CASE NO.

6496

APPLICATION,

TRANSCRIPTS,

SMALL EXHIBITS,

ETC.

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
State Land Office Building
Santa Fe, New Mexico
14 March 1979

EXAMINER HEARING

IN THE MATTER OF:

Application of Llano, Inc. for rescission of pool rules, Lea County, New Mexico.

CASE 6496

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division:	Lynn Teschendorf, Esq. Legal Counsel for the Division State Land Office Bldg. Santa Fe, New Mexico 87503
For the Applicant:	Donald C. Cox, Esq. MADDOX, MADDOX, & COX Hobbs, New Mexico
For Getty Oil Co.:	William F. Carr, Esq. CAMPBELL AND BLACK Jefferson Place Santa Fe, New Mexico 87501

I N D E X

E X H I B I T S

MR. NUTTER: Call next Case Number 6496, which is the application of Llano, Inc. for rescission of pool rules, Lea County, New Mexico.

Call for appearances.

MR. COX: My name is Donald C. Cox, Maddox, Maddox, and Cox, Attorneys, in Hobbs, Mr. Examiner. I appear on behalf of Llano. I have one witness to call, at this time.

MR. CARR: May it please the Examiner, my name is William F. Carr, Campbell and Black, P. A., Santa Fe, appearing on behalf of Getty Oil Company, and I have one witness.

MR. NUTTER: Will you proceed, Mr. Cox?

MR. COX: Yes. Mr. Klaar, would you be sworn, please?

MR. NUTTER: Do you have a witness?

MR. CARR: Yes, I do.

(Witnesses sworn.)

AL KLAAR

being called as a witness and having been duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. COX:

Q. Would you state your name and address for the record, please?

A. My name is Al Klaar. I live at 600 West Cielo in Hobbs, New Mexico.

Q. What is your present occupation, Mr. Klaar?

A. I'm presently employed by Llano, Incorporated, as Manager of Engineering.

Q. Have you previously testified before the Commission or Division in hearings?

A. No, sir, I have not.

Q. Would you give the Hearing Officer your educational background that enables you to testify as an expert witness?

A. Yes. I graduated with a Bachelor's of Science degree in petroleum engineering in 1964 from the New Mexico School of Mines at Socorro. I worked as a -- right thereafter I worked as a drilling and production engineer for PanAmerican Petroleum Corporation, later known as Amoco, for ten years.

In 1974 I went to work for Llano as an engineer.

In 1975 I was promoted to my present position.

Q. Has all of your experience been in the southeastern New Mexico area?

A. Yes, sir. The fifteen years of experience that I have in the oil and gas industry has strictly been in southeast New Mexico.

Q. Have you had experience with the Morrow sands both in your previous employment and at Llano?

A. Extensive experience, yes, sir.

Q. Are you familiar with the Grama Ridge Morrow Gas Field and the surrounding areas which are the subject matter of this application?

A. Yes, I am.

MR. COX: Are the witness' qualifications acceptable?

MR. NUTTER: Yes, they are.

Q. (Mr. Cox continuing.) Are you familiar with Llano's application in this case?

A. Yes, sir.

Q. Would you briefly state what Llano seeks to accomplish by this application?

A. Llano, under Case Number 6496 wishes the Oil Conservation Division to consider rescinding the Grama Ridge-Morrow Pool rules, which are on the books at this time. These rules, by the way, came into being, I understand, in November, 1965.

These rules further call for 640-acre spacing in the Grama Ridge-Morrow Pool. The applicant, Llano, pro-

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poses that said pool be redeveloped and operated under 320-acre spacing and well location requirements.

Q. Would you refer to Exhibit A and identify it, please?

A. Exhibit A, labeled Area Map of the Grama Ridge-Morrow Gas Field, indicates those wells outlined in yellow which have 640 acres assigned and are on the books as being in the Grama Ridge-Morrow Gas Pool at this time.

I think the Commission is aware that a well in -- Getty's well in Section 35 was part of the nomenclature hearing just one or two hearings previous to that.

I would like to point out that the two wells indicated as open circles in Section 28 of 21 South, 34 East, the Pogo well, wherein some testimony was just presented in the previous case, as of the time of the construction of this exhibit we were not aware whether they had completed a Morrow well or not, so we have it indicated as a drilling well which has been permitted to the Morrow formation.

I further want to point out that the well in Section 36, a Getty well, is, as far as we know, in the process of drilling to the Morrow right now.

Q. The Grama Ridge-Morrow Field is outlined in yellow on this exhibit, is that correct?

A. Yes, sir, it is. There is a further

delineation of Section 33 and 34 in Township 21 South, Range 34 East, and Section 3 and 4 in Township 22 South, Range 34 East, showing that those four wells are part of the Grama Ridge-Morrow Unit, operated by Llano Incorporated as an underground gas storage unit, or project, if you please.

Q. Would you refer to Exhibit B --

A. I think I might want to stay a little while longer on Exhibit A, if you don't mind.

Q. Add anything you want.

A. The indication here is, and please let me stress that the Commission has Llano's four wells in 33, 34, 3, and 4, as Grama Ridge-Morrow Pool wells, and Llano's well in Section 10 as a Grama Ridge-Morrow Pool well, and I understand that if a previous hearing is considered favorably, 35 will be more than likely added in as a Grama Ridge-Morrow Pool well.

I do wish to point out the fact that the well in Section 2, the Getty Two State, has been completed, and is completed and producing from a zone completely separate from any of the other wells that are represented by Exhibit A.

MR. NUTTER: Now you mean another zone in the Morrow or another formation?

A. I wish to point out that Llano looks at that

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as the Getty Two State is completed in the Atoka Zone.

MR. NUTTER: You don't consider it a Morrow well at all, then?

A. No, sir. The accepted and readily defineable wells, as subsequent testimony will show, in looking at logs we have an interval, or we have a top, which is not only defined in the Grama Ridge-Morrow Pool, it's also defined in pools to the south and to the west, it is known as the top of the Morrow Clastics.

All wells, except the well in Section 2, have produced, are having gas injected, or are producing from zones, Morrow Sand zones, which are below the top of the Morrow Clastics.

I wish to further point out that the well in Section 2, known as the Getty Two State, if one looks at the record filed with the Commission, one has the idea that that well is also producing from there, but I wish to set the record straight.

The well was perforated in zones, sand zones, below the Morrow Clastics, and production was hoped to be initiated in those zones, and Llano personnel witnessed the fact that those zones were unable to give up any gas, and they were not plugged but the zone up above in the Atoka was perforated and produced and had an initial bottom hole pressure in excess of 8200 pounds.

Q. (Mr. Cox continuing.) Anything further to add regarding Exhibit A, Mr. Klaar?

A. No, sir.

Q. Would you please refer to Exhibit B and identify that and explain the general features thereof?

A. Exhibit B, labeled Structural Contours on Top of Morrow Clastics, is Llano's interpretation of how the structure on top of the Morrow Clastics appears throughout this area.

The noteworthy features are as follows: We agree with previous testimony of Pogo that there is a deep-seated fault on the west side, actually the fault runs from southwest to northeast, and it does cross the area between Pogo's well in Section 28 and our well in Section 33.

We further think that this deep-seated fault comes up through the Morrow and we further agree with Pogo that there's a good possibility it does not cut the Strawn, but the Strawn is really draped over this area.

I wish to further point out that through evidence, some of it to be presented later, we interpret a fault on the -- running just about through the middle of the structure, but running approximately north-south through Llano's Section 10, Llano's Section 3, and Llano's Section 34, indicating to us that we have a storage system of four

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wells, an underground gas storage system of four wells, on the upthrown side of two faults.

If you will note, we interpret the logs of the fault on the east to be downthrown to the east; the fault on the west to be downthrown to the west; and in between is sandwiched Llano with its four underground gas storage wells.

Q. In your opinion, and based on these faults that you've located on Exhibit B, do you anticipate that there is primary recovery available in the east half of Section 34 and the east half of Section 3?

A. My interpretation of the structure, as indicated thus far, indicates to me that that is the case.

Q. Is it also your opinion that because of the faults, that you also anticipate that the old wells, by that I mean the wells in 33 and 34, 4 and 3, that are part of the unit, have drained no more than approximately 320 acres?

A. I will so now state that I wish to present further testimony to the fact that this is the case, yes.

Q. Is it one of the other exhibits that you're referring to?

A. Yes, one of the subsequent exhibits.

Q. Okay, good. What data did you look at to arrive at your opinion about the location of the fault through

Sections 34, 3, and 10?

A. Data obtained from other operators in the area, in fact, two other operators in the area indicated to us that this is the case, that there is a fault, seismic data, by the way, that this is the case that there is a fault running through 34, 3, and 10.

Q. Okay, on down into 15 and up into 27, 26?

A. Yes, sir.

Q. Is there any other information you wish to make available to the Division related to Exhibit B?

A. Only the fact that the points plotted on this structural contour plat are readily identifiable and are known as the top of the Morrow Clastics on any electric log one wishes to consult.

Q. Would you then please refer to Exhibit C, identify it, and point out the pertinent items shown thereon?

A. In the mid-portion of Exhibit C, on the bottom, you will see a small scale reproduction of the area, to indicate just what this cross section, better known as Exhibit C, cross section of the Grama Ridge-Morrow Gas Field, just where we have taken this and constructed this cross section.

Q. Is that cross section identified as a line between A and A prime?

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A. Yes, sir, it certainly is.

Q. All right. Continue, please.

A. Going back to the previous exhibit and realizing that we wish to structurally show what is happening, we have brought the Pogo well from 28 down to the straight line which we chose as our cross section, being the well, our well in Section 33, our well in Section 34, and Getty's 35 State in Section 35.

Prominent features in this cross section to be noticed are as follows, and as previously testified to by one or two other people:

At the juncture of the cross section crossing the fault, we interpret that Pogo has a 600-foot throw downward on the top of the Morrow Clastics, as compared to our well in Section 33.

The two main features, of course, or two main tops shown,are the top of the Morrow Clastics and the top of the Barnett Shale, which is synonymous with the base of the Morrow.

Going further east we interpret, based upon structure, the fact that going from Llano's Grama Ridge-Morrow Unit No. 2 Well in Section 34 eastward to Getty's 35 State we encountered this east fault, as Llano likes to term it, with a 225-foot throw downward to the east, resulting in part, as further evidence will show, subsequent evidence

will show, again the fact that Llano is sitting between two faults with its four wells, and that Pogo is sitting separate and that the Getty 35 is -- is also separated from us by a fault.

I wish to take just a minute if I can, the fact, the thing I brought out on Exhibit A, I wish to check one point, if the Examiner will allow me about thirty seconds.

MR. NUTTER: Sure.

A. Mr. Examiner, I just realized that I would have liked to have pointed out where the Getty Two State is completed, the well in Section 2 down there, but I just realized that my cross section as I've got it here as Exhibit C does not go quite far up high enough for me to show that on this Exhibit C, so I'm sorry I --

MR. NUTTER: What is the perforated interval on the Getty Two State?

A. I have that. If you will give me half a minute I think I can locate it.

Mr. Examiner, I have perforations on Getty's Two State, but I'm afraid I have it a subsea depth. I do not have it in actual footage.

MR. NUTTER: Well, Mr. Bosecker, do you have that?

MR. BOSECKER: I sure do.

MR. NUTTER: You're going to be testifying in a minute, aren't you?

MR. BOSECKER: Yes.

MR. NUTTER: Okay, we'll get those perforation intervals when he testifies.

A. Thank you, sir.

Q. Is there anything else, Mr. Klaar, that you wish to add regarding Exhibit C?

A. No, sir, there is not.

Q. Okay.

A. I think Mr. Bosecker could really tell us where that well is perforated.

Q. Okay. Is it a fair summary of your testimony to this point that Exhibits A, B, and C support the development of 320-acre spacing because of separations due to structure and fault?

A. I think up to this point, yes, sir, and I wish to go to further exhibits to prove my point.

Q. All right. If you will refer to Exhibit D and identify it and point out the relevant features to the Examiner.

A. Exhibit D identified and labeled as BHP Histories, Grama Ridge-Morrow Gas Field, identifies the bottom hole pressures -- actual bottom hole pressures measured and obtained on four wells. The blue circle is the

Grama Ridge-Morrow Unit No. 1. The purple triangle is the Grama Ridge-Morrow Unit No. 2, both operated by Llano. The red diamond is the Getty Two State No. 1, and the yellow square is the Getty 35 State No. 1.

As testified in a previous case, correctly, the Grama Ridge Unit No. 1 and No. 2 were drilled and operated initially by Shell and bottom hole pressures obtained by them, and this plat has a scale on the left of the bottom hole pressures in psig versus a time scale on the bottom, starting with 1965 and going to the present.

You will note that at the end of '65 and beginning of 1966 GRM Unit No. 1 and No. 2 Wells had initial bottom hole pressures in the range of -- or at 7611 for the No. 1 Well, and 7682 psig for the No. 2 Well.

We have further a further bottom hole pressure on each well toward the end of 1966, showing that with production, primary production, the wells, each well's bottom hole pressure declined.

The primary production history or period of these two wells terminated in April of 1973. To bring you up to date, in November of 1972 Llano purchased not only these two wells but also the other two wells that are now storage wells, with the idea of initiating underground gas storage.

At the time that injection for purposes of

underground gas storage commenced, the first well -- was actually in April of 1973 -- actual bottom hole pressures were obtained, and I wish to point out that at that time the Grama Ridge-Morrow Unit No. 1 had a bottom hole pressure of 548 pounds. Grama Ridge-Morrow Unit No. 2 had a bottom hole pressure of 378 pounds.

Continuing on the time scale and going to the right, we are now in the storage history, or storage portion of the reservoir.

You will note that in 7-6-77 and '78, having injected sufficient gas into the underground storage reservoir to just about half fill the reservoir, we were very interested in what bottom hole pressures we were running into. I'd also like to admit we were very interested in knowing what the bottom hole pressure was when offset operators started drilling offset wells to the same horizon.

You will further see that the red diamond up there indicating that the Getty Two State had a bottom hold pressure, as we were informed, of 8224 psig at datum, on February 14th, 1978, and the Getty 35 State had initial bottom hole pressure of 7455 psig on January 13th, 1979.

I think it's relevant to point out that the Getty Two State had initial bottom hole pressure five to six hundred pounds higher than any initial well had at any

time drilled out there to the Grama Ridge-Morrow Pool.

The second thing to point out is the fact that the Getty 35 State had initial bottom hole pressure of 7455, clearly indicating to Llano that it was completed in a separate reservoir; that there was no communication between the Getty 35 and any of our storage system wells.

Q. Are all of the points plotted on Exhibit D from actual measured bottom hole pressure?

A. Yes, sir, they certainly are. We have lots of surface shut-in pressure data, but that could have been interpreted as distortion, so only bottom hole -- measured bottom hole pressures are plotted here on Exhibit D.

Q. Are the points assigned to Getty Two State No. 1 and Getty 35 State No. 1 shown to scale on Exhibit D?

A. Yes, sir. Exhibit D is plotted to scale.

Q. Any other comments you wish to make regarding Exhibit D?

A. No, sir.

Q. I direct your attention to what's been marked as Exhibit E, and ask if you will identify it and make comment as you deem appropriate to the Hearing Examiner.

A. Exhibit E is Llano's attempt to show what Llano thinks was the actual drainage area of wells in the Grama Ridge-Morrow Pool.

If I might digress just a half a minute,

Mr. Examiner, at the time a well is drilled, management is always very interested in knowing how much are you going to make from this well. Here we have a case of where we have four wells, Grama Ridge-Morrow Units 1, 2, 3, and 4, where management doesn't ask that question any more because they know exactly how much it made. The wells were depleted.

So, half of our -- or a portion of our materials/bouds equation doesn't leave much doubt in calculating drainage area. We identify it, though, as follows:

We show how much primary gas production these wells have made on the first line. We show how much primary oil production was made. We, under note number one, we take this condensate production and convert it to equivalent Mcf at the rate of 3500 cubic feet per stock tank barrel.

Now we also have some small numbers under the first three wells, the GRM Units No. 1, 2, and 3, which are labeled Remaining Primary Reserves.

At the time we approached the State to enter into a unit agreement for purposes of storing gas, State might have had us over a barrel, and they said you've still got 21,000 Mcf remaining in there even though you only have 548 pounds bottom hole pressure, and they told us we still had the same amount in the No. 2. We were also informed that we had 318,519 Mcf remaining in the No. 3 at the time

we included it into the storage unit.

The Federal government, under GRM Unit No. 3, agreed with us that it was depleted.

Q. Was that No. 4 instead of No. 3, Mr. Klaar?

A. I want to say No. 4, yes, sir. The Federal government under GRM Unit No. 4 agreed with us that the well was depleted and the 2.6-billion, as indicated under the first line there, was the total amount that the well had made.

We add up these primary gas production figures, equivalent Mcf due to condensate production, the remaining primary reserves, to obtain the ultimate producable reserves line. We applied an 80 percent recovery efficiency, which for the Morrow in southeast New Mexico is a reasonable number, to obtain the original gas in place; therefore arriving at a number of 8.8-billion cubic feet for the No. 1; 7.5 for the No. 2; 2.7 for No. 3; 3.4, or 3.3, for No. 4; 1.9 for Llano's Government "A" Well in the Section 10.

Now I don't wish to mislead the Examiner, but on the Getty 35 we had to use a completely different approach, since the Getty 35 first started producing a month and a half ago. Llano had to use its expertise in being an intrastate gas pipeline and having more than 100 wells connected to it, and having followed the progress of production of these wells on a day-by-day basis, we have ana-

lyzed the resultant data submitted to us on the Getty 35, specifically being the 4-point pressure test, which ended up with, if I remember correctly, 11.1 calculated absolute open flow.

Experience has shown Llano that an 11.1 -- any absolute open flow obtained in the Morrow whereby the 4 points line up in a straight line and fall on a slope between point 5 and point 1, as we would want them to, experience has shown Llano that approximately 55 percent of a calculated absolute open flow is the initial stable maximum rate that the Morrow well will flow.

MR. NUTTER: What percent?

A. 55 percent.

That brings us to the fact that -- we looked at the Getty 35 and we came to a conclusion that the well initially stabilized would flow 6-million a day. I wish to point out to the Commission that in this instance Llano is also the transporter of gas, so we know day-by-day what the well has made, and it has made in the range of 3.9 to 4.1 million a day since -- since it was connected to the line or system.

To continue, though, further with -- with how we arrive at the -- at our estimate of reserves that can be attributed to the Getty 35 State, experience has shown Llano further that once a stabilized initial rate in

a Morrow well is obtained, thereafter the well will decline at a yearly rate of 35 percent per year.

So applying not only our 55 percent factor to the calculated absolute open flow as obtained -- as Getty obtained, but the 35 percent decline rate, we have come to the conclusion that the Getty 35 will actually produce 5-billion cubic feet plus 70,000 Mcf due to consideration for liquid production.

Applying the 80 percent recovery efficiency results in a figure of 6.337-billion cubic feet original gas in place as our estimate for this well.

