.

Q Did you have any permeability information concerning this immediate area available to you?

A No, sir, and I was unable to find any in our files. I do not believe that there is much in existence in that these wells were all drilled to a deeper zone in the Drinkard when the Tubb and Blinebry zones were not zones of interest, and, therefore, I wouldn't expect to find too much. We have no core analyses to get permeability data.

Q That is certainly understandable, the wells being as old as these. I would like to ask one further point. I would like your expert opinion as to what the -- let's take first the Tubb Pool. You propose there a 240-acre unit, which will give you an allowable of one and one half times the standard 160-acre allowable, is that correct?

A Yes.

Q Now, I would like for you to tell me -- refer, please to Exhibit 3 in the Tubb, --

A Yes, sir.

Q -- to the Hardison Well, I believe it is, in the SE/4 of Section 27.

A Yes, sir.

Q And let's say the Continental Well in the NW/4 of 35.

A Yes, sir.

Q And I would like for you to tell me whether you think the Hardison Wells and the Continental Wells and even the Humble Wells, for that matter, would produce more, the same, or less gas in these two situations; one where your proposed unit well has 160-acre allowable, and the second situation where it has 240-acre allowable?

A Well, sir, just speaking, I, of course, can't tell you to the cubic feet, but generally speaking, I would say that the Humble and Continental Wells that you have referred to --

Q And the Hardison Well, too, please.

A I will even go further, I will say that all of the offset wells to the proposed units, including Continental and Humble's Wells will produce more gas ultimately, if this application is denied, than they will produce if the application is granted, and that difference, not talking about so many cubic feet, but the majority of that difference would be due to the fact that they would partially drain the unassigned 40-acre tracts that would then exist, and would produce more than their fair share of the hydrocarbons in this reservoir.

Q Can you tell me how the Hardison Well could jump over your well and have a greater influence on these undrilled 40 than your own well would have?

A Yes, sir. It's my opinion this situation is analogous to the pan that I referred to before. I believe that you are going to get in proportion to the rates you withdraw from those wells thru the straws. The harder you pull, the more you are going to get.

Q One major difference between the situation here and your hypothetical pan, Mr. Anderson, I believe that the location of the straws in the pan would not have any effect upon the ultimate amount of liquid that would be withdrawn through the straws, while, according to your testimony, increased withdrawals from your No. 1 Well in the Tubb Pool would reduce recovery from the Continental and Humble Wells, and this is the difference that I am trying to get at right here.

A It will produce it before the offset wells can. It will produce because it is allowed to produce at a higher rate, a rate that is comparable to its surface acreage and interest in the reservoir.

Q It will actually take some gas out of the Cone Well that would never come out though, not only with respect to time --

A It may not get the same cubic foot of gas that most of the Gulf Cone 40-acres get, but it would get a cubic foot in lieu of it.

Q Well, in your opinion, and when you advised your company as to the protection of their correlative rights with regard to offset drillings, do you not feel that drilling wells opposite each other across property lines,which wells are to have equal allowables, is the most equitable way of assuring each operator recovering his just and equitable share from these two wells?

A Well, in generalization,it depends upon many things. The type of drive mechanism, structural position, there are other things.

Q We have no knowledge concerning these, and we have no reason to believe that they are different. Let's assume it will be common in the two wells.

A In this particular reservoir, I believe that the two mechanisms is the expansion of the gas, and I believe that in reservoirs of this type that it is not necessary to offset across the lease line in order to protect your correlative rights.

Q But isn't that -- wouldn't that be the most ideal way of doing it? I understand that very often you rely upon the theory of counter drainage, and rather than offset directly, you will move to one end of the drilling unit while the offsetting well is in the other end, and thereby counter drain the two tracts?

A From the standpoint of primary recovery in these gas reservoirs, I don't think that it would be any more practical to have your well locations, say exactly in the center of each 160-acres. I don't think it would be any more practical or any more efficient.

Q Here is a precise point I am trying to make, Mr. Anderson. You feel, and I think rightly so, that you have the right to withdraw in terms of allowable 240-acres worth of allowable out of this Tubb gas. My question goes to the place where you are going to procure it, and with regard to that place, who are you going to take the gas from, and my question in particular is, is it not so that you are going to take the gas from the Hardison Well, and you are going to get your 240-acre allowable at the ex-

pense of the offsetting wells that are only on 160-acre allowable, rather than have your well over there where it should be and drain it from that area where possibility of counter drainage exists?

A I believe all drainage will be compensated by counter drainage.

Q How can the Hardison Well counter drain against one and a half allowable on your Cone 1 Well?

A Once again, I believe the entire area is analogous to the pan. I believe that Humble concurs with my belief, or they would not have furnished the waiver of objection to us getting that increased allowable that you are referring to.

Q Well, Continental offsets you there, and they don't concur, so undoubtedly they felt it will have an effect on their wells, and reduce the recovery from the Continental well.

A By the amount that Continental will drain from the undedicated tracts in the proposed unit; an amount that they are not entitled to, in the first place.

Q Is an offset well the only method of protecting yourself against being drained?

A I am sorry.