Q. Did you hear the testimony previously given that the Getty 35 is an exceptional well?

A. Yes, sir, I heard that.

Q. And what is your opinion related to the Getty 35 Well?

A. The Getty 35 is a good well. It is not an exceptional well, in my opinion.

Q. Would you continue with Exhibit E, please?

A. Do you want me to expound on why I think that?

Q. Yes, if you'd like to. If you'd like to, go ahead.

A. In my estimation the Getty 35 falls into

the category, as I said, of 55 percent reduction from a calculated absolute open flow. A normal well in the Morrow will end up making between 2 to 3-1/2 billion cubic feet. Anything above that I classify as good.

An exceptional well in the Morrow will make in excess of 14 to 15 billion cubic feet, and I'm sure some of us know of some of these wells.

So I don't wish to haggle about what's good and exceptional, but I think the Commissioner -- the Examiner ought to realize what I classify as good and exceptional.

I wish to go on here and point out the fact that the column way on the right was averaged, considering that we are talking about here in Exhibit E, we're talking about six wells. We averaged the figures to come up with a resultant figure of 5.1 billion cubic feet per well to be the average original gas in place in the six wells considered.

To continue downward in Exhibit E, we have done an extensive study of the mechanisms and the net sand pays and have come to the following conclusions that we can assign as indicated, the net thickness or net -- thickness of the net productive sands, as indicated per well there, an average, weighted average porosity also is indicated individually per well. From core analysis,production and production data, mainly from our four wells, which were just about at the depletion point when we initiated injection,

we have concluded that the initial water saturation, the average formation water saturation, is 30 percent.

From past records we have found out and are listing the initial reservoir pressures per well. From past records, also, we have given you here the initial reservoir temperatures, as we have done with the specific gravity from gas analysis on record, and the supercompressability factor identified as Z, is nothing more than interpolation of the critical temperatures and pressures from published data.

The result of going and applying the material balance equation on a per well basis and trying to -- and figuring out drainage area is this, we indicate and think that the GRM Unit No. 1 drained approximately 358 acres. We think the GRM Unit No. 2 drained 407 acres. We're of the opinion that the No. 3 drained only 248 acres, and the No. 4, 285.

We think Llano's Government A has a good chance of draining 461 acres, but we also think that the Getty 35 State will only drain 262 acres.

Again, averaging the bottom half of this Exhibit E results in averaging thickness per well, the weighted average porosity per well, the pressure, and so on, the result being that after you average out these figures for the six wells that are demonstrated here, the

average well drained no more than 327 acres.

Q. If you -- what result would you get if you did assign extra credit to the Getty 35?

A. If one assumes that the 5-billion cubic feet that Llano looks forward to transporting from the Getty 35 out of the Morrow is actually low, and one goes and assumes, therefore, 8-billion cubic feet is what the well will make, utilizing the same data you come to the conclusion, or you calculate, that 331 acres is what the well will drain.

If you up that and say the well will actually make 10-billion cubic feet and run it through the figures, then run it through the same formula, you come to the conclusion that the well will drain 414 acres.

MR. NUTTER: How many cubic feet would you have to have if you're going to say 640?

A. We -- I don't have a calculator handy, but it would be --

MR. NUTTER: You didn't calculate that?

A. From there on it would be proportional. It would be approximately 13 or 13-1/4 billion cubic feet.

MR. NUTTER: And then you would have that -- you still wouldn't have an exceptional well by your --

A. No, sir, by my criteria you would have a very good well, an excellent well, but you would not have

an exceptional well.

MR. NUTTER: Still short of exceptional.

A. I think exceptional wells are wells such as the Indian Basin Cisco, one or two wells that are -- I'm sure that you're aware of, that were drilled in '58, which have cumulatives of 27--28 billion cubic feet.

MR. NUTTER: Some of the Carlsbad wells.

A. Or maybe even 40-billion cubic feet.

MR. NUTTER: Some of the Carlsbad wells.

A. Right.

Q. (Mr. Cox continuing.) Do you have anything else that you wish to add with regard to Exhibit E?

A. Yes. I do wish to add the fact that the net productive thickness, the average porosity, all of the parameters, all of the production in Exhibit E, has come and has only been considered from the top of the Morrow Clastics marke on down. None of these wells produce anywhere above the top of the Morrow Clastics zone.

VOIR DIRE EXAMINATION

BY MR. NUTTER:

Q. Now, while we're here on this exhibit, Mr. Klaar, you attributed 5-billion cubic feet to the Getty 35 No. 1 on the top line there.

A. Yes, sir.

Q. Now that 5-billion was derived by taking the absolute open flow, taking 55 percent of that, declining it at the rate of 35 percent.

A. That's correct.

Q. Is this a common practice with you in making analysis of how much gas you're going to obtain -- how much gas Llano is going to obtain from a well when you connect it?

A. This is a common practice after reviewing the 4-point test. First of all,in looking at a 4-point test the percent drawdown in reaching the highest point, meaning the highest volume point, is considered.

If 4 points, during this 4-point test, are achieved and the well flows several million cubic feet rate per day with only a 10 percent reduction, or a 15 percent reduction from shut-in wellhead pressure, a stabilized shut-in wellhead pressure for 72 hours prior to that, then we do not look at it the same way. But if that fourth point or the points decline to where the flowing pressure is less than 80 percent of the shut-in pressure, then we apply -- then we apply this formula here, because experience has shown us that any other type of material balance equation we use, and we try to justify on the basis of 30 feet of pay, et cetera, or 120 feet of net pay, after viewing an initial calculated absolute open flow, can lead you very

astray, and I'm specifically talking about instances where -- that have occurred where an initial absolute -- I mean calculated absolute open flow of 28-million came about and was published and was put into the public record, and the well was put on line and after producing 93-million cubic feet total -- now that's 93,000 Mcf -- the well was dead. It has 37 feet of net pay.

But if at the time the engineer would have looked at the fact that the fourth rate achieved on this calculated absolute -- or 4-point back pressure test, if he would have looked at it and seen that the fourth rate flowed at a wellhead pressure of something like 550 pounds, I think he would have realized that something was wrong.

Q. Okay, well now, when this Getty 35 No. 1 was tested, was the flowing pressure on the fourth point less than 80 percent of the shut-in pressure?

A. I will have to get the data to answer that question.

Yes, sir, I have it here. The shut-in pressure, as recorded on the Getty 35 State in the Morrow, was 7468. The flowing pressure on the fourth point was 58 -- what a minute, this is an absolute here, so it's 7468.2, and the fourth point was 5829.2.

Q. What percent was that?

A. It comes out to 78 percent, Mr. Examiner.

Or a drawdown of 22 percent, another way of looking at it.

You realize that we're talking in terms of being connected to --- two-thirds of the wells that Llano is connected to are Morrow wells. There is interpretation involved. One person might choose 85 percent or 15 percent drawdown as his swingover point; another might choose 20 percent.

In fact, I lean towards the 20 percent myself, and it indicates 22 percent.

Q. Now, this 327 acres that you've got here on the average well, is that an average of these figures across here, or is that calculated for these parameters here coming down?

A. That is an average of the figures, if I remember correctly, of the figures coming down.

Let me think a minute.

Q. It's calculated? Coming down here?

A. The individual parameters going into the formula were averaged.

Q. I don't know if mathematically it will make any difference. It probably shouldn't.

A. I don't know, either, but as I remember it, it was calculated on the basis of the average, sir.

Q. So you had all these average parameters and you calculated 327.

A. Right. Right.

MR. COX: Are there any further questions, Mr. Examiner?

MR. NUTTER: No, no.

DIRECT EXAMINATION CONT'D

BY MR. COX:

Q. Mr. Klaar, do the producing sands in the Getty 35 State look similar to the producing sands in GRM Unit 1 and No. 2?

A. Yes, sir, they do. This is the -- this is, of course, one of the conclusions, or one of the reasons that Llano came to a conclusion that there is a better than even chance of having a fault between our wells and the Getty 35, because we have taken the Morrow sands below the top of the Morrow Clasic and we have identified them and broken them down into A through E zone, and it turns out that the main producing zone in the Getty 35 looks very similar and appears at the same place that our Morrow Zone A appears.

Q. Because they are similar would you -- would the reserves tend to be the same, also?

A. I would tend to think and in my opinion, I would think that the Getty 35 would end up being very close in producing history as some of our better wells, namely,

the Morrow -- GRM Unit No. 1 and GRM Unit No. 2.

Q. Would you restate the reserve figures from the Exhibit for the record, please?

A. Actually produced gas only from the GRM Unit No. 1 was 6.997-billion and from the GRM Unit No. 2, 5.897-billion.

Q. And for the Getty 35?

A. For the Getty, this compares to our estimate that the Getty 35 will produce 5.0-billion cubic feet.

Q. Anything further you wish to add related to Exhibit E?

A. No, sir, that's it.

Q. Were Exhibits, Llano's Exhibits A through E, inclusive, prepared by you or under your supervision?

A. Yes, they were.

MR. COX: Mr. Examiner, we offer Llano Exhibits A through E, inclusively.

MR. NUTTER: Exhibits A through E will be admitted in Case 6496.

Q. Mr. Klaar, in your opinion will the granting of Llano's application prevent waste, promote conservation, and protect the correlative rights of the parties involved?

A. Yes, sir, it certainly will, and in fact, it will also help us in one of our obligations, an obligation that we have.

Q What obligation is that, please?

A It becomes obvious, of course, after checking our exhibits here, that we think the east half of Section 34 and the east half of Section 3 are productive of primary gas in the same interval as we're storing gas.

Upon finalizing a unit for the purposes of storing gas in the Morrow below the top of the Morrow Clastics with the State of New Mexico, relevant to Section 3 in Township 22 South, Range 34 East, and Sections 33 and 34 in Township 21 South, Range 34 East, we signed a unit agreement, which is on file, which states in part that we have the obligation that any offset operator comes in and drills a well capable of producing primary oil or gas, and this is not gas coming from our storage unit, then we are obligated to offset that production, under -- under this unit agreement.

Q For the record, is that paragraph fourteen of your unit agreement with the State of New Mexico?

A Yes, sir, I'm reading from a document now called Unit Agreement for the Operation of the Grama Ridge-Morrow Unit Area, Lea County, New Mexico, which is dated the 25th day of April, 1973.

In part, on page twelve, Section 14, it states under the main heading of Drainage, "In the event a well or wells producing oil or gas in paying quantities should

be brought in on land adjacent to the unit area, draining unitized substances from the lands embraced therein, unit operator shall drill such offset well or wells as a reasonably prudent operator would drill under the same or similar circumstances."

Q. Is that unit agreement on file with the State Land Office?

A. Yes, sir, it is.

MR. COX: Pass the witness.

MR. NUTTER: Are there any questions of the witness?

MR. CARR: I have a few.

MR. NUTTER: Mr. Carr.

CROSS EXAMINATION

BY MR. CARR:

Q. Mr. Klaar --

A. Yes, sir.

Q. --what we consider an excellent well you may consider an excellent well. That's sort of like possible versus probable probable potash.

A. I thought I made it clear with what my interpretation was, sir.

Q. As I look at your Exhibit Number B --

A. Okay.

Q. -- you have a gas storage unit, which is limited on both the east and the west by faults, is that correct?

A. That's our latest interpretation.

Q. And that, in essence, is the core of what was originally the Grama Ridge-Morrow Pool, is that also correct?

A. Correct, with the inclusion of Section 10, and I wish to point out --

Q. Right.

A. -- that Section 10 is not a storage well at this time.

Q. Okay. Is it your testimony that these wells effectively isolate this area, seal it off, from both the acreage to the west and the acreage to the east? Is that your testimony?

A. Yes, sir.

Q. Now, in terms of this fault on the east side, how precisely can you place it? Could it be 100 feet either direction from the line? I just don't know, and how precise a line can you draw?

A. In placing the fault where I did, I wish to point out that this is -- this is the conclusion I and the people that have worked on this have drawn.

Whether this fault is 100 feet or 300 feet

to the west or to the east could be -- could be very possible.

Q. But this is -- this is where you would -- where you estimate the fault actually lies?

A. Yes, sir, this is where we estimate.

Q. It's an estimate?

A. Yes, sir.

Q. I'd like to direct your attention to Exhibit Number E. Now, across the bottom of the table you have calculated drained acreage -- or area, acres.

A. Right.

Q. Now, based on this table, is your testimony that the Llano Grama No. 1 in fact drained 358 acres?

A. My testimony is that based on a known number, which was the total production from the well, and my estimates of the parameters I need for the material -- material bounds equation to find out how much acreage I've drained, yes, we think, and I think, that 358 acres is all that the No. 1 Well drained. Correct.

Q. Likewise the No. 2 drained 407; the No. 3, 248, and so forth?

A. That is correct. Now, I wish --

Q. So these are actual acres drained.

A. Well, I don't know how I'm ever going to be able to prove it to you, because I'm using estimates for

net thickness; I'm using a weighted average porosity.

Q. Okay. Now, let me take you back to your Exhibit Number B.

A. Yes.

Q. If this -- if the faults, for the purpose of this testimony, are precisely where you've placed them, there would be acreage in Section 33 that could not be drained by the No. 3 Well, is that correct?

A. That is correct. There is -- to us it indicates that there is as much as half -- now are you talking about Section 3 or 33, I'm sorry.

Q. 33, where the --

A. 33, okay, yes, it inidicates that there's as much as half of that section which was not drained in the Morrow, that's correct.

Q. Because of that fault.

A. Sir?

Q. Because of that fault?

A. Because of that fault.

Q. And the same would apply in Section 34, that there is acreage to the east of the fault that couldn't be drained by the No. 2 Well.

A. That is correct.

Q. Well, how many acres would you guess there are in this area between the two faults that could be

drained by the four wells in Sections 33, 34, 3, and 4?
I mean just a guess.

A. Well, let's see. Well, the conclusion I have reached, really, is that the four wells that in 1965, November, 1965, were assigned 640 acres by the pool rules being established at that time, that for all practical purposes 320 per well, or a total of 1280 acres, as far as our storage system is concerned, plus or minus a few acres, is essentially all that they ever drained.

Q. Okay, now the question that I have for you is that if the fault wasn't in 33, might the No. 3 Well have drained more than just the 240 acres which you say it actually drained?

A. No, sir.

Q. Why not?

A. Because the way I came to the 248 acres is I did not regard where that 248 acres was. For all I know, is that 248 acres is cigar-shaped and runs for three miles.

Q. If we could assume that it's -- the acreage you're draining lies within your storage unit by that well, I would ask you if you could give me an estimate of how many acres are in Sections 33, 34, 3, and 4, which are within your storage unit and which could be drilled by the four wells that are drilled and completed in those four sections?

A. I think an addition, if you will give me just a minute, --

Q. Sure.

A. -- an addition of these numbers here will get me the number I'm after, or that you're after.

I would estimate that roughly 1300 acres in the following sections between the two faults: Sections 33, 34, 3, and 4 were productive between the two faults, and contributed to the primary production of these four wells prior to injection.

Q. You said 1300?

A. Yes, sir.

Q. Would you total for me the number of acres that were drilled by the No. 2, 3, and 4, and 1 Wells?

A. 2, 3, 4, and 1?

Q. The four wells that lie -- the four storage wells, the ones in Sections 33, 34, 3, and 4.

MR. NUTTER: Now, Mr. Carr, you mean what would the sum of the acreage drained as per Exhibit Number E be?

MR. CARR: That is correct.

MR. NUTTER: In other words, you want the sum --

MR. CARR: Of the acreage that was drilled by the No. 1, No. 2, No. 3, and No. 4 Llano Grama Unit Wells.

A. That addition comes out to 1298 acres.

Q. That's out of the 1300 that were available, according to your testimony, is that correct?

A. I gave you an estimate of 1300. I did not go into detail.

Q. Okay. Now, if these could be cigar-shaped areas that are being drained, would you have put a storage unit in whereby that you could drain from sections miles away gas you are injecting?

Does that make sense that you would?

A. I think I can best answer your question by saying that Llano didn't have much choice. Llano needed a storage unit between a gas pipeline, as Llano is, between the major volume that we move during the winter versus other volumes that we move during the rest of the year, there is no way we could contract sufficient gas.

We studied the area and we came to a conclusion that, and this was a preliminary conclusion, and believe it or not, sometimes we have worried about having come to this preliminary conclusion, that these four wells were a field unto themselves, and when offset operators started drilling, I tell you, there were white knuckles, because of this very same thing that you've brought out. What if the area that is productive, it does not lie right around the wellbore but is lenticular, like we know and

suspect that all Morrow is, and what if a well gets drilled 2-1/2 miles away from the boundary of the gas storage unit and all of a sudden for no reason our pressure goes to pot.

Q. Is it still your position that the Grama Ridge-Morrow Storage Unit is a single storage unit?

A. Yes, sir, and I could be proven wrong tomorrow if somebody comes in and drills a well in the southwest quarter of Section 27 and hits our storage unit.

Q. But as of this date no such well has been drilled, is that correct?

A. No such well has been drilled, correct, and I think as you have -- also as Getty has amply testified in a previous case, Getty agrees with the fact that they did not drill into our storage system.

Q. Do you agree with that?

A. Wholeheartedly.

Tomorrow I might say something else.

Q. It's my understanding you would go to 320-acre spacing, is that correct?

A. Yes, sir, that is our desire.

Q. That would free up the west half of 34 for you to drill a well, I believe you testified.

A. The west half of 34?

Q. I'm sorry, the east half.

A. It would free up the east half, yes, sir.

Q. Now, under --

A. There's one thing to be pointed out, and I think the Examiner might correct me on this, we have four wells in the present Morrow Pool. Now, I think that if it changes to 320 acres, those four wells, they each got to have 320 acres assigned to it, is that correct, Mr. Examiner?

MR. NUTTER: Yes, sir.

Q. Mr. Klaar, are you familiar with the circumstances surrounding the drilling of the initial two wells in the Grama Ridge-Morrow Unit?

I believe they're the No. 2 and the No. 3.

A. No, sir, I am not familiar, but I wish to state that I think it's the No. 4 Well, the Federal Well in Section 4 that was the first well that was ever drilled in the field.

Q. All right, and then the No. 1.

A. And then I think it was the No. 1. At that time I was not associated with either Shell or Llano, and I'm sorry, I'm not in detail familiar with what happened during the time these wells were drilled.

Q. Would it surprise you to learn that there was immediate pressure response between the two wells when the No. 1 was finally produced?

A. No, sir, that would not surprise me at all.

Q. Showing communication between those two?

A. One thing that -- that has not been presented by Llano is the fact that the storage unit, the underground gas storage unit, exists as follows:

The No. 1 and the No. 2 Wells are injection and withdrawal wells.

The No. 3 and the No. 4 Wells are just withdrawal wells.

So it does not surprise me at all that since the pressure came up in 3 and 4 after I injected into the 1 and 2, no, sir, that does not surprise me.

Q. If your application is granted and special pool rules are rescinded, how close could you drill to the east line of Section 34 and still be at a standard location?

A. Okay, keeping in mind the fact that we would have to assign 320 acres to every existing well, we would be talking about an east half proration unit in Section 34, which, if the Commission would see fit to rescind the 640 rules and go to the statewide 320, we would then be operating under the statewide 320, which allow you to be 660 feet from the side, that's the closest distance, 1980 feet from the end, which would be the north and south end of the proration unit, and I think it further states to be 330 feet away from the inside quarter quarter section.

So, to answer your question, 660 feet away from the east line of Section 34 would be the closest that we

could legally come.

Q. Now how close could you drill to a side boundary under the present special pool rules?

A. I don't have a copy of that available, but I think it is 1650 feet, based upon 640-acre spacing.

Q. So by rescinding the rules an orthodox location moves 990 feet --

A. Further east.

Q. -- further east?

A. Yes, sir.

Q. Okay.

A. That is correct.

Q. Do you believe that in a situation where you were drilling -- you have a producing well 660 feet from the line in Section -- from the east line in Section 34, and you're offset by a well drilled at an orthodox location, which was 1650 feet from the west line of Section 35, do you believe you'd have a situation where you would -- all the drainage that would occur in Section 35 from your well would be compensated for by drainage from the well drilled in Section 35?

A. I don't know if I quite understand your question. Are you referring to the fact that we are 660 feet off of the lease line versus Getty being 1650 feet off the lease line, and is your question, if I might rephrase

it, that we will get as much by that fact, or I don't understand the rest of the question?

Q My question is when you drill a well like this, it naturally drains not just a square 320, or a rectangular 320 acres.

A Right.

Q So it's draining adjoining properties. If everyone drills wells under uniform spacing rules, whathyou drain in an adjoining lease ought to be compensated for by counter-drainage from the offsetting well.

A Okay.

Q Do you believe when you're 660 feet from a line and the offsetting well is 1650, that the drainage you are -- that the property you're draining is being compensated for by counter-draining from the offsetting well?

A Well, if -- if you equate the two wells, our well at 660, Getty's at 1650, and say they started producing at the same time, then I would certainly love to have our well at 660. That answers your question.

The fact of the matter is that the Getty 35 is now producing and started producing on the 14th of January, 1979, and we have not even had a chance to build a location yet, so who is draining who?

Q Well, under the present rules, you have had a well, though, on the offsetting section.

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A Right.

Q So it's draining adjoining properties. If everyone drills wells under uniform spacing rules, whathyou drain in an adjoining lease ought to be compensated for by counter-drainage from the offsetting well.

A Okay.

Q Do you believe when you're 660 feet from a line and the offsetting well is 1650, that the drainage you are -- that the property you're draining is being compensated for by counter-draining from the offsetting well?

A Well, if -- if you equate the two wells, our well at 660, Getty's at 1650, and say they started producing at the same time, then I would certainly love to have our well at 660. That answers your question.

The fact of the matter is that the Getty 35 is now producing and started producing on the 14th of January, 1979, and we have not even had a chance to build a location yet, so who is draining who?

Q Well, under the present rules, you have had a well, though, on the offsetting section.

A. I have had a well which never drained what Getty 35 is producing from, and I have a well which is not draining what the Getty 35 is producing from.

Q. Do you believe, though, that if from the date that you start to produce, that the drainage from your well will be compensated for by counter-drainage by Getty? In their 35 Well?

A. That is really hard to say. The first thing I believe is that -- that I think the main producing zone in the Getty 35 will appear in a well on the east section of 34. I'm not trying to say it won't appear. By that time I also expect the well in the east half of 34 to encounter that formation at less of an initial pressure than what the 35 encountered, which was 7455.

Q. You're certainly not saying here today that by drilling with one well in 35 at an orthodox location and dedicating 640 acres to it, Getty gained any advantage on you, are you?

A. No, sir.

Q. Now let me ask you about this fault again. Suppose it falls 300 feet west -- or east, I'm sorry, east, and I'm talking about the easternmost fault, the one that runs through Section 34, suppose it falls 300 feet to the east of where you have drawn it.

A. Uh-huh.

Q. Is that possible?

A. It's possible.

Q. If you drilled this section 1650 feet from the east line, is it possible that you could fall on the west side of that fault?

A. Yes, sir, that is very possible.

Q. So the fault could even move over to within 1650 feet of the east line of Section 34.

A. I wish to point out that this fault, as indicated through Section 34 and Section 3, was obtained after being only allowed to look at other people's, other operators' seismic data, and I wish to further point out that we wanted to purchase that seismic data and it was unavailable, so whether this is -- this fault is located right down the middle of 34 or whether it's located on the middle of the east half of 34, I just wish to state that this is my interpretation.

Q. Okay, now, if it were in the middle of the east half of 34, and that's possible, I guess, is that right?

A. A lot is possible.

Q. Is that possible?

A. Yes, sir.

Q. How many productive acres would you have in 34 that you could dedicate to a well?

A. You would probably end up with -- if under your assumption the fault ran in the east half, or through the middle of the east half of 34, you'd probably only have half the productive acres.

Q. You might only have a 160.

A. There is that possibility.

Q. In that situation do you believe that you would -- that Getty would see the drainage of your productive acreage in 34 equal to what you would be draining from Getty in 35?

A. I would hate to speculate on it.

Q. I won't ask you to.

A. It still depends on porosity, thickness of pay, and all of the rest of the parameters that I went through on Exhibit E.

You are trying, you know, I am trying to give you a cut and dried answer, but it's impossible for me to say.

Q. I appreciate that.

If you fall on the west side of this fault in 34, could that well be of some value to you in your storage project?

A. As far as the storage project goes, yes, it could be of some value. That's right.

MR. CARR: I have nothing further.

(There followed a discussion off the record.)

MR. NUTTER: We will continue the hearing in Case 6496 until 9:00 o'clock a. m. tomorrow morning.

(Hearing continued.)

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(REPORTER'S NOTE: Thereafter and on the 15th day of March, 1979, the hearing was continued, as follows, to-wit:)

MR. NUTTER: The hearing will come to order. We'll now resume with Case Number 6496. I believe that Mr. Cox had finished your direct case yesterday afternoon?

MR. COX: We did, Mr. Nutter, however just at the end of the direct case we read a paragraph from a unit agreement between Llano and the State of New Mexico into the record.

Would you prefer that the entire unit agreement be made part of the record or perhaps that page?

MR. NUTTER: We have a copy of the unit agreement in our file, Mr. Cox.

MR. COX: All right.

MR. NUTTER: And you have read that particular paragraph into the record here, so if there's ever any need to, we can retrieve the unit agreement.

MR. COX: I see, so we won't bother making it further a part of this record.

MR. NUTTER: That's correct.

MR. COX: Thank you. Yes, we are now through.

MR. NUTTER: Mr. Carr?

MR. CARR: I would at this time call Chris Bosecker.

CHRIS BOSECKER

being called as a witness and having been previously sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. CARR:

Q. Will you state your name for the record, please?

A. Chris Bosecker.

Q. Mr. Bosecker, where do you reside?

A. Midland, Texas.

Q. By whom are you employed and in what position?

A. Getty Oil Company, Lead Reservoir Engineer for the Midland E & P District.

Q. Have you previously testified before this Commission, had your credentials accepted and made a matter of record?

A. Yes, I have.

Q. Are you familiar with the subject matter of this case?

A. Yes, I am.

MR. CARR: Mr. Examiner, are the witness' credentials acceptable?

MR. NUTTER: Yes, they are.

Q. (Mr. Carr continuing.) Mr. Bosecker, does your area of responsibility include the Grama Ridge-Morrow Pool?

A. Yes, it does.

Q. Will you refer to what has been marked for identification as Exhibit Number One and explain to the Examiner what it is and what it shows?

A. Exhibit Number One is simply a land map of the Grama Ridge-Morrow area in Lea County, New Mexico, as of March, '79, to the best of our knowledge.

The scale is one inch equals 2000 feet.

Q. Does this reflect the Getty wells drilled to the west of the Grama Ridge-Morrow Pool?

A. It reflects two Getty wells that have been drilled on the east flank of the Grama Ridge-Morrow Field, and one Getty well that is now drilling in Section 36.

Q. Have you been involved with the drilling of both of these wells?

A. Yes, I have.

Q. Mr. Bosecker, as the background for the testimony you're about to give, so that we can keep things sort of in some sort of order, would you briefly summarize

what the general geology is in the area?

A. Well, the Grama Ridge area is located in south central Lea County along the northeastern portions of the northwest shelf. Structurally this area is best described as a broad, anticlinorium associated with a large northeast/southwest down to the basin fault along its western flank.

This anticlinal ridge is most pronounced in Pennsylvanian and older strata, which are also broken up into numerous fault segments. These fault blocks serve as separate hydrocarbon reservoirs for the Lower Pennsylvanian-Morrow Sands.

This large structural feature was present during Pennsylvanian time and had an influence on sedimentation patterns as evidenced by the depositional thinning of the Morrow rocks as they gain structure on the ridge complex.

This structural influence on sedimentation is seen even over individual faults. The Grama area lies on the south end of that anticlinal complex and is well within the porous sand trends of the Lower Morrow Clastic interval.

In the Grama area the Lower Morrow Clastic contains sand units, which are the prime objective of this area. These sands are thought to represent various marine

sand environments associated with deltaic and shallow marine shoal complexes. In other words, the pay interval is relatively continuous as opposed to channel-type deposits of some other Morrow fields.

This interpretation has been supported by the dipmeter log run in Getty 35 State Well No. 1. The sands are characteristically grey to grey-white in color, poor to well sorted, and range from coarse to fine grain. Conglomerate horizons within these sands are common. Porosities range from 5 to 17 percent and average 8 to 11 percent in most commercial producers.

Gas production is primarily related tl stratigraphic entrapment with productivity being enhanced by increased structural position on a given structure.

Q. Mr. Bosecker, please refer to what has been marked as Exhibit Number Two and explain what it is to the Examiner.

A. Exhibit Number Two is a Form C-105 on the Getty Two State Well No. 1. This was the first well drilled by Getty in the Grama Ridge-Morrow Field, completed in February of 1978, located 1980 feet from the north and west boundaries of Section 2.

Q. That is a standard location?

A. Yes, it is.

Q. Please refer to Exhibit Three and explain

this to the Examiner.

A. Exhibit Number Three is a Form C-122, a multipoint back pressure test for a gas well, which was the official test for the Getty Two State Well No. 1, a gas well.

Calculated absolute open flow 1965 Mcf per day.

Q. Mr. Bosecker, I direct your attention to Exhibit Number Four and ask you to explain what this shows.

A. Exhibit Number Four is again a Form C-105, a well completion or recompletion -- a well completion report in this case, for the Getty 35 State No. 1, the second well Getty drilled in the Grama Ridge-Morrow Field. Its well location was 2310 feet from the south line and 1650 feet from the west line of Section 35; drilled and completed recently. The official completion for the Morrow zone was January of '79.

Q. Please refer to Exhibit Five and explain what it shows to the Examiner.

A. Exhibit Number Five is a C-122, a multipoint back pressure test for a gas well, particularly for Getty 35 State No. 1.

The calculated absolute open flow for this well was 11,107 Mcf per day.

MR. NUTTER: Now that's from the Morrow?

A. From the Morrow zone, yes.

MR. NUTTER: Okay. Let's go back to your Exhibit Number One, then, Mr. Bosecker.

I believe the legend on that map is incorrect to that well.

A. The legend.

MR. NUTTER: For that well, it says Morrow 1.1-million. It would be 11.1-million.

A. Yes, I guess it would. Sorry.

MR. NUTTER: Well, you didn't make the map.

A. Well, I should have caught it, though.

MR. NUTTER: Okay, go ahead.

Q. (Mr. Carr continuing.) Mr. Bosecker, you heard Mr. Klaar testify yesterday as to pressures encountered in the gas storage area. How does the pressure in this well compare with those?

A. The pressure of the Getty well, and wells, is higher than the operating pressure that now exists in the gas storage project.

Q. How do you explain this pressure variation?

A. Getty believes that there is a fault that separates the Llano Gas Storage Project from the Getty production.

Q. So you concur with Llano that there is a good possibility of a fault somewhere in the east half of Section 34?

A. I concur with Llano that there is a good possibility that a fault exists, and probably it's in the east half of Section 34, but I am not sure.

Q. Please refer to Exhibit Number Six and what it shows.

A. Exhibit Number Six is a Form C-101, Application to Permit to Drill a Well, and a Form C-102, Well Location and Acreage Dedication Plat. Both of these forms are for the Getty well, which is now drilling in Section 36.

Q. Are you drilling at a standard location?

A. Yes. It's 1980 feet from the north and 1650 feet from the west of Section 36.

Q. How long has Getty been actively exploring the Morrow formation in southeastern New Mexico in this area?

A. Well, at the Grama Ridge-Morrow Field a relatively short length of time. Our first well was drilled and completed, or was completed last year.

Q. And as you are exploring this, in this general area, what are your costs based on?

A. Well costs?

Q. Yes.

A. Well, our economics for exploration in general are developed on 640-acre spacing for exploratory efforts and purposes.

Q Mr. Bosecker, would you refer to what has been marked for identification as Exhibit Number Seven and explain what it is and what it shows?

Mr. Bosecker, is Exhibit Number Seven the same cross section which was introduced in the Pogo case on March 14th?

A Yes, it was.

Okay, Exhibit Number Seven is a structural cross section, cutting across the Grama Ridge-Morrow Field in Lea County, New Mexico.

The vertical scale is 1 inch is equal to 100 feet.

This cross section is made up of porosity logs, sonic logs, formation neutron density logs, and they are hung on a structural datum of -9000 feet.

Depicted between the well on the left, the No. 1 Well and the No. 2 Well, is the major down to the basin fault that has been discussed in prior testimony in another case, and then the two wells in the center represent two wells in the gas storage project, and the well to the east, which is on the right, represents the Getty 35 State Well No. 1.

And it shows that there is a probably Morrow displacing fault between the gas storage project wells and the Getty well.

And I believe that this fault separates the project, the storage project, and the Getty well.

Q. Does this fault also reveal other similarities from well to well in the Morrow formation?

A. Yes, I think that it does. There is some sand continuity with varying amounts of production in these intervals, but it does appear to relate sand continuity.

Q. Mr. Bosecker, would you refer to what has been marked as Exhibit Number Eight and explain what it shows?

A. Exhibit Number Eight is a big sheet of paper.

Q. Well, maybe we could put one up on the wall and identify it.

A. Exhibit Number Eight again is a cross section and we made this using the deep well porosity logs, records in the Getty 35 State No. 1 on the left, and the Getty Two State No. 1 on the right.

Again it's hung on a structural datum of -9000 feet, and the purpose of preparing this data and making a cross section, is to illustrate that the sands do have continuity between these two wells, geological continuity.

Q. Mr. Bosecker, would you refer to Exhibits Nine and Ten and explain what they are and what they show?

A. Okay, Exhibit Number Nine is a typical

Horner plot on the Getty Two State Well No. 1, a pressure build-up test run February of 1978.

This is a plot which plots wellbore bottom hole pressure on the left versus the log of T-plus-delta-T over-delta-T on the horizontal. And this was done to determine the reservoir pressure, the initial reservoir pressure in that well.

P* was extrapolated to be 8,270 pounds.

And the data sheet, I'll just touch on -- on some of the key things that this particular Horner plot illustrates. One is that the plot reflects a two-layer reservoir. I'll go back into that in a minute.

Another thing that it illustrates is the initial pressure, 8,270 psi; another thing is the -- that there is no boundary seen in the well. The permeability calculated to be moderate, about two millidarses. The reservoir parameters in the area of the wellbore we thought at this time could deplete a 640-acre proration unit.

Now, there's a little bit more to this. I hadn't planned to go into it, but in the prior testimony it was pointed out that it was witnessed that the lower zone was not contributing a significant amount of hydrocarbons when we perforated an upper section, and I didn't bring all the details. I didn't think that would be discussed, but I would like to point out in this Horner plot,

and from the work and the way this well was completed, we did perforate a lower section, which is in the Morrow Clastic Sand interval, and we treated it with 2500 gallons of 7-1/2 percent NE Acid, perforated it through the tubing with a small jet, and acidized it and attempted to swab it back and the well was not performing at rates sufficient to make a well that we were satisfied with.

Knowing that the othersand also was available, we went ahead and perforated it and then treated both intervals at the same time with another 2500 gallons of 7-1/2 percent NE Acid.

The second -- after the second perforating job that zone initially had higher permeability and contributed more production in the wellbore, and I'd like to add that that can be seen from this Horner plot. I didn't explain how it could be seen, but it's from the lowering effect where you have essentially two -- two straight lines develop and a humping type effect, I guess would be another way to describe it.

After this well was completed Getty elected to immediately offset it, thinking that the lower zone, even though it did not contribute at the rates we had hoped, was commercial, that it hadn't been cleaned up and really, for that matter, hadn't been heavily treated, and we elected to drill a well in Section 25 based upon this information,

and a lot of that basis was this test right here.

Some of our partners did not think we had that good a well, and all of our partners which had rather small interests elected to go nonconsent in this second well, with a 300 percent penalty.

And we drilled the second well, which we -- it was initially completed at a higher rate. The completion procedure on the second well was basically the same plan as on the first well. We intended to perforate the lower section. If we had ample production, we would leave it along at that point. If not, we were going to perforate the upper section. And we perforated the lower section; it was not treated, and the calculated absolute open flow of over 11-million and we're producing it in the second well.

And that's all I have to say about that at this time.

Q All right. Mr. Bosecker, would you refer to Exhibits Eleven and Twelve and explain what they are?

A Exhibit Number Eleven is a Horner plot on the same well but taken several months later in December of 1978. Now, as you can see, the humping effect is no longer there, and the reason for that is that the first one was in early transient behavior where we've reached semi-steady state here, and what this means is that the zones -- there

has been sufficient cross flow to where it's behaving as one reservoir.

The well has substantially improved and cleaned up, which we'll show later, from when it was initially completed until this point in time.

Going over a few of the things that -- in the data sheet that are of interest, this particular Horner plot at this time indicates a single layer reservoir, as compared to the two layer indicated before. The P* now is 8,270 psi, a decrease of 420 pounds, which is a result of pressure depletion from production. No boundary is indicated. The permeability calculated out to be moderate and is slightly increased compared to the permeability on the first test. This permeability calculated to be 2.2 millidarses per foot; on the first one it was 2.0, but close, very close.

And, again, we thought that this well could efficiently deplete 640-acre proration unit.

Q. Will you refer to Exhibits Thirteen and Fourteen and explain what they are?

A. Exhibit Number Thirteen, again, is a Horner plot, this time on Getty 35 State Well No. 1 in the Morrow zone. P* is 7,460 psig. Again, in this case it was taken very shortly after completion and it shows an indication of some layering effect.

As far as the data sheet, Exhibit Number Fourteen, I believe, it indicates -- some pertinent points are the plot reflects a two layer reservoir performance, P* 7,460, no boundary is indicated, the permeability is good, being greater than calculated for the Getty Two State, and 5.5 millidarses.

The reservoir parameters in the area of the wellbore should efficiently deplete a 640-acre proration unit, and also P* being 7,460, is a drop in the reservoir pressure on the east side of the fault from what was initially encountered in the Getty Two State of 8,270, and later found in the Getty Two State in December of 7,850, which to me shows that there is north-south communication in the reservoir on the east side of the fault.

Q. Mr. Bosecker, are you aware of evidence which would establish an east-west communication in that general pool -- general area?

A. Yes, I am, from examining previous testimony from previous people, particularly Shell Oil Company, when they asked for field rules back in 1965. They had drilled two wells, the State GRA No. 1 in Section 3, and the GR Federal No. 1 in Section 4, and they ran some reservoir limit tests to determine if this field could be effectively drained on develop of 640-acre spacing.

What they found out was that whoever ran

this test was, they produced the well in Section 3 at a 6-million a day rate for six days, and at the same time they monitored the pressure in the well in Section 4.

Now, this well in Section 4 was 3,645 feet from the other well, and they- received pressure response, or pressure disturbance in 10 hours from the one well to the other well.

Now, that is a rapid time to receive response for that length of time -- or for that distance, and to me that indicates that between those two wells you have good rock characteristics, porosity and permeability, particularly permeability.

Q And this data is contained in Oil Conservation-- -- is from Oil Conservation Commission Case Number 3337, is that correct?

A Yes, and that's the case in which Shell testified that they could drain 640 acres.

MR. CARR: We would ask that the Commission take notice of this.

MR. NUTTER: We will take administrative notice of Case Number 3337, I believe you said.

A That's correct.

Q Mr. Bosecker, would you refer to your Exhibit Number Fourteen and explain what it is and what it shows? This is Fifteen, I'm sorry; this is Fifteen.

Would you also like to consider Sixteen at the same time?

A. Yes. Yes. Exhibit Number Fifteen is a tabulation of production from the Grama Ridge-Morrow Field in one particular well, the Getty Two State Well No. 1, and it's by months since completion, through February.

And the February gas rate at the time this was prepared was estimated off of the field reports, so it might fluctuate minutely, but it shows the cumulative production as of March 1st, '79 to be already 429-million cubic feet a day -- or cumulative being 429-million cubic feet.

Also, I stated earlier that this well in Section 2 has improved as we had anticipated it would and its current rate is 1,700 Mcf per day, 17 barrels of condensate, flowing on a choke at 764 per inch, and tubing pressure of 3,175 psi.

You can relate that to the 4-point that was introduced earlier and see that that is a substantial improvement and this shows to me that the well is cleaning up, or has cleaned up, and that all or most of the sections are contributing production in commercial quantities.

Q. Now I would direct your attention to what has been marked as Exhibit Sixteen-B, and request that --

A. Is that -- what is that, Sixteen?

Q. The exhibit we previously referred to as Sixteen is Sixteen-A, and we're now going to refer to Exhibit Sixteen-B.

A. Well, Sixteen-A, I haven't discussed, but it --

Q. Just a minute, just a minute, please. The production graph should be Sixteen-A, and I'm getting ready to pass out Sixteen-B. Okay?

A. I want to discuss this first.

Q. Okay.

A. Sixteen-A is simply a plot of production in million cubic feet per month versus time, and it just helps substantiate that the well is performing and it's not declining. It has actually gotten a little better. The wellhead pressure has gone up somewhat.

Q. All right, Mr. Bosekcer, will you now refer to Exhibit Sixteen-B and explain what it is?

A. Sixteen-B is a tabulation of production by months for the Morrow zone in Getty 35 State Well No. 1 that is perforated. Its cumulative is only 112-million, the reason being the well was just potentialed in January and it's just going on stream. It now is flowing at a rate of 3,962 Mcf per day, 18 barrels of condensate on a 10/64th inch choke with a flowing tubing pressure of 4700 psi.

These rates were current some time last week.

Q. Now, Mr. Bosecker, what conclusions can you draw from this data about the Grama Ridge-Morrow Pool and the formation in this area?

A. Well, basically, Getty, and I believe that one well in the east side of this fault will drain 640 acres.

Q. In your opinion are you dealing with the traditional old lenticular channel sands in the Morrow formation in this area?

A. Not the Morrow that is discussed in a lot of cases. This is more a deltaic or a point-bar deposit, and can be seen from its areal extent already, and so not only does it have areal extent, it has good rock properties, and the confining thing about it is the faults.

Q. I believe you heard Mr. Klaar testify yesterday concerning the gas storage project, where on his exhibit -- from his Exhibit Number B he estimated that there were 1300 productive acres in Sections 33, 34, 3, and 4, that could be drained by the four wells located thereon, and then noted on his Exhibit E that the four wells located in those sections have, in fact, drilled 1298 acres.

Are you familiar with that testimony?

A. Yes.

Q. Do you generally agree with the calculations set forth in Mr. Klaar's Exhibit Letter E?

A. Well, that portion of it I think I could

concur with.

Q. Now, let me ask you, referring to Llano's Exhibit B, in your opinion if the fault were --

MR. NUTTER: Which exhibit are you referring to?

MR. CARR: I'm referring to Llano Exhibit Number B, which is a structure of contours on top of the Morrow.

Q. In your opinion had the two faults, as indicated on this exhibit, not fallen exactly where they appear, and therefore, not traversing -- not traverse Sections 33, 34, 3, and 4, would in your opinion the four wells drilled thereon have drained those four 640-acre sections?

A. Assuming you have the same rock properties that you -- that we have seen evidence to between these wells, yes.

Q. Mr. Bosecker, it's my understanding that Getty has developed the acreage to the west of the -- to the east of the storage project on 640-acre drilling tracts.

A. That is correct.

Q. And that you have drilled at standard locations?

A. In all cases, yes.

Q. In your opinion, how would granting Llano's application to rescind the special pool rules effect Getty?

A. I think that if Llano's allowed to drill a well 660 feet from our lease line, then we have developed on the existing wells, which is 1650, that it will adversely affect Getty's position in the area.

Q. By going to the statewide rules, then, they would be able to move toward your lease line, is that correct?

A. Yes, and that is their intention from this.

Q. Do you believe that this will result in drainage of Getty's property that cannot be compensated for by counter drainage?

A. Yes.

Q. Are you familiar with the Commission's recently promulgated formula used to penalize wells drilled at unorthodox locations?

A. Somewhat familiar.

Q. In your opinion will this formula, if applied in this case, protect the correlative rights of Getty?

A. Not if we're on 320-acre spacing.

Q. And the reason for that is?

A. Well, if we had 320-acre spacing, they could drill an orthodox location 660 feet from our lease line.

Q. And as you understand their formula, if they drilled at the 660 location, would any penalty be assessed?

A. Not if it was an orthodox 660 location.

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Q. Mr. Bosecker, in your opinion, will granting Llano's application to rescind the special pool rules for the Grama Ridge-Morrow Pool impair the correlative rights of Getty and other interest owners in this area?

A. Yes.

Q. Now, Mr. Bosecker, approximately how much did it cost Getty to drill the two wells located in Sections 35 and in Section 2?

A. Section 2 was the first well, which is completed in the Morrow, and the costs are approximately $1,000,000, or was $1,000,000.

In Section 35, this is a dual well in the Morrow and the Bone Springs, and we have spent to date over $2,000,000 on that well.

Q. In your opinion will the wells in Sections 35 and 2 drain their respective sections?

A. Yes.

Q. Do you believe that changing the spacing requirements in this pool will result in the drilling of unnecessary wells, thereby causing economic waste?

A. Yes, I do.

Q. Were Exhibits One through Sixteen-B prepared either by you or under your direction and supervision?

A. Yes.

MR. CARR: At this time, Mr. Examiner, I

would move the introduction of Getty Exhibits One through Sixteen-B.

MR. NUTTER: Getty Exhibits One through Sixteen-B will be admitted in evidence.

MR. CARR: And I have nothing further on direct.

MR. NUTTER: Are there any questions of the witness?

MR. COX: I've got a little here.

CROSS EXAMINATION

BY MR. COX:

Q. Mr. Bosecker, would you please refer back to Exhibit Seven?

A. What is Exhibit Seven?

Q. Exhibit Seven is your structural cross section, Pogo's well cross section.

A. Yes, I have it.

Q. Does this cross section show your perforation points for the Two State and the 35 Well?

A. No, it doesn't. This cross section shows no perforations and it just shows one of those two wells.

Q. Excuse me, which one is this?

A. This is Exhibit Seven.

Q. Perhaps it's Exhibit Eight, then, we want to

look at. Yes, sir, Exhibit Eight shows both of them.

Are perforations shown on Exhibit Eight? Are the perforation points on this?

A. Yes.

Q. Would you point them out?

A. Okay, the perforations for both of these wells were shown on the lefthand side of the center of the depth interval. And they're just small pencil marks, about a quarter of an inch horizontal marks. And those are individual perforations.

Q. Which well has completion below the Morrow Clastic zone?

A. Both wells.

Q. Okay. Which well has only perforations above the Morrow Clastic zone?

A. None.

Q. Referring to the Getty Two State at 12,762, what are -- what are these?

A. Those are two perforations at 12,761 and 62.

Q. Are they producing?

A. Yes, they are.

Q. Is that completed above the Morrow Clastics?

A. That's completed above the Morrow Clastic marker as we have shown on this cross section, yes.

Q. Did you not just say that none was completed

above the Morrow Clastics?

A. You said none -- what well was completed only above.

Q. All right. What do your Horner pressure data show on the lower zones on the Two State?

A. The -- in both cases in which the Horner plots were made from the pressure build-up information on the Getty Two State, all the perforations were open in that particular well.

Now, I discussed each of those and we can go over each of them separately, if you would like.

Q. Wasn't it your testimony that you felt that the lower members were not contributing significantly to this well in the Two State?

A. Not -- no, not -- I indicated that on the initial completion the perforations below the Morrow Clastic interval, those perforations were not cleaned up when we perforated the upper zone that did exhibit higher permeability. And it has taken some time for them to clean up, and I believe, and it can be seen from the Horner plot, that they are contributing now.

Q. When you initially treated the lower zone, wasn't it a fact that the well would not flow?

A. It would flow by heads. It made some gas and water and swabbed and it was not a well in which we were

satisfied to stay with, without either giving it a larger treatment or going up the hole, and we decided that we would perforate the whole interval and then if we needed to give it a large treatment, which we have not as of yet, but we may, we would do it all at one time.

Q. Referring to Exhibit Nine, and Ten, you've testified to a two layering effect. Couldn't that effect also be because of the fact that the lower zone is not cleaned up and not producing?

A. Well, I testified that the lower zone was not cleaned up, that as a result of it not being cleaned up we encountered a layering effect. By layering I mean there's more than one zone of various thicknesses that have varying permeability.

Q. In the 35 do you have any perforations above the Morrow Clastics?

A. Not as yet.

Q. So that your main production in the Two State comes from the zone above the Morrow Clastics, is that right?

A. Initially, on initial completion without doubt that was the case.

Q. And your main production in the 35 comes from perforations below the Morrow Clastics, only.

A. Yes, that's the only --

Q. Yes.

A. -- perforations in the 35. At this point in time in Section 2 all the zones, to the best of our knowledge, are producing gas.

Q. Pardon me, would you state that again, the last part of your answer again?

A. Well, in the Getty Two State No. 1 now you can see that flowing tubing pressures increased, the well has cleaned up, and the perforations below the Morrow Clastics marker have cleaned up, and are contributing production in commercial quantities.

Q. How do you know that the ones below are?

A. We have good reason to believe they were not initially and I think you would agree with that. The well has improved. The upper zone, there was no problems with it initially, so I don't see how it could improve even more. The improvement would have to come from the zone that was -- was performing poorly initially.

Q. In your pressure data do you conclude that there is communication below the Morrow Clastics in 35 and Two State?

A. Yes.

Q. From your pressure data do you conclude that there is -- that there is communication between the 35 and the Two State above the Morrow Clastics?

A. There's no perforations as yet in the 35 above the Morrow Clastics interval. Probably there is areal extent, because you can see the same zone present in both wells, and I know of no reason why you wouldn't have communication, but you cannot either prove it or disprove it until you perforate it and monitor it.

Q. Isn't it just as possible to conclude that there are two separate zones instead of one in communication?

A. What well are you talking about?

Q. I'm talking about the communication between 35 and Two State.

A. If there are two separate zones in what?

Q. Isn't it just as possible to conclude there are two separate zones rather than communication between the zones?

A. Well, the Horner plot, the first Horner plot in the Getty State Two was in early transit behavior and it showed this humping effect that indicated layering that indicated more than one zone of growing permeability and pressure.

There was no common reservoir pressure at that immediate time of completion. The second Horner plot was in semi steady state behavior and with a common reservoir pressure at that point in time. No boundary effect could be seen or no layering effect could be seen.

Q. How long did it flow during the second test? Excuse me, for the first test. How long did it flow for the first test before you shut it in?

A. It's 15,000,20 minutes and I think that's about ten days. We've got a calculator, we'll have it shortly. 10.4.

Q. Isn't it possible that if you had flowed it longer that the boundary effect of the fault would have been seen on the build-up curve?

A. The boundary of the fault to the west?

Q. Yes.

A. It was produced at a longer time and shut-in in December, and it did not show the boundary at that time.

Q. How long was it produced, did you say?

A. Well, it produced from February to December and then shut-in, that length of time.

Q. How long was it?

A. Ten months, or something like that.

MR. COX: No more questions of the witness.

CROSS EXAMINATION

BY MR. NUTTER:

Q. Mr. Bosecker, on your Exhibit Number Eight, you have picked the top of the Morrow Clastics at 12,800

in the 35-1, and at approximately 12,829 feet in the Two State 1.

Now, I noticed on Mr. Klaar's Exhibit Number B in the 35-1 but not the Two State, that he has picked the top of the Morrow Clastics at identically the same point of 12,800.

Now, all of the Morrow Clastics you show approximately 210 feet or 20 feet of Morrow limestone -- no, correction, approximately 200 feet of Morrow limestone between the top of the Morrow and the Morrow Clastics.

Now, Mr. Klaar stated yesterday he thought your well was perforated in the Atoka. In your opinion is this clearcut Morrow formation right here where these upper perforations are in the Two State?

A. Let me elaborate a little, if I can.

Q. Okay.

A. The way Getty goes about its business is the exploratory geologist drills the first well, the wildcat well, and at that time they call the DST's and look at the samples and pick the tops, and et cetera.

After that first well is drilled and completed it goes over to the production group and it's carried on in the production group.

These tops on the first well that was drilled in the field was not picked by me or any of my staff. It

was picked by our exploratory team, and what we have done is extrapolate the information gained from the first well over to the second well, and it is the exploratory team's opinion that these are the correct markers.

Q. Well, you both agreed -- from the one well that you've got in common on your exhibits, you've both agreed that the Morrow Clastics are at the same point, the 12,800 here.

Now, you have picked the Morrow Clastics at 12,000, or your exploratory group has picked the Morrow Clastics at 12,830, 04 29 in the Two State.

A. That's a very good marker and I could see how we could agree on that.

Q. Well now, he has stated, then, that the upper perforations, which are at 12,761 feet, are in the Atoka, but this would be in the limestone interval and you've got 200 feet of lime above the marker.

A. It is lime.

Q. Is it the Morrow or is it the Atoka?

A. Again, our geologist says this is the Morrow lime, our exploratory geologists from their analysis, say that it's the Morrow limestone.

Q. There usually is some Morrow considered to be above the clastic.

A. Right, and let me -- it shows to be Morrow

limestone.

The interval that is porous and permeable is not a lime, it's a sand, I better mention that.

Q. All right, I see the sand now.

A. Uh-huh.

Q. All right. Mr. Klaar, where would you pick the top of the Morrow on Getty's Exhibit Number Eight on the Two State Well? You said that these perforations were Atoka.

MR. KLAAR: Okay, first of all, we seem to have no problem agreeing to the top of the Morrow Clastics.

MR. NUTTER: The Clastics seem to be agreeable.

MR. KLAAR: Fine. That, due to the fact that it's such an easily identifiable marker, everybody has agreed to that.

I would tend to pick the top of the Morrow, and there's a reason for why everybody goes on the top of the clastics, because the top of the Morrow is a hard place to pick, to say this is the top of the Morrow.

I would tend to pick the top of the Morrow just almost immediately below where the Getty Two State was perforated.

MR. NUTTER: Okay.

MR. KLAAR: I'd say that's the top of the

Morrow.

MR. NUTTER: So you'd give it approximately 50 feet of Morrow above the clastics.

MR. KLAAR: Yes, sir.

MR. NUTTER: Okay, well, I just wanted to resolve that difference there between whether the well was Atoka or Morrow.

MR. KLAAR: I want you to be aware that I'm not a paleontologist, so I cannot certify to --

A. I am not either, and don't want to be.

Q. (Mr. Nutter continuing.) Now, I would like to clarify the perforated interval, Mr. Bosecker, on that Two State.

On your Exhibit Number -- we've got two groups of perforations but they seem to kind of have an overlapping effect. Was the well perforated three different times?

A. To the best of -- well, to the best of my knowledge, it was perforated in two different stages. I don't know how many times the gun went into the hole, you know. It was a through tubing 1 11/16th inch jet charge, which had very poor penetration, from what I understand.

Q. Well, it was my understanding, also, from your direct testimony that the lower perforations were made, the well wasn't -- and treated -- the well did not perform

satisfactorily.

A. It was treated with 2500 gallons of 7-1/2 percent NE acid, if I remember right.

Q. Okay, and then you weren't satisfied with the performance, so you came up the hole to 12,700, reperforated, and then treated with another 2500 gallons over the gross interval.

A. Over the gross interval.

Q. But then this C-105, which is your exhibit Number Two, states that there was a treatment from 12,941 to 13,129. I presume that was the first treatment.

A. That was the first treatment.

Q. And then there was a treatment from 12,761 to 12,941 with 2500 gallons, so that would indicate that the upper section was treated separately.

A. Okay, now I really need to spread Exhibit Number Eight out.

The first treatment shows to be from 12,941 --

Q. To 129.

A. -- to 13,129. That's to the best of my recollection. That is true.

Q. And that was that initial perforated interval that's shown there under item 31 on that form.

A. Uh-huh. And the second treatment shows to be from 12,761, which is the top perf, down through 12,941.

Okay, that's not where I testified to. I, it's my understanding and memory that all this was done through the tubing and I do not believe we had a bridge plug in the hole, and that it was overall. I do not have the records here to double check that, but if that Form C-105 is exactly correct, it would indicate to be a bridge plug in number two.

Q. And treated the upper perfs separately.

A. And broke them down separately, yes, which is possible.

Q. And then what's the overall perforated interval in the 35-1, in your Exhibit Number Four, which shows they go from 12,907 down to 13,102, I presume?

A. Okay, now what's the question?

Q. What is the overall perforated interval in that well? From 12,907 to 13,102?

A. Yes, to the best of my knowledge.

Q. And then on your big exhibit there, these are not perforations, these little tics that are down here at lower intervals.

A. Those are -- well, no, that has something to do with the logging tools, the compensated neutron formation density.

Q. They're not perfs, though.

A. I think -- it's not perfs -- I think it has

to do with the volume of boreholes for computing your cement requirement. I think, I'm not sure of that, but I believe that's what those things are.

Q. Okay.

A. We should have put stars or something so we wouldn't confuse you there.

MR. NUTTER: Are there any further questions of Mr. Bosecker? He may be excused.

(Thereupon a recess was taken.)

MR. NUTTER: The hearing will come to order, please. We'll continue now with Case Number 6496. Mr. Cox, I believe you said you had a rebuttal witness.

MR. COX: Yes. We'd like to recall Mr. Klaar.

MR. NUTTER: Okay, Mr. Klaar is still under oath.

AL KLAAR

being recalled to the witness stand, and having been previously sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. COX:

Q Are you the same Al Klaar that previously testified in this case?

A. Yes, sir.

Q. Do you have some comments to make to the Commission regarding the Horner plots that were introduced in evidence by Getty?

A. Yes, sir, I do.

Q. Okay, would you please go ahead?

A. The attention is called to Getty's Exhibit Number Nine and Number Eleven.

The first one, Number Nine, being the Horner plot which shows that the extrapolated bottom hole pressure at the time was 8270; the second one being the one taken eleven months later in December of 1978, showing that at that time the Horner plot indicates stabilized bottom hole pressure of 7850.

I have no difference with the fact of the way the tests were taken, and the plot thereof, but I do offer this interpretation.

It is a known fact that sand zones, productive sand zones, in the Atoka and in the Morrow, sustain what is called a damaged area when drilling into them, and my opinion, the first plot taken right after the well was potentialed --

Q. Is that Exhibit Nine?

A. Yes, that is Exhibit Nine, shows to me that instead of, as Getty interprets there being two zones in-

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dicated through the hump there, what we are really seeing there is the affect of the damaged zone initially and right after being perforated.

I would like to further point out that this was obtained after the top zone, which Llano has called the Atoka zone, was perforated.

The conclusion that I come to is that we are talking whether either Exhibit Nine or Exhibit Eleven, we are still only talking about one zone being productive into the well, and that being the upper zone, which is, according to Getty interprets that as the Upper Morrow Zone and according to Llano as the Atoka Zone.

I think it's corroborated by the fact that cleanup has taken place when the second test was taken, under Exhibit Eleven, and it just shows you a clean, straight line at the end of the Horner plot there.

I think it is further corroborated by the fact, and I think that the Examiner will appreciate the fact of a well drilling immediately offsetting gas storage unit that the first thing we did was contact people in charge of exploration and production department of Getty and we obtained their approval to witness certain items which would take place on their well as it was being drilled.

We, of course, were very interested as the well was being drilled and as it was being completed. Our

Our initial interest was not in anything up above the top of the Morrow Clastics. It centered solely around the fact of what's happening below the Morrow Clastics because that's where we're storing our gas.

We were witness to the fact that when the first set of perforations were performed, perforating job was performed, the well did not come in, did not flow. The well was then swabbed down and after being swabbed down and having essentially no more than a couple of hundred feet, we're talking about 200 to 250 feet of fluid on the formation, the well would not flow more than 15 to 30 Mcf per day.

Pressurewise we're talking about a back pressure of no more than 100 to 125 pounds being on the formation at that time.

I would further want to point out that under G-13 -- by "G" I'm referring to the fact that we've got that down as Getty Number Thirteen Exhibit -- the point was made that the buildup pressure test on the Getty 35, and a Horner plot thereof, indicated a buildup pressure, stabilized buildup pressure, of 7460 pounds.

Please keep in mind that the initial pressure on the Getty Two State after perforating the upper zone and getting the well to flow, was 8270. Eleven months, almost twelve months later, the same Getty Two State was

down to a pressure of 7850, as extrapolated by the Horner plot, but yet barely a month later on the Getty 35, where we know and realize that a producing interval below the top of the Morrow Clastics is productive, we -- and Getty calculates 7460 pounds.

The point is it dropped 500 pounds in pressure in eleven, twelve, months by producing 300 and some odd thousand Mcf of gas, and yet, if we are to believe that these are in communication, in other words, that both the upper and the lower parts in the Getty Two State are productive, and one is draining the other, then we find it hard to explain the fact that in just one month 400 pounds less pressure is recorded on the Getty 35.

The implication being that the Getty Two State is the one that ought to be the lower, not the Getty 35.

MR. NUTTER: You're saying, in other words, that it looks like from here the 35-1 was draining the Two State.

A. If that's -- if that's a possibility, yes, sir.

MR. NUTTER: But it hasn't been proved.

A. But I don't think -- but I do not think that the lower portion, or the stuff below the top of the Morrow Clastics, is productive in the Getty Two State, so

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the end result being in my opinion, we are talking about two separate reservoirs.

Number one, the upper zone has not been perforated in Getty 35. The producing interval below the top of the Morrow Clastics is not productive in the Getty Two State.

MR. NUTTER: Well now, Mr. Klaar, ---

A. Yes, sir.

MR. NUTTER: Mr. Bosecker's interpretation of the Horner plot on the Getty 35-1 showed that he -- or he indicated that he interpreted this as also indicative of a two layer reservoir. Do you think again that this same situation you're talking about on the Exhibit Nine, that it's not a two layer reservoir on the Two-1 but simply a matter of wellbore cleanup?

A. It could be the identifical situation again.

MR. NUTTER: Now, do you agree with this interpretation of all of these Horner plots, that none of them shows a reservoir boundary, or limits?

A. Yes, sir, I do agree with that interpretation, that none show a reservoir boundary or a reservoir limit. The only difference of opinion I have is the two layer concept in the first one on the Getty Two State, and coming to the same conclusion that there are two layers productive in the Getty 35.

MR. NUTTER: Okay, is there any way to analyze a Horner plot in such a manner as to be able to tell whether you've got a two layer reservoir or whether you've got wellbore cleanup?

A. Well, a plot by itself, when you have more than one zone productive, or open to the wellbore, with a difference of several feet in between, and you get what is termed a hump here, the first conclusion you draw is that more than likely it's a two layer reservoir. I have no difference of opinion there.

But I'm of the opinion that the same type of data, the same type of conclusion, is also sustained when you are talking about the fact of having a damaged zone.

Now, there would be one further step after the Horner plot, and that would be the reverse data or to take the well and produce it for some time to convince yourself that you have cleaned up your damage, then shut the well in and obtained the same type of information.

This is why I say that I think the second plot on the Getty Two state is representative of what is really going on. It shows one layer. It shows one zone.

MR. COX: Exhibit Eleven you're referring to?

A. Yes, that's Exhibit Eleven.

All of these, all of these type tests and plots, Mr. Examiner, involve time, and it is of course the engineer's responsibility to choose the correct time so that he gets to see what is happening, and I submit that if possibly the well would have been cleaned up further and then the first plot obtained, that the same type of plot that is Exhibit Eleven would have been obtained for Exhibit Number Nine.

The point was made that Shell conducted an interference test and proved to themselves, and at the time to the Commission's satisfaction, that 640 acres could be drained back in 1965. I imagine this was just prior to the November, 1965, or maybe at the November, 1965, hearing to approve the rules governing the fact that it would be developed on 640.

I wish to point out, though, that we do not dispute the fact that there is communication between the wells. As I pointed out yesterday, there is definite communication between wells, otherwise how could our two west wells, who's never had an injection, be pressured up, I just --

Q. (Mr. Cox continuing.) Excuse me, Mr. Klaar, are you referring to the Llano wells in the storage unit?

A. Yes.

Q. Okay.

A. Yes, I am. I'm sorry.

How else could the No. 3 and No. 4 Wells in Llano's storage system be pressured up if injection only took place in Llano's No. 1 and No. 2 Wells?

The further analysis of the sand zones below the top of the Morrow Clastics indicates that when the four wells in Llano's gas storage unit are considered and are looked at as a whole, there are identified five sand zones, and some of these are even identified by Getty's exhibits.

We do not plan to go into detail except to state that, yes, there is a common gas zone which we label as "A", the first one that you run into, between the No. 1 and the No. 4 Wells.

We also not only admit but realize that there is communication between the No. 2 and the No. 3 in another gas zone. As I remember it, it was the Morrow "D" Sand.

But at the same time we wish to point out that, taking as an example the No. 3 Well, it has a zone identified as Morrow "C" Sand, which is not found in any of the other wells to be productive.

MR. NUTTER: Okay, well now, --

A. So the -- what I'm coming to in a long way,

is this: That we still feel, when all these zones are considered, and the fact of the --- of what we think are known faults in there, we still feel that we have only drained, as far as area and acreage goes, we feel we have only drained an average of 320 acres, where I had the feeling that Getty was through Shell's data, was stipulating that Shell had proved that 640 acres would be drained.

MR. NUTTER: Okay, well now, Mr. Bosecker in his interpretation, or in his computations of the data sheets on these Horner plots, came up with 2 millidarses on the Two-1 and increasing to 2.2 later.

He had 5.5 millidarses, I believe it was, on the 35-1.

A. Uh-huh.

MR. NUTTER: Now do you have any calculated permeabilities for the No. 3 in Section 33 or the No. -- correction, the No. 4 in Section 4 or the No. 1 in Section 3?

A. Okay, we have --

MR. NUTTER: That would indicate what those permeabilities are? Because Shell's data indicated high permeability, probably.

A. Right. We have core data, which was originally obtained by Shell or the original operator, and if Steve finds that particular data, I'm sure I can tell you

what the average permeability was.

It was obtained not through log interpretation but through cores.

Okay, I have to remember these are the old well names. Our well now called the GRM Unit No. 1, according to this data, has an average permeability -- had and has an average permeability of 6.7 millidarses.

The No. 2 Well, which is up in Section 3, calculated out to 2.2.

MR. COX: What section is that again, please?

A. The No. 2 --

MR. NUTTER: The No. 2 is in Section 34.

A. The No. 2 is in -- you're right, I was reading a date and not section here, I'm sorry. I was reading a completion date and thinking it was giving me the section.

The No. 2 Well is in 34, and this tabulation shows that it calculates out to average permeability 2.2.

The No. 3 Well, now called the No. 3, in Section 33, calculated out to an average permeability of 4.8.

MR. NUTTER: How about the No. 4?

A. The No. 4, 1.6.

MR. NUTTER: So that has a low permeability.

That has the lowest of any of your four wells then, doesn't it?

A. Yes, sir, it also, by Exhibit E, by Llano's Exhibit E, shows it had the lowest recovery.

MR. NUTTER: But that was one of the two wells on Shell's pressure interference test, I believe, wasn't it?

A. And that is also the well that has communication with the No. 1 Well, which has the highest permeability. There's one zone in No. 4 which is in direct communication with the No. 1 Well.

Just as there is one zone in the No. 2 that is in communication with the No. 3.

MR. NUTTER: And these permeabilities, these are average permeabilities for the entire --

A. These are -- these are weighted average permeabilities as per core, sir.

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

CROSS EXAMINATION

BY MR. CARR:

Q. Now, let me see if I can figure out what we're talking about here.

A. Okay.

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Q. I believe in response to Mr. Nutter's question you stated that from the Horner plot it was really not possible to determine whether or not you had a damaged zone that was cleaning up or you had a two layer reservoir. Is that a correct understanding of your testimony?

A. It's a matter of interpretation.

Q. I would like for you to look at the figure on page 123 of Pressure Buildup and Flow Tests in Wells. It's Monograph Number One, Henry L. Daugherty Series, Society of Petroleum Engineers.

I'd like you to look at this plot and I'd like for the record, there are nine examples on this. And I'd like you to look at the plot in the top line in the center.

MR. NUTTER: Are these all contained on one page, Mr. Carr?

MR. CARR: Yes, sir, it is.

MR. NUTTER: We'll Xerox that page, then, and offer it as an exhibit, how about that?

MR. CARR: That would be fine with me. Would you like to stop and do that now?

MR. NUTTER: Yeah, let's do it so I can have one.

MR. CARR: Okay.

(Thereupon a short recess was had.)

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Q. (Mr. Carr continuing.) Now, Mr. Klaar, I'd like you to direct your attention to what has been marked for identification purposes as Getty's Exhibit Number Seventeen, and I'd like you to look at the figure in the center of the top line, on which we have written "damaged zone". I think that bears up by the caption beneath the diagram.

A. Right, it bears up by the fact that it says "skinned and/or well fill-up."

Q. And that is correct for me to assume that means damaged zone?

A. Yes, sir.

Q. Okay. And then I'd like for you to look at the diagram in the bottom row in the center on which we have written "two layer". Below it it says "stratified layers or fractures with tight matrix."

A. Correct.

Q. And I would ask you to compare this to Getty's Exhibit Number Nine, and ask you if, in your opinion, that the example, textbook example, for a two layer reservoir doesn't seem to closely correlate with the plot on the Horner plot, Getty Exhibit Number Nine?

A. I can agree that the two layer exhibit closely approximates what Getty's Exhibit Number Nine shows, but at the same time I can also say that the same thing is essentially showed by the damage zone exhibit up at the top

of the page.

Q. But the damaged zone exhibit, do you seem to hit a straight line before you break loose and hump on the -- on the plot?

MR. NUTTER: What do you mean, Mr. Carr, "break loose and hump"?

A. I think I see what you're getting at, Mr. Carr, and I think I would further point out that if that's the interpretation to be made by the two criteria here, then how come there is no straight line exhibited on the two layer afterwards, after it makes the hump.

So what I'm saying is that you've essentially got just about the same thing indicated.

Q. Is it your testimony that you would not encounter a straight line after the hump in the --

A. No, sir, that's not what I said.

Q. Okay, was it your testimony that you would necessarily have a straight line prior to the rise in the plotting the second of the nine figures?

A. You can have a straight line before. You would most certainly hope to have a straight line after. All I'm saying is that these are idealized plots and that a well condition, an actual well condition, you can try to fit that to one of these nine examples to tell you what it is that you most likely have.

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Q Mr. Klaar, based on the plot that is contained on Getty Exhibit Number Nine, can you tell whether or not you have a damaged zone or a two layer zone?

A On Exhibit Number Nine.

Q Yes, sir.

A I can tell you, if I were not sitting here and knowing as much as I do about the well, I would wonder whether I had either, whether I had a damaged zone or whether I had a two layer effect.

Q But you're not able to tell based on this plot whether or not you have a damaged zone.

A By assuming that I know nothing about the well and I'm just looking at that, I would wonder which way to go.

MR. CARR: Mr. Examiner, if there is no objection, we would like to offer what has been marked for identification as Getty Exhibit Number Seventeen.

MR. NUTTER: Getty Exhibit Number Seventeen will be admitted in evidence.

MR. CARR: I have no further questions of Mr. Klaar.

MR. NUTTER: Did you have any further questions, Mr. Cox?

MR. COX: Yes, just a couple, please.

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REDIRECT EXAMINATION

BY MR. COX:

Q. Mr. Klaar, do you have a comment concerning the production data from the Getty Two State Well?

A. Yes, sir. As presented by Getty just a little while ago, the claim was made that Getty Two State got better. It was the reason that finally a one layer reservoir was interpreted through the Horner plot.

I wish to point out the fact that Getty Exhibit Three indicates that the well flowed at -- right at 2,000,000 a day on the initial 4-point test, and that Getty's Exhibit Fifteen and Sixteen-A show that the well did not really increase in production or become that much better. In fact, the well, according to GEtty's own figures, is flowing at 1700 Mcf per day at this time.

One further -- to summarize, really, what I'm -- what I'm saying, is that Getty has through the Horner plot and through assumptions therefrom, presented data which to them shows that 640 acres will be drained by one well.

I submit that Llano, not through assumptions but through calculations, has shown that 320 acres is the average drainage area for a well out there, and wish to state at this time that we still think 320 acres per well should be the way to develop the area.

MR. NUTTER: Well, Mr. Klaar, Liano is the purchaser from the Getty Two State, isn't it?

A. Yes, sir.

MR. NUTTER: You don't happen to have the number of days production it had on all these months that Mr. Bosecker had listed on Exhibit Fifteen and --

A. I do not have them with me, but I can say that practically every day of the month that the well was producing. Now, I imagine that for the shut-in tests, or to obtain the shut-in pressure in December for the Horner plot, it was not producing to us, but I do not have the data with me. There were no reasons to have the wells shut-in, Mr. Examiner.

MR. NUTTER: Well, the well declined from 53-million cubic feet in August to 39-million cubic feet in September; there's only one day's difference in the length of the month. That seems like a pretty sizeable decline, but then it jumped back up to 49-million for the month of October. I just wonder how much producing days had to do with this or possibly line pressure.

A. Well, at the same time that this production was taking place through that 12-month period there, there were surface problems that Getty had run into, but I'm not ready and I'm not able to tell you how many days that they did not deliver to us due to having stack-pack problems,

which is a device that we -- that we separate oil and gas, and the gas comes to us as purchaser and the oil goes to the tanks, and how many days Getty was down for various other reasons --

MR. NUTTER: There have been some mechanical problems at the surface?

A. Yes, sir, there have been. I am not prepared at this time to discuss, though, how many days there were. I just don't know.

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

MR. CARR: Mr. Carr has a question.

RECROSS EXAMINATION

BY MR. CARR:

Q. Mr. Klaar, the production would decline on a well if in fact there was a choke on the well, isn't that correct? Or production would be restricted if there was a choke on a well?

A. Yes, sir, and I can say that the choke is -- there is a choke, yes, sir.

Q. Thank you. And another point you made is that you've proven mathematically that the average number of acres that can be drained by a well in this area is approximately 320, is that a correct characterization of your

testimony?

A. Yes, sir, that is.

Q. And I assume you're referring to your Exhibit E when you say you have proven this.

A. Yes, sir.

Q. And on that you've averaged the production from seven wells.

A. I thought it was six.

Q. You're correct, it is six. And is it not also correct that of those six wells, four of them are drilled into sections where the number of productive areas are severely limited by faults?

A. I can agree with that.

MR. CARR: I have no further questions of Mr. Klaar.

MR. NUTTER: Do you have any?

MR. COX: We're through, sir.

MR. NUTTER: Does anyone have anything to offer in Case Number 6496? Mr. Carr, do you have a statement?

MR. CARR: Mr. Examiner, I believe there are several letters in the files. I have Xeroxed copies of them that were sent to me. We may also have the originals here.

Would the Commission prefer to read them or

I'll be glad to do it.

MR. NUTTER: You can just state what they are and then give them to us. We don't have any correspondence in that case file at all.

MR. CARR: Okay. We have a letter from Belco Petroleum Company, signed by Mr. Lee Nering, who is their Administrative Geologist, and it states Belco supports Getty in Case 6496. We further contend that rescission of the order is not taken in good faith in the spacing order. Getty, et al, undertook in good faith in applications conforming to rules for the drilling of the offsetting Getty Two State 1 in Section 2 and the Getty 35-1 in Section 35, which were drilled then in conformity to the existing spacing order. We contend that the spacing regulation provided for protection of offsetting correlative rights and would continue to do so.

In the absence of a waiver from the direct offsetting owners, Belco contends that approval of Llano's application in Case 6496 will violate the correlative rights of the offsetting owners of existing pool exterior wells which were drilled in conformity with the requirements.

MR. NUTTER: Mr. Carr, if you'd just state the essence of --

MR. CARR: Okay, all right.

MR. NUTTER: -- the correspondence rather

than read it.

MR. CARR: Phillips Petroleum Company, we have a letter from W. J. Maharg, M-A-H-A-R-G, Engineering Director. It in essence restates the same information contained in the Belco letter.

We also have a letter from Sabine Production Company, signed by C. H. Madson, and again this letter supports the position of Getty in this case.

MR. COX: Mr. Examiner, in relationship to those letters, I would ask that the owners of the non-operating interests in the Getty well be identified, if they are in fact some of those people who submitted letters.

MR. NUTTER: Mr. Carr, is Phillips Petroleum Company a part owner in Getty wells?

MR. CARR: I believe it states their interest in each of the letters. I didn't read all of them.

MR. NUTTER: Phillips has 25 percent working interest ownership.

MR. BOSECKER: In Section 36.

MR. NUTTER: In 36 No. 1, which is currently being drilled.

Sabine is a 1/4th working interest participant in the Getty 36 No. 1, which is being drilled.

Belco is a co-owner in -- with Getty in properties located in Section 35 and Section 2.

So presumably, they're a co-owner of those two producing wells.

Does anyone have anything further they wish to offer now?

Mr. Carr, a closing statement?

MR. CARR: Very briefly.

As the testimony has shown, in 1978, late 1978 and early 1979, Getty completed its No. 35 Well in Section 35, offsetting the Grama Ridge-Morrow Gas Pool to the east.

Soon after this Llano naturally wanted to drill a Morrow well in the east half of Section 34, which is understandable.

The Oil Conservation Commission has devised a new procedure for penalizing wells drilled in unorthodox locations, based on the amount the location varies from a standard location, and also based on the increased area of drainage in adjoining properties which results from the unorthodox location.

Now, the problem is that in the case before the Commission, Llano, if the application is granted, will be able to get around this procedure for penalizing wells, because in effect the rules of the game are going to be changed halfway through the game. They will be able to drill at an unorthodox -- or orthodox location 660 feet

from a lease line, where Getty has in good faith developed the land at orthodox locations 1650 feet from the lease line.

The problem here is further compounded by the fact that because there is, and I think everyone agrees, the great probability that a fault cuts through Section 34 at some point, there is a question as to how many productive acres are in 34 and can in fact be dedicated to a Llano well drilled in the east half of that section.

We submit that this fact situation must be weighed against the Commission's statutory duty to protect correlative rights. If you simply grant Llano's application rescinding the special pool rules, you are in effect, we believe, authorizing drainage of Getty's acreage, drainage that cannot be compensated for by counter drainage.

The only way this application could be granted and the correlative rights of Getty not severely impaired, would be to impose some sort of a meaningful penalty on the production from any well drilled in the east half of Section 34.

Now, we further urge the Commission to deny the application on the grounds that to develop this acreage on 320-acre spacing will result in the drilling of unnecessary wells, thereby causing economic waste.

The real question here is whether -- how

many acres will one well drill -- drain, and we believe that the evidence is clear that a well will drain 640 acres when it is not restricted by fault, and in view of this, we believe that the application must be denied as the evidence simply does not support it.

MR. NUTTER: Thank you. Mr. Cox?

MR. COX: Mr. Examiner, I don't want to belabor the case any more. We could respond totally to Mr. Carr's remarks, but we want to simply say that we think that the data which Llano has presented clearly establishes that 320 acres is all that can be drained, and remind you and the Commission of the fact that much of the data presented is real data, not assumed data or speculative data, in relationship to that.

The evidence is before the Commission and we don't really wish to take any more time here today, and ask that the application be granted.

MR. NUTTER: If there's nothing further in Case Number 6496, we'll take that case under advisement.

(Hearing concluded.)

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REPORTER'S CERTIFICATE

I, SALLY WALTON BOYD, a Court Reporter, DO HEREBY CERTIFY that the foregoing and attached Transcript of Hearing before the Oil Conservation Division was reported by me; that said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability, knowledge, and skill, from my notes taken at the time of the hearing.

Sally W. Boyd, C.S.R.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. _____, heard by me on _____ 19____.

_____, Examiner
Oil Conservation Division

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Form C-105
Revised 1-1-65

NEW MEXICO OIL CONSERVATION COMMISSION

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

5-NMOCC 3 - WIO 1-File
1-R.J. Starrak-Tulsa Belco 1-Engr
1-A.B. Cary-Midland ✓ Mesa
1-J.D. Mc Coy-Houston Southland

5a. Indicate Type of Lease: State [X] Fee [ ]

5. State Oil & Gas Lease No.: LG-1207

1a. TYPE OF WELL: OIL WELL [ ] GAS WELL [X] DRY [ ] OTHER

b. TYPE OF COMPLETION: NEW WELL [XX] WORK OVER [ ] DEEPEN [ ] PLUG BACK [ ] DIFF. RESVR. [ ] OTHER

7. Unit Agreement Name:

2. Name of Operator: GETTY OIL COMPANY

8. Farm or Lease Name: TWO STATE

3. Address of Operator: P. O. BOX 730, HOBBS, NEW MEXICO 88240

9. Well No.: 1

4. Location of Well: UNIT LETTER F LOCATED 1980 FEET FROM THE NORTH LINE AND 1980 FEET FROM THE

10. Field and Pool, or Wildcat: UNDESIGNATED

THE SOUTH LINE OF SEC. 2 TWP. 22-S RGE. 34-E NMPM

12. County: LEA

MAR 2 0 1978

MIDLAND, TEXAS
PRODUCTION DEPARTMENT

15. Date Spudded	16. Date T.D. Reached	17. Date Compl. (Ready to Prod.)	18. Elevations (DF, RKB, RT, GR, etc.)	19. Elev. Cashinghead
10-30-77	1-16-78	2-13-78	2608' GR	--

20. Total Depth	21. Plug Back T.D.	22. If Multiple Compl., How Many	23. Intervals Drilled By	Rotary Tools	Cable Tools
13,381'	13,360'		→	0 - TD	--

24. Producing Interval(s), of this completion — Top, Bottom, Name: 12,759 - 13,322 MORROW

25. Was Directional Survey Made: YES

26. Type Electric and Other Logs Run: DUAL LATERLOG, BHC SONIC, COMP. NEUTRON, NEUTRON, NEUTRON DENSITY.

27. Was Well Cored: NO

28. CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT LB./FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13-3/8	48	402	17-1/2	500 CLASS C	-
10-3/4	40.5,45.5,51	5,577	12-1/4	2350 LITE & CLASS "C"	-
7-5/8	39,33.7,29.7	11,694	9-1/2	2165 LITE & CLASS H	-

29. LINER RECORD

SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN
5"	11,387	13,379	350	

30. TUBING RECORD

SIZE	DEPTH SET	PACKER SET
2-3/8"	12,638	12,638

31. Perforation Record (Interval, size and number)

12,941-13,129 - 9 - .25" Holes
12,761-13,322 - 7 - .25" Holes
12,759-12,763-1/2 - 8 - .25" Holes

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL	AMOUNT AND KIND MATERIAL USED
12,941-13,129	2,500 Gals. 7-1/2 NE Acid
12,761-12,941	2,500 Gals. 7-1/2 NE Acid

33. PRODUCTION

Date First Production	Production Method (Flowing, gas lift, pumping — Size and type pump)	Well Status (Prod. or Shut-in)
2-14-78	FLOWING	SHUT-IN

Date of Test	Hours Tested	Choke Size	Prod'n. For Test Period →	Oil — Bbl.	Gas — MCF	Water — Bbl.	Gas — Oil Ratio
2-14-78	24	VARIOUS					-

Flow Tubing Press.	Casing Pressure	Calculated 24-Hour Rate →	Oil — Bbl.	Gas — MCF	Water — Bbl.	Oil Gravity — API (Corr.)
1000	PKR.			1,965		

34. Disposition of Gas (Sold, used for fuel, vented, etc.): WAITING ON GAS CONNECTION.

Test Witnessed By:

35. List of Attachments: DEVIATION SCHEDULE

36. I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.

ORIGINAL SIGNED BY
DALE R. CROCKETT

SIGNED Dale R. Crockett TITLE AREA SUPERINTENDENT DATE 3-15-78

/bh

INSTRUCTIONS

This form is to be filed with the appropriate District Office of the Commission not later than 20 days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radioactivity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. This form is to be filed in quintuplicate except on state land, where six copies are required. See Rule 1105.

INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

Southeastern New Mexico				Northwestern New Mexico			
T. Anhy		T. Canyon		T. Ojo Alamo		T. Penn. "B"	
T. Salt	1690'	T. Strawn	11,750'	T. Kirtland-Fruitland		T. Penn. "C"	
B. Salt	3600'	T. Atoka	11,925'	T. Pictured Cliffs		T. Penn. "D"	
T. Yates	3790'	T. Miss		T. Cliff House		T. Leadville	
T. 7 Rivers		T. Devonian		T. Menefee		T. Madison	
T. Queen		T. Silurian		T. Point Lookout		T. Elbert	
T. Grayburg		T. Montoya		T. Mancos		T. McCracken	
T. San Andres		T. Simpson		T. Gallup		T. Ignacio Qtzte	
T. Glorieta		T. McKee		Base Greenhorn		T. Granite	
T. Paddock		T. Ellenburger		T. Dakota		T.	
T. Blinebry		T. Gr. Wash		T. Morrison		T.	
T. Tubb		T. Granite		T. Todilto		T.	
T. Drinkard		T. Delaware Sand		T. Entrada		T.	
T. Abo		T. Bone Springs		T. Wingate		T.	
T. Wolfcamp	11,230'	T. Morrow	12,440'	T. Chinle		T.	
T. Penn.		T. Morrow Classtics		T. Permian		T.	
T Cisco (Bough C)		T. @	12,687'	T. Penn. "A"		T.	

XXXXXXXXXXXX XXXXXXXX GAS SANDS OR ZONES

No. 1, from	11,750'	to	11,820'	No. 4, from	13,022'	to	13,343'
No. 2, from	12,759'	to	12,764'	No. 5, from		to	
No. 3, from	12,938'	to	12,958'	No. 6, from		to	

IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from ..... to ..... feet. .....

No. 2, from ..... to ..... feet. .....

No. 3, from ..... to ..... feet. .....

No. 4, from ..... to ..... feet. .....

FORMATION RECORD (Attach additional sheets if necessary)

From	To	Thickness in Feet	Formation	From	To	Thickness in Feet	Formation
0	90	90	Surface - Redbed	9640	10698	1058	Lime, Shale
90	408	318	Redbed, Sand, Gravel	10698	10746	48	Chert, Shale, Lime
308	1326	918	Redbed, Anhydrite	10746	11250	504	Shale, Lime
1326	3146	1820	Anhydrite	11250	11378	128	Shale, Lime, Sand
3146	3690	544	Anhydrite, Salt	11378	11621	243	Shale, Lime
3690	4075	385	Sandstone	11621	11759	138	Shale
4075	4255	180	Dolomite	11759	11854	95	Lime
4255	4586	331	Sand, Dolomite	11854	11926	72	Lime, Chert
4586	4718	132	Lime, Sand, Dolomite	11926	11947	21	Lime
4718	5532	814	Sand, Lime	11947	11970	23	Lime, Shale
5532	5577	45	Lime, Dolomite	11970	12070	100	Lime, Sand, Shale
5577	6021	444	Sand	12070	12169	99	Shale
6021	7071	1050	Lime, Sand	12169	12542	373	Shale, Lime
7071	7429	358	Sand, Lime, Shale	12542	12565	23	Shale
7429	7808	379	Shale, Lime	12565	12584	19	Lime, Shale
7808	7948	140	Shale	12584	12593	9	Shale, Lime, Chert
7948	9268	1320	Shale, Lime	12593	12613	20	Shale
9268	9640	372	Lime	12613	12764	151	Shale, Lime

(CONTINUED)

3 - NMOCC - Santa Fe
1 - Midland
1 - Hobbs File

NEW MEXICO OIL CONSERVATION COMMISSION

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Form C-122
Revised 9-1-65

Type Test: [XX] Initial [ ] Annual [ ] Special — Test Date: 2-13-78

Company: GETTY OIL COMPANY	Connection: NOT AVAILABLE
Pool: GAMMA RIDGE MORROW	Formation: MORROW
Unit:	

Completion Date	Total Depth	Plug Back TD	Elevation	Lease Name
2-6-78	13,381	13,360	3608.2 GL	GETTY "2" STATE

Csg. Size	Wt.	d	Set At	Perforations	Well No.
5"	18.0	4.276	13,379	From 12,759' To 13,322'	1

Tbg. Size	Wt.	d	Set At	Perforations	Unit	Sec.	Twp.	Rge.
2-3/8"	4.7	1.995	12,638	From To	F	2	22-S	35-E

Type Well – Single – Bradenhead – G.G. or G.O. Multiple	Packer Set At	County
SINGLE	12,638'	LEA

Producing Thru	Reservoir Temp. °F	Mean Annual Temp. °F	Baro. Press. – P_a	State
TUBING	183 @ 13,322	60	13.2	NEW MEXICO

L	H	Gg	% CO_2	% N_2	% H_2S	Prover	Meter Run	Taps
12,638'	12,638'	0.609	0.32	0.26	-	-	4"	FLANGE

	FLOW DATA				TUBING DATA		CASING DATA		
NO.	Prover Line Size X Orifice Size	Press. p.s.i.g.	Diff. h_w	Temp. °F	Press. p.s.i.g.	Temp. °F	Press. p.s.i.g.	Temp. °F	Duration of Flow
SI	4" X 1.5"				6467	58	PACKER		SI 78 Hr
1.	4" X 1.5"	630	10.2	95	4350	65			4.0"
2.	4" X 1.5"	640	19.0	94	2800	64			4.5"
3.	4" X 1.5"	600	28.0	92	1760	61			3.5"
4.	4" X 1.5"	630	31.0	92	1000	60			4.0"
5.									

RATE OF FLOW CALCULATIONS

NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P_m	Flow Temp. Factor Ft.	Gravity Factor Fg	Super Compress. Factor, Fpv	Rate of Flow Q, Mcfd
1	10.84	80.20	643.2	.9952	1.281	1.046	1159
2.	10.84	111.40	653.2	.9963	1.281	1.049	1617
3.	10.84	131.03	613.2	.9990	1.281	1.046	1901
4.	10.84	141.21	643.2	1.0000	1.281	1.049	2057
5.							

NO.	P_t	Temp. °R	T_r	Z
1.	6.49	555	1.45	0.877
2.	4.24	554	1.45	0.752
3.	2.67	552	1.44	0.755
4.	1.59	552	1.44	0.830
5.				

Gas Liquid Hydrocarbon Ratio _____ Mcf/bbl.
A.P.I. Gravity of Liquid Hydrocarbons _____ Deg.
Specific Gravity Separator Gas 0.609 XXXXXXXXX
Specific Gravity Flowing Fluid XXXXX
Critical Pressure 671 P.S.I.A. _____ P.S.I.A.
Critical Temperature 362 R _____ R

P_c 6480.2 P_c^2 41,993

NO	P_t^2	P_w	P_w^2	$P_c^2 - P_w^2$
1		4358.4	18995.7	22997.3
2		2816	7929.9	34063.1
3		1790.5	3205.9	38787.1
4		1063.7	1131.5	40861.5
5				

(1) $\frac{P_c^2}{P_c^2 - P_w^2} = 1.233$ (2) $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 1.215$

AOF = Q $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 1965$

Absolute Open Flow 1965 Mcfd @ 15.025 | Angle of Slope θ _____ | Slope, n 0.928

Remarks: _____

Approved By Commission:	Conducted By:	Calculated By:	Checked By:
	GETTY OIL COMPANY	M. Y. MERCHANT	DALE R. CROCKETT

(Signed) DALE R. CROCKETT

Form C-105
Revised 11-1-78

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OPERATOR		

NEW MEXICO OIL CONSERVATION COMMISSION
WELL COMPLETION OR RECOMPLETION REPORT AND LOG

3-NMOCC-HOBBS
1-R. J. STARRAK-TULSA
1-A. B. CARY-MIDLAND
1-FILE
1-MYH, EXGR.
1-BELCO-MIDLAND
1-SOUTHLAND-MIDLAND
1-MESA-MIDLAND
1-BH, FIELD CLERK

5a. Indicate Type of Lease: State [X] Fee [ ]

5. State Oil & Gas Lease No.: L-723

1a. TYPE OF WELL: OIL WELL [X] GAS WELL [X] DRY [ ] OTHER Dual

b. TYPE OF COMPLETION: NEW WELL [X] WORK OVER [ ] DEEPEN [ ] PLUG BACK [ ] DIFF. RESVR. [ ] OTHER

7. Unit Agreement Name: -

8. Farm or Lease Name: Getty "35" State

2. Name of Operator: Getty Oil Company

9. Well No.: 1

3. Address of Operator: P. O. Box 730, Hobbs, New Mexico 88240

10. Field and Pool, or Wildcat: Wolfcamp / Grama Ridge Morrow

4. Location of Well: UNIT LETTER K LOCATED 2310 FEET FROM THE South LINE AND 1650 FEET FROM

THE West LINE OF SEC. 35 TWP. 21S RGE. 34E NMPM

12. County: Lea

15. Date Spudded	16. Date T.D. Reached	17. Date Compl. (Ready to Prod.)	18. Elevations (DF, RKB, RT, GR, etc.)	19. Elev. Casinghead
3-15-78 (w)	10-25-78	10-11-78 Wolfcamp 1-3-79 Morrow	3675.8 GR	-

20. Total Depth	21. Plug back T.D.	22. If Multiple Compl., How Many	23. Intervals Drilled By	Rotary Tools	Cable Tools
13,355	13,265	Dual	→	810'-13,355'	0-810'

24. Producing Interval(s), of this completion — Top, Bottom, Name

10,810-10,828 Wolfcamp - Oil
12,907-13,102 Morrow - Gas

25. Was Directional Survey Made: Yes

26. Type Electric and Other Logs Run: BHC, CNL-FDC; DLL; and Dipmeter 13,100-10,832',
Cement Bond Log: & PFC - Schlumberger

27. Was Well Cored: Yes

28. CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT LB./FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
20		29	24	3 yds. Ready Mix	
13 3/8	48	398	16	950 sxs Cement Circ.	
10 3/4	51,45.5 & 40.5	4496	12 ¼	2750 sxs Cement Circ.	575 sxs circ.
7 5/8	39,33.7 & 29.7	10832	9 ¼	1955 sxs	

29. LINER RECORD

SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN
5"	10,389	13,354	575 sxs	

30. TUBING RECORD

SIZE	DEPTH SET	PACKER SET
2 3/8	10,187	10,187
Dual 2 3/8	12,200	12,200

31. Perforation Record (Interval, size and number)

Wolfcamp: 10,810,12,14,16,18,20,22,24,26, & 28' = 10 (.36") holes.

Morrow: 12,907,09,11,14,16,18,20,22,24; 13,071,81,85,92,94,98,100, & 102 = 17 (.36") holes

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL	AMOUNT AND KIND MATERIAL USED
10,810-28' (Wolf.)	5000 gals. MOD 202 15% - 15 ball sealers.

33. PRODUCTION

Date First Prod.	Production Method (Flowing, gas lift, pumping - Size and type pump)	Well Status (Prod. or Shut-in)
Wolfcamp 11-10-78 Morrow 1-3-79	Flowing Flowing	Producing Producing

Date of Test	Hours Tested	Choke Size	Prod'n. For Test Period	Oil - Bbl.	Gas - MCF	Water - Bbl.	Gas - Oil Ratio
Wolfcamp 11-15-78	24 hrs.	20/64"	→	600	1,153	799	1921/1
Morrow 1-8-79	4 Pt.	Various		-	-	-	-

Flow. Tubing Press.	Casing Pressure	Calculated 24-Hour Rate	Oil - Bbl.	Gas - MCF	Water - Bbl.	Oil Gravity - API (Corr.)
Wolfcamp 1765#	Packer	→	600	1,153	799	44.6
Morrow 4400#	Packer		-	AOF 11,107	-	

34. Disposition of Gas (Sold, used for fuel, vented, etc.): Sold

Test Witnessed By:

35. List of Attachments: Deviation Schedule & 4 Point Test

36. I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.

SIGNED Dale R. Crockett TITLE Area Superintendent DATE 1-25-79

INSTRUCTIONS

This form is to be filed with the appropriate District Office of the Commission not later than 20 days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radioactivity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. This form is to be filed in quintuplicate except for state land, where six copies are required. See Rule 1105.

INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

Southeastern New Mexico				Northwestern New Mexico			
T. Anhy		T. Canyon		T. Ojo Alamo		T. Penn. "B"	
T. Salt		T. Strawn	11,682'	T. Kirtland-Fruitland		T. Penn. "C"	
B. Salt		T. Atoka	(Lime) 12,151'	T. Pictured Cliffs		T. Penn. "D"	
T. Yates	4,160'	T. Miss		T. Cliff House		T. Leadville	
T. 7 Rivers		T. Devonian		T. Menefee		T. Madison	
T. Queen		T. Silurian		T. Point Lookout		T. Elbert	
T. Grayburg		T. Montoya		T. Mancos		T. McCracken	
T. San Andres		T. Simpson		T. Gallup		T. Ignacio Qtzte	
T. Glorieta		T. McKee		Base Greenhorn		T. Granite	
T. Paddock		T. Ellenburger		T. Dakota		T.	
T. Blinebry		T. Gr. Wash		T. Morrison		T.	
T. Tubb		T. Granite		T. Todilto		T.	
T. Drinkard		T. Delaware Sand		T. Entrada		T.	
T. Abo		T. Bone Springs	8,342'	T. Wingate		T.	
T. Wolfcamp	(Shale) 10,070'	T. Morrow cl.	12,800'	T. Chinle		T.	
T. Penn.		T. Morrow	12,907'	T. Permian		T.	
T. Cisco (Bough C)		T. Rustler	1,724	T. Penn. "A"		T.	

OIL OR GAS SANDS OR ZONES

No. 1, from 10,810 to 10,832 No. 4, from 13,069 to 13,102

No. 2, from 11,778 to 11,836 No. 5, from ____ to ____

No. 3, from 12,733 to 12,924 No. 6, from ____ to ____

IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from None to ____ feet. ____

No. 2, from ____ to ____ feet. ____

No. 3, from ____ to ____ feet. ____

No. 4, from ____ to ____ feet. ____

FORMATION RECORD (Attach additional sheets if necessary)

From	To	Thickness in Feet	Formation	From	To	Thickness in Feet	Formation
			(See Attached Sheet)				

EXHIBIT V

NEW MEXICO OIL CONSERVATION COMMSSION
MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Form C-122
Revised 9-1-65

Type Test: [x] Initial [ ] Annual [ ] Special				Test Date: 1-23-79	
Company: Getty Oil Company		Connection: Llano, Inc.			
Pool: Grama Ridge Morrow		Formation: Morrow			Unit: -
Completion Date: 1-3-79	Total Depth: 13,355'	Plug Back TD: 13,265'	Elevation: 3675.8 GL		Farm or Lease Name: Getty "35" State
Csg. Size: 5" / Wt.: 18.0 / d: 4.276 / Set At: 13,355		Perforations: From 12,907 To 13,102			Well No.: 1
Tbg. Size: 2 3/8" / Wt.: 4.7 / d: 1.995 / Set At: 12,200		Perforations: From - To -			Unit: K / Sec.: 35 / Twp.: 21-S / Rge.: 34-E
Type Well – Single – Bradenhead – G.G. or G.O. Multiple: Morrow Gas/Wolfcamp Oil - Dual		Packer Set At: 10,187'/12,200'			County: Lea
Producing Thru: Tubing	Reservoir Temp. °F: 175° 13,352	Mean Annual Temp. °F: 60	Baro. Press. – P_a: 13.2 psia		State: New Mexico

L	H	Gg	% CO_2	% N_2	% H_2S	Prover	Meter Run	Taps
12,200	12,200	0.599	0.592	0.511	-	-	3"	Flange

NO.	FLOW DATA: Prover Line Size X Orifice Size	Press. p.s.i.g.	Diff. h_w	Temp. °F	TUBING DATA: Press. p.s.i.g.	Temp. °F	CASING DATA: Press. p.s.i.g.	Temp. °F	Duration of Flow
SI					5970	57	Packer	-	SI 92 hrs & 15 min
1.	3" x 1.75" 4/64"	490	10	85	5500	64	-	-	30 min.
2.	3" x 1.75" 6/64"	500	21	84	5200	64	-	-	45 min.
3.	3" x 1.75" 8/64"	505	34	83	4775	63	-	-	45 min.
4.	3" x 1.75" 12/64"	530	62	83	4400	64	-	-	30 min.
5.									

RATE OF FLOW CALCULATIONS

NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P_m	Flow Temp. Factor Ft.	Gravity Factor Fg	Super Compress. Factor, Fpv	Rate of Flow Q, Mcfd
1	20.15	70.94	503.2	.9768	1.292	1.040	1876
2.	20.15	103.81	513.2	0.9777	1.292	1.040	2748
3.	20.15	132.74	518.2	0.9786	1.292	1.049	3547
4.	20.15	183.52	543.2	0.9786	1.292	1.045	4886
5.							

NO.	P_t	Temp. °R	T_t	Z
1.				
2.				
3.				
4.				
5.				

Gas Liquid Hydrocarbon Ratio _____ Mcf/bbl.
A.P.I. Gravity of Liquid Hydrocarbons _____ Deg.
Specific Gravity Separator Gas _____ XXXXXXXXX
Specific Gravity Flowing Fluid XXXXX _____
Critical Pressure 671 P.S.I.A. _____ P.S.I.A.
Critical Temperature 362 R _____ R

*P_c 7468.2 P_c^2 55.774

NO	P_t^2	P_w *	P_w^2	$P_c^2 - P_w^2$
1		6969.2	48.570	7.204
2		6538.2	42.748	13.026
3		6405.2	41.027	14.747
4		5829.2	33.980	21.794
5				

(1) $\frac{P_c^2}{P_c^2 - P_w^2} = 2.559$ (2) $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 2.273$

$AOF = Q\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 11,107$

Absolute Open Flow 11,107 Mcfd @ 15.025 | Angle of Slope θ _____ | Slope, n .874

Remarks: *Pc & Pw from bottom hole pressure recorder @ (-9329) 13005'

Approved By Commission:	Conducted By:	Calculated By:	Checked By:
	M.Y. Merchant	M.Y. Merchant	D. R. Crockett

API # 30-025-26236

DISTRIBUTION

NEW MEXICO OIL CONSERVATION COMMISSION

Form C-101
Revised 1-1-65

SANTA FE
FILE
U.S.G.S.
LAND OFFICE
OPERATOR

OCC-HOBBS - 1 - File
1-Roy-Starrak-Tulsa - 1 - Well, Eagle
1-A.B. Cary-Midland - 1 - Foreman
1-Gil, Field Clerk

5A. Indicate Type of Lease
STATE [X] FEE [ ]

5. State Oil & Gas Lease No.
LG-6004

APPLICATION FOR PERMIT TO DRILL, DEEPEN OR PLUG BACK

1a. Type of Work
DRILL [X] DEEPEN [ ] PLUG BACK [ ]

b. Type of Well
OIL [X] GAS [ ] SINGLE [ ] MULTIPLE [ ] WATER [X]

7. Unit Agreement Name

8. Farm or Lease Name
GRAY "36" STATE COM

2. Name of Operator
GETTY OIL COMPANY

9. Well No.
1

3. Address of Operator
P.O. BOX 730, HOBBS, NEW MEXICO 88240

10. Field and Pool, or Wildcat
GRAMA RIDGE

4. Location of Well
UNIT LETTER F LOCATED 1650 FEET FROM THE NORTH LINE AND 1650 FEET FROM THE WEST LINE OF SEC. 36 TWP. 21-S RGE. 34-E

12. County
LEA

19. Proposed Depth
13,400

19A. Formation
MORROW *

20. Rotary or C.T.
ROTARY

21. Elevations (Show whether DF, RT, GR, etc.)
3674' GL

21A. Kind & Status Plug. Bond
BLANKET

22. Approx. Date Work will start
2-17-79

PROPOSED CASING AND CEMENT PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	SACKS OF CEMENT	EST. TOP
17"	13-3/8"	48	1160'	1630	SURFACE
12-1/4"	9-5/8"	36	5600'	2400	SURFACE
8-1/2"	7"	26	11700'	1500	5000'
6-1/8"	4-1/2"	11.6	13400'	600	11500'

1. The above casing program will be used to drill and test the Morrow formation, and any other possible productive zones. A BOP equipment and system will be used, and mud weight will be gradually increased from 8.5#/gallon to 13.0#/gallon if necessary.

2. See attachments for BOP's and choke manifold.

* Deepest Zone will be Morrow - well could be dual in either Morrow-Strawn; or Morrow-Wolfcamp, depending on the productivity.

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM IF PROPOSAL IS TO DEEPEN OR PLUG BACK, GIVE DATA ON PRESENT PRODUCTIVE ZONE AND PROPOSED NEW PRODUCTIVE ZONE. GIVE BLOWOUT PREVENTER PROGRAM, IF ANY.

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

Signed DALE R. CROCKETT Title AREA SUPERINTENDENT Date February 12, 1979

(This space for State Use)

APPROVED BY [signature] TITLE SUPERVISOR, DISTRICT II DATE FEB 14 1979

CONDITIONS OF APPROVAL, IF ANY:

/sh

cc: NMOCC
R.J. Starrak-Tulsa
A.B. Cary-Midland
1-File
1-Foreman

NEW MEXICO OIL CONSERVATION COMMISSION
WELL LOCATION AND ACREAGE DEDICATION PLAT

Form C-102
Supersedes C-128
Effective 1-1-65

All distances must be from the outer boundaries of the Section

Operator	Lease	Well No.
Getty Oil Co.	Getty "36" State	1

Unit Letter	Section	Township	Range	County
F	36	21 South	34 East	Lea

Actual Footage Location of Well:
1980 feet from the North line and 1650 feet from the West line

Ground Level Elev.	Producing Formation	Pool	Dedicated Acreage
3674.1		Grama Ridge	640 Acres

1. Outline the acreage dedicated to the subject well by colored pencil or hachure marks on the plat below.

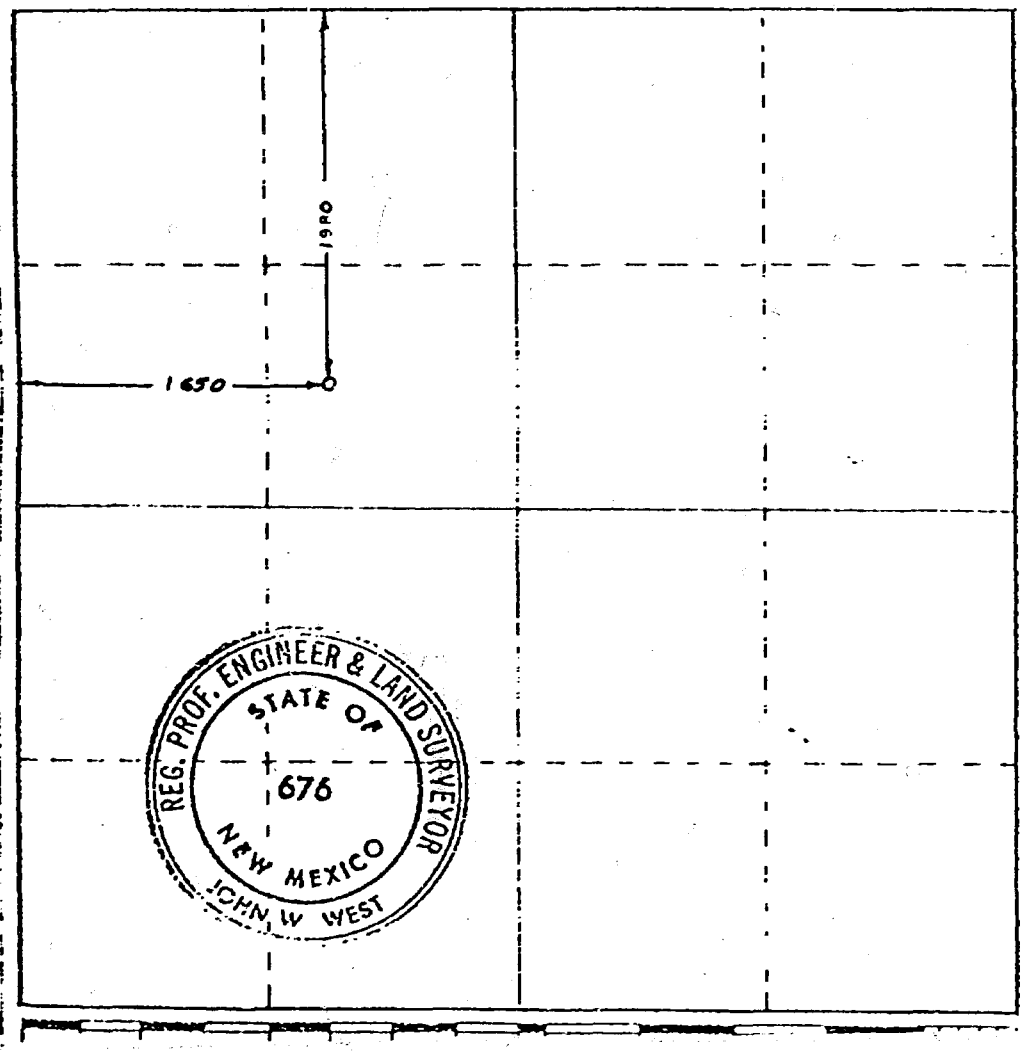
2. If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).

3. If more than one lease of different ownership is dedicated to the well, have the interests of all owners been consolidated by communitization, unitization, force-pooling, etc?

[XX] Yes [ ] No If answer is "yes," type of consolidation Communitization

If answer is "no," list the owners and tract descriptions which have actually been consolidated. (Use reverse side of this form if necessary.) _____

No allowable will be assigned to the well until all interests have been consolidated (by communitization, unitization, forced-pooling, or otherwise) or until a non-standard unit, eliminating such interests, has been approved by the Commission.



CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief

ORIGINAL SIGNED BY
DALE R. CROCKETT

Name: Dale R. Crockett

Position: Area Superintendent

Company: Getty Oil Company

Date: February 12, 1979

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed: February 7, 1979

Registered Professional Engineer and/or Land Surveyor

Certificate No. John W. West

DATA SHEET

Getty Two State Well No. 1
Gramma Ridge Morrow Field
Pressure Buildup Test No. 1
February 14-17, 1978

Horner Plot of the captioned test is attached. The interpretation of this plot is as follows;

1. No boundaries are present.
2. The plot reflects a two-layer reservoir performance.
3. The P*, initial reservoir pressure, is 8,270 psig.

Summary of Kh calculations:

1. The stabilized production rate was 1798 MCF/D or 320,214 B/D.
2. Gas viscosity was 0.03484 cp.
3. Bg, reservoir gas volume factor, was 2.79 $(10)^{-3}$ ft/SCF.
4. Horner Plot slope is 75 psi/ cycle.
5. Kh is 67.5 md.-ft.
6. K based 33' net pay is 2.0 m.d.

Tight

Conclusion:

1. No boundary is indicated.
2. Permeability is moderate.
3. The reservoir parameters in the area of the wellbore should efficiently deplete a 640 acre proration unit.

can't calculate

what are the producable reserves attributable to this well?

DATA SHEET

Getty Two State Well No. 1
Gramma Ridge Morrow Field
Pressure Buildup Test No. 2
December 9-12, 1978

Horner Plot of the captioned test is attached. The interpretation of this plot is as follows;

1. No boundaries are present.
2. A single-layer reservoir type plot is shown as compared to a two-layer type indicated by pressure buildup test No. 1.
3. P*, reservoir pressure, was 7850 psig compared to test No. 1 P* of 8270 psig, or a decrease of 420 psi.

RHP

Summary of Kh Calculations:

1. The stabilized production rate was 1,527 MCF/D or 271,950 Bbls. gas/D.
2. Gas viscosity was 0.03323 cp.
3. Bg, reservoir gas volume factor, was $(2.85)(10)^{-3}$ ft^3/ft^3
4. Horner Plot slope is 57 psi/cycle
5. Kh was 73.5 md. ft.
6. K based on 33 net feet pay is 2.2 m.d.

Conclusions:

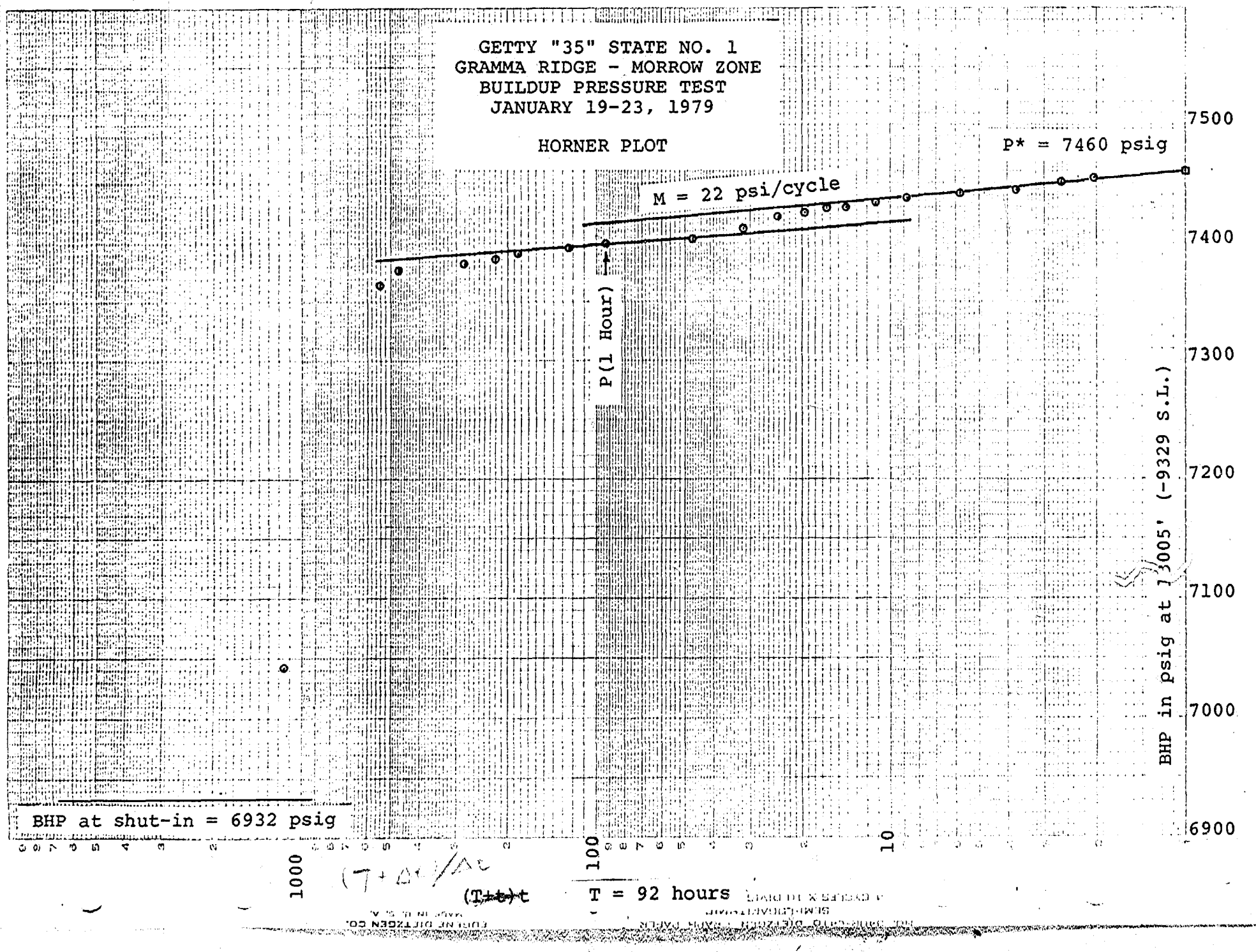
1. No boundary is indicated.
2. The permeability is moderate and slightly increased as compared to the previous buildup test.
3. The reservoir parameters in the area of the wellbore should efficiently deplete a 640 acre proration unit.

420,000 mcF in 10 months + drop 420 psi - indicates less than 640 -

Ex 12

GETTY "35" STATE NO. 1
GRAMMA RIDGE - MORROW ZONE
BUILDUP PRESSURE TEST
JANUARY 19-23, 1979

HORNER PLOT



DATA SHEET

Getty "35" State Well No. 1
Gramma Ridge - Morrow Field
Pressure Buildup Test No. 1
January 19-23, 1979

Horner Plot of the captioned test is attached. The interpretation of this plot is as follows;

1. No boundaries are present.
2. The plot reflects a two-layer reservoir performance.
3. The P*, initial reservoir pressure, is 7,460 psig.

Summary of Kh calculations:

1. The stabilized production rate was 1437 MCF/day or 255,922 Bbls./Day.
2. The gas viscosity is 0.03224 cp at reservoir conditions.
3. Bg, reservoir gas volume factor, is 2.88×10^{-3} cuft./SCF
4. Horner Plot slope is 22 psi/cycle.
5. Kh is 175.6 m.d. - ft.
6. Based on 32 productive feet, permeability is 5.5 m.d.

Conclusions:

1. No boundary is indicated.
2. Permeability is good, being greater than calculated for Getty Two State Well No. 1
3. The reservoir parameters in the area of the wellbore should efficiently deplete a 640 proration unit.
4. The lower initial pressure at the Getty "35" State reflects pressure communication with the Getty Two State.

BHP
What was Pi at
#2 at Time
35 completed?

TABULATION OF PRODUCTION
GRAMA RIDGE MORROW FIELD

		Condensate Bbls.	Gas MCF
Getty "2" State Well No. 1	May, 1978		488
	June		44,926
	July	294	54,354
	Aug.	497	53,410
	Sept.	367	[illegible]
	Oct.	355	48,991
	Nov.	364	45,131
	Dec.	476	43,649
	TOTAL	2,353	330,023
	Jan.	515	51,769
	Feb.	339	47,600*
CUM. (3-1-79)		3,207	429,392

CURRENT PRODUCTION RATE

1700 MCFPD, 17 BC, 7/64" ch., 3175 psi T.P.

4-15

GETTY OIL COMPANY
GETTY TWO STATE NO. 1
GRAMMA RIDGE MORROW FIELD
LEA COUNTY, NEW MEXICO

GAS PRODUCED

GAS PRODUCTION - MCF/MONTH

100

10

Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

19 78 | 19 79 | 19 80 | 19 81 | 19 82

TABULATION OF PRODUCTION
GRAMA RIDGE MORROW FIELD

		Condensate Bbls.	Gas MCF
Getty "35" State Well No. 1	Nov. 1978	1,732	3,109
	Dec.	0	0
	TOTAL	3,419	3,109
	Jan.	121	22,015
	Feb.	1,566	87,164*
CUM. (3-1-79)		3,419	112,588

CURRENT PRODUCTION RATE

3962 MCFD, 18 BC, 52 BW, 10/64" ch., 4700 psi T.P.

*Estimated based on current rate.

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
State Land Office Building
Santa Fe, New Mexico
14 March 1979

EXAMINER HEARING

IN THE MATTER OF:

Application of Llano, Inc. for rescission of pool rules, Lea County, New Mexico.

CASE 6496

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: Lynn Teschendorf, Esq.
Legal Counsel for the Division
State Land Office Bldg.
Santa Fe, New Mexico 87503

For the Applicant: Donald C. Cox, Esq.
MADDOX, MADDOX, & COX
Hobbs, New Mexico

For Getty Oil Co.: William F. Carr, Esq.
CAMPBELL AND BLACK
Jefferson Place
Santa Fe, New Mexico 87501

I N D E X

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
3020 Plaza Blanca (505) 471-2462
Santa Fe, New Mexico 87501

E X H I B I T S

MR. NUTTER: Call next Case Number 6496, which is the application of Llano, Inc. for rescission of pool rules, Lea County, New Mexico.

Call for appearances.

MR. COX: My name is Donald C. Cox, Maddox, Maddox, and Cox, Attorneys, in Hobbs, Mr. Examiner. I appear on behalf of Llano. I have one witness to call, at this time.

MR. CARR: May it please the Examiner, my name is William F. Carr, Campbell and Black, P. A., Santa Fe, appearing on behalf of Getty Oil Company, and I have one witness.

MR. NUTTER: Will you proceed, Mr. Cox?

MR. COX: Yes. Mr. Klaar, would you be sworn, please?

MR. NUTTER: Do you have a witness?

MR. CARR: Yes, I do.

(Witnesses sworn.)

AL KLAAR

being called as a witness and having been duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. COX:

Q. Would you state your name and address for the record, please?

A. My name is Al Klaar. I live at 600 West Cielo in Hobbs, New Mexico.

Q. What is your present occupation, Mr. Klaar?

A. I'm presently employed by Llano, Incorporated, as Manager of Engineering.

Q. Have you previously testified before the Commission or Division in hearings?

A. No, sir, I have not.

Q. Would you give the Hearing Officer your educational background that enables you to testify as an expert witness?

A. Yes. I graduated with a Bachelor's of Science degree in petroleum engineering in 1964 from the New Mexico School of Mines at Socorro. I worked as a -- right thereafter I worked as a drilling and production engineer for PanAmerican Petroleum Corporation, later known as Amoco, for ten years.

In 1974 I went to work for Llano as an engineer.

In 1975 I was promoted to my present position.

Q. Has all of your experience been in the southeastern New Mexico area?

A. Yes, sir. The fifteen years of experience that I have in the oil and gas industry has strictly been in southeast New Mexico.

Q. Have you had experience with the Morrow sands both in your previous employment and at Llano?

A. Extensive experience, yes, sir.

Q. Are you familiar with the Grama Ridge Morrow Gas Field and the surrounding areas which are the subject matter of this application?

A. Yes, I am.

MR. COX: Are the witness' qualifications acceptable?

MR. NUTTER: Yes, they are.

Q. (Mr. Cox continuing.) Are you familiar with Llano's application in this case?

A. Yes, sir.

Q. Would you briefly state what Llano seeks to accomplish by this application?

A. Llano, under Case Number 6496 wishes the Oil Conservation Division to consider rescinding the Grama Ridge-Morrow Pool rules, which are on the books at this time. These rules, by the way, came into being, I understand, in November, 1965.

These rules further call for 640-acre spacing in the Grama Ridge-Morrow Pool. The applicant, Llano, pro-

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poses that said pool be redeveloped and operated under 320-acre spacing and well location requirements.

Q. Would you refer to Exhibit A and identify it, please?

A. Exhibit A, labeled Area Map of the Grama Ridge-Morrow Gas Field, indicates those wells outlined in yellow which have 640 acres assigned and are on the books as being in the Grama Ridge-Morrow Gas Pool at this time.

I think the Commission is aware that a well in -- Getty's well in Section 35 was part of the nomenclature hearing just one or two hearings previous to that.

I would like to point out that the two wells indicated as open circles in Section 28 of 21 South, 34 East, the Pogo well, wherein some testimony was just presented in the previous case, as of the time of the construction of this exhibit we were not aware whether they had completed a Morrow well or not, so we have it indicated as a drilling well which has been permitted to the Morrow formation.

I further want to point out that the well in Section 36, a Getty well, is, as far as we know, in the process of drilling to the Morrow right now.

Q. The Grama Ridge-Morrow Field is outlined in yellow on this exhibit, is that correct?

A. Yes, sir, it is. There is a further

delineation of Section 33 and 34 in Township 21 South, Range 34 East, and Section 3 and 4 in Township 22 South, Range 34 East, showing that those four wells are part of the Grama Ridge-Morrow Unit, operated by Llano Incorporated as an underground gas storage unit, or project, if you please.

Q. Would you refer to Exhibit B --

A. I think I might want to stay a little while longer on Exhibit A, if you don't mind.

Q. Add anything you want.

A. The indication here is, and please let me stress that the Commission has Llano's four wells in 33, 34, 3, and 4, as Grama Ridge-Morrow Pool wells, and Llano's well in Section 10 as a Grama Ridge-Morrow Pool well, and I understand that if a previous hearing is considered favorably, 35 will be more than likely added in as a Grama Ridge-Morrow Pool well.

I do wish to point out the fact that the well in Section 2, the Getty Two State, has been completed, and is completed and producing from a zone completely separate from any of the other wells that are represented by Exhibit A.

MR. NUTTER: Now you mean another zone in the Morrow or another formation?

A. I wish to point out that Llano looks at that

as the Getty Two State is completed in the Atoka Zone.

MR. NUTTER: You don't consider it a Morrow well at all, then?

A. No, sir. The accepted and readily defineable wells, as subsequent testimony will show, in looking at logs we have an interval, or we have a top, which is not only defined in the Grama Ridge-Morrow Pool, it's also defined in pools to the south and to the west, it is known as the top of the Morrow Clastics.

All wells, except the well in Section 2, have produced, are having gas injected, or are producing from zones, Morrow Sand zones, which are below the top of the Morrow Clastics.

I wish to further point out that the well in Section 2, known as the Getty Two State, if one looks at the record filed with the Commission, one has the idea that that well is also producing from there, but I wish to set the record straight.

The well was perforated in zones, sand zones, below the Morrow Clastics, and production was hoped to be initiated in those zones, and Llano personnel witnessed the fact that those zones were unable to give up any gas, and they were not plugged but the zone up above in the Atoka was perforated and produced and had an initial bottom hole pressure in excess of 8200 pounds.

Q. (Mr. Cox continuing.) Anything further to add regarding Exhibit A, Mr. Klaar?

A. No, sir.

Q. Would you please refer to Exhibit B and identify that and explain the general features thereof?

A. Exhibit B, labeled Structural Contours on Top of Morrow Clastics, is Llano's interpretation of how the structure on top of the Morrow Clastics appears throughout this area.

The noteworthy features are as follows: We agree with previous testimony of Pogo that there is a deep-seated fault on the west side, actually the fault runs from southwest to northeast, and it does cross the area between Pogo's well in Section 28 and our well in Section 33.

We further think that this deep-seated fault comes up through the Morrow and we further agree with Pogo that there's a good possibility it does not cut the Strawn, but the Strawn is really draped over this area.

I wish to further point out that through evidence, some of it to be presented later, we interpret a fault on the -- running just about through the middle of the structure, but running approximately north-south through Llano's Section 10, Llano's Section 3, and Llano's Section 34, indicating to us that we have a storage system of four

wells, an underground gas storage system of four wells, on the upthrown side of two faults.

If you will note, we interpret the logs of the fault on the east to be downthrown to the east; the fault on the west to be downthrown to the west; and in between is sandwiched Llano with its four underground gas storage wells.

Q. In your opinion, and based on these faults that you've located on Exhibit B, do you anticipate that there is primary recovery available in the east half of Section 34 and the east half of Section 3?

A. My interpretation of the structure, as indicated thus far, indicates to me that that is the case.

Q. Is it also your opinion that because of the faults, that you also anticipate that the old wells, by that I mean the wells in 33 and 34, 4 and 3, that are part of the unit, have drained no more than approximately 320 acres?

A. I will so now state that I wish to present further testimony to the fact that this is the case, yes.

Q. Is it one of the other exhibits that you're referring to?

A. Yes, one of the subsequent exhibits.

Q. Okay, good. What data did you look at to arrive at your opinion about the location of the fault through

Sections 34, 3, and 10?

A. Data obtained from other operators in the area, in fact, two other operators in the area indicated to us that this is the case, that there is a fault, seismic data, by the way, that this is the case that there is a fault running through 34, 3, and 10.

Q. Okay, on down into 15 and up into 27, 26?

A. Yes, sir.

Q. Is there any other information you wish to make available to the Division related to Exhibit B?

A. Only the fact that the points plotted on this structural contour plat are readily identifiable and are known as the top of the Morrow Clastics on any electric log one wishes to consult.

Q. Would you then please refer to Exhibit C, identify it, and point out the pertinent items shown thereon?

A. In the mid-portion of Exhibit C, on the bottom, you will see a small scale reproduction of the area, to indicate just what this cross section, better known as Exhibit C, cross section of the Grama Ridge-Morrow Gas Field, just where we have taken this and constructed this cross section.

Q. Is that cross section identified as a line between A and A prime?

A. Yes, sir, it certainly is.

Q. All right. Continue, please.

A. Going back to the previous exhibit and realizing that we wish to structurally show what is happening, we have brought the Pogo well from 28 down to the straight line which we chose as our cross section, being the well, our well in Section 33, our well in Section 34, and Getty's 35 State in Section 35.

Prominent features in this cross section to be noticed are as follows, and as previously testified to by one or two other people:

At the juncture of the cross section crossing the fault, we interpret that Pogo has a 600-foot throw downward on the top of the Morrow Clastics, as compared to our well in Section 33.

The two main features, of course, or two main tops shown,are the top of the Morrow Clastics and the top of the Barnett Shale, which is synonymous with the base of the Morrow.

Going further east we interpret, based upon structure, the fact that going from Llano's Grama Ridge-Morrow Unit No. 2 Well in Section 34 eastward to Getty's 35 State we encountered this east fault, as Llano likes to term it, with a 225-foot throw downward to the east, resulting in part, as further evidence will show, subsequent evidence

will show, again the fact that Llano is sitting between two faults with its four wells, and that Pogo is sitting separate and that the Getty 35 is -- is also separated from us by a fault.

I wish to take just a minute if I can, the fact, the thing I brought out on Exhibit A, I wish to check one point, if the Examiner will allow me about thirty seconds.

MR. NUTTER: Sure.

A. Mr. Examiner, I just realized that I would have liked to have pointed out where the Getty Two State is completed, the well in Section 2 down there, but I just realized that my cross section as I've got it here as Exhibit C does not go quite far up high enough for me to show that on this Exhibit C, so I'm sorry I --

MR. NUTTER: What is the perforated interval on the Getty Two State?

A. I have that. If you will give me half a minute I think I can locate it.

Mr. Examiner, I have perforations on Getty's Two State, but I'm afraid I have it a subsea depth. I do not have it in actual footage.

MR. NUTTER: Well, Mr. Bosecker, do you have that?

MR. BOSECKER: I sure do.

MR. NUTTER: You're going to be testifying in a minute, aren't you?

MR. BOSECKER: Yes.

MR. NUTTER: Okay, we'll get those perforation intervals when he testifies.

A. Thank you, sir.

Q. Is there anything else, Mr. Klaar, that you wish to add regarding Exhibit C?

A. No, sir, there is not.

Q. Okay.

A. I think Mr. Bosecker could really tell us where that well is perforated.

Q. Okay. Is it a fair summary of your testimony to this point that Exhibits A, B, and C support the development of 320-acre spacing because of separations due to structure and fault?

A. I think up to this point, yes, sir, and I wish to go to further exhibits to prove my point.

Q. All right. If you will refer to Exhibit D and identify it and point out the relevant features to the Examiner.

A. Exhibit D identified and labeled as BHP Histories, Grama Ridge-Morrow Gas Field, identifies the bottom hole pressures -- actual bottom hole pressures measured and obtained on four wells. The blue circle is the

Grama Ridge-Morrow Unit No. 1. The purple triangle is the Grama Ridge-Morrow Unit No. 2, both operated by Llano. The red diamond is the Getty Two State No. 1, and the yellow square is the Getty 35 State No. 1.

As testified in a previous case, correctly, the Grama Ridge Unit No. 1 and No. 2 were drilled and operated initially by Shell and bottom hole pressures obtained by them, and this plat has a scale on the left of the bottom hole pressures in psig versus a time scale on the bottom, starting with 1965 and going to the present.

You will note that at the end of '65 and beginning of 1966 GRM Unit No. 1 and No. 2 Wells had initial bottom hole pressures in the range of -- or at 7611 for the No. 1 Well, and 7682 psig for the No. 2 Well.

We have further a further bottom hole pressure on each well toward the end of 1966, showing that with production, primary production, the wells, each well's bottom hole pressure declined.

The primary production history or period of these two wells terminated in April of 1973. To bring you up to date, in November of 1972 Llano purchased not only these two wells but also the other two wells that are now storage wells, with the idea of initiating underground gas storage.

At the time that injection for purposes of

underground gas storage commenced, the first well -- was actually in April of 1973 -- actual bottom hole pressures were obtained, and I wish to point out that at that time the Grama Ridge-Morrow Unit No. 1 had a bottom hole pressure of 548 pounds. Grama Ridge-Morrow Unit No. 2 had a bottom hole pressure of 378 pounds.

Continuing on the time scale and going to the right, we are now in the storage history, or storage portion of the reservoir.

You will note that in 7-6-77 and '78, having injected sufficient gas into the underground storage reservoir to just about half fill the reservoir, we were very interested in what bottom hole pressures we were running into. I'd also like to admit we were very interested in knowing what the bottom hole pressure was when offset operators started drilling offset wells to the same horizon.

You will further see that the red diamond up there indicating that the Getty Two State had a bottom hold pressure, as we were informed, of 8224 psig at datum, on February 14th, 1978, and the Getty 35 State had initial bottom hole pressure of 7455 psig on January 13th, 1979.

I think it's relevant to point out that the Getty Two State had initial bottom hole pressure five to six hundred pounds higher than any initial well had at any

time drilled out there to the Grama Ridge-Morrow Pool.

The second thing to point out is the fact that the Getty 35 State had initial bottom hole pressure of 7455, clearly indicating to Llano that it was completed in a separate reservoir; that there was no communication between the Getty 35 and any of our storage system wells.

Q. Are all of the points plotted on Exhibit D from actual measured bottom hole pressure?

A. Yes, sir, they certainly are. We have lots of surface shut-in pressure data, but that could have been interpreted as distortion, so only bottom hole -- measured bottom hole pressures are plotted here on Exhibit D.

Q. Are the points assigned to Getty Two State No. 1 and Getty 35 State No. 1 shown to scale on Exhibit D?

A. Yes, sir. Exhibit D is plotted to scale.

Q. Any other comments you wish to make regarding Exhibit D?

A. No, sir.

Q. I direct your attention to what's been marked as Exhibit E, and ask if you will identify it and make comment as you deem appropriate to the Hearing Examiner.

A. Exhibit E is Llano's attempt to show what Llano thinks was the actual drainage area of wells in the Grama Ridge-Morrow Pool.

If I might digress just a half a minute,

Mr. Examiner, at the time a well is drilled, management is always very interested in knowing how much are you going to make from this well. Here we have a case of where we have four wells, Grama Ridge-Morrow Units 1, 2, 3, and 4, where management doesn't ask that question any more because they know exactly