Q Isn't an offset well ordinarily the accepted method in the oil industry of protecting yourself against drainage?

A No, sir.

Q How else do you protect yourself?

A By allocation formula.

Q Well, even with an allocation formula, Mr. Anderson, you can be drained very properly without offsetting yourself?

A Not without counter drainage.

Q You mean there is no possibility of being drained without counter drainage?

A Not if the allocation formula is 100 percent applicable to the reservoir, an attempt is always made to arrive at such a formula.

Q On your Exhibit No. 7, in the Tubb Pool, could you tell me how the length of the radii of the various circles was ascertained?

A Yes, sir. I calculated that from the formula of the area of a circle. The area of a circle is equal to pi times R squared.

Q Well, you might -- that is true, the one circle could include this whole plat. Is this supposed to be effective drainage radius that you have here in Exhibit 7?

A I explained that this is an academic Exhibit just designed to show that the drainage and the counter drainage about the proposed unit, if you attempt to equalize all differences in the area.

Q The circles have significance in size only as they compare to each other, is that the significance of them?

A Yes, they do, that significance -- they enclose the area that is presently assigned to the well. They also showed what ratio the allowables will be in -- be in the same ratio as the areas within those circles, provided our applications are granted.

Q Well, I note, sir, that there is a substantial portion there of the J. R. Cone lease, the S/2 of the SE/4 of 26 that isn't covered by a circle, and I wanted to know whether you meant to imply from your Exhibit that that area wouldn't be drained at all?

A No, sir.

MR. COOLEY: That's all the questions I have. Thank you.

MR. NUTTER: Any further questions of Mr. Anderson? If not, he may be excused.

(Witness excused)

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

MR. BURTON: We will offer all of our Exhibits that have been marked and identified, in evidence.

MR. NUTTER: Is there objection to the receipt of Sinclair Oil & Gas Company's Exhibits 1 through 13 in Case 1499, and Exhibits 1 through 13 in Case 1500? If not, the Exhibits will be received in evidence.

Does anyone have anything further they wish to offer in either of these cases?

MR. PAYNE: I have a statement to read, Mr. Examiner. "In connection with Sinclair Oil and Gas Company's application to be heard September 10, please be advised that the undersigned as an offset operator, objects to the formation of 200-acre Blinebry and 200-acre Tubb non-standard gas proration unit, proposed by

Sinclair Oil and Gas Company in Section 26, Township 27 East. Signed, R. Olsen Oil Company, by Phillip Randolph."

MR. NUTTER: Any further statements?

MR. KASTLER: I am Bill Kastler, appearing on behalf of Gulf Oil Corporation. Gulf has executed a unitization agreement wherein Sinclair has agreed to include the NE/4 of the SW/4 of Section 26, 21 South, 37 East, in which Gulf has an interest. If the Commission does not approve this application in these two cases and this acreage is not included in the expanded units, Gulf will suffer drainage from the NE/4 of the SW/4 and, therefore, Gulf would like to see the application of Sinclair approved.

MR. NUTTER: Any further statements? If not, --

MR. BURTON: I would like to offer a brief statement. We recognize the natural hesitancy of the Commission to grant exceptions to standard proration units; they have been fixed by the field rules. But we feel that this is a fair and reasonable unit for these wells and in this acreage. And I call attention to the field rules themselves, which appear to contemplate exceptions. The Tubb rules contain proviso for exceptions after notice of hearing for acreage more than 160 acres, and the Blinebry rules are almost the same. They do not use the word "more," but they contain the same proviso with reference to exceptions to standard proration units. In addition to that, we have shown in the record here that the Commission on other occasions has granted exceptions to the standard rule. We, therefore, are not asking for a new ex-

ception or a unique order. It is one that the Commission has recognized in the past, and some of those include units which are greater in size than the ones we are applying for. I call attention, also, to the waivers which have been presented by three offset operators, and the two who have sent notices protesting the applications. Neither of them have seen fit to appear and present any testimony in opposition. The only testimony here is that which the applicant has presented, which we feel will warrant and justify the granting of the application.

MR. NUTTER: Anyone have anything further? If not, we will take Case 1499 and Case 1500 under advisement, and take next Case 1501.

C E R T I F I C A T E

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/or under my personal supervision, 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 22nd day of Sept., 1958, in the City of Albuquerque, County of Bernalillo, State of New Mexico.

J. A. Trujillo
Notary Public

My Commission Expires:

October 5, 1960.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 1499, heard by me on 9-10, 1958.

, Examiner
New Mexico Oil Conservation Commission

OIL CONSERVATION COMMISSION
P. O. BOX 871
SANTA FE, NEW MEXICO

September 29, 1958

COPY

Mr. Horace C. Burton
Sinclair Oil & Gas Company
P.O. Box 1470
Midland, Texas

Dear Mr. Burton:

We enclose two copies of Order R-1254 and Order R-1255 issued September 29, 1958, by the Oil Conservation Commission in Cases 1499 and 1500, respectively, which were heard on September 10th at Santa Fe before an examiner.

Very truly yours,

A. L. Porter, Jr.
Secretary - Director

bp
Encls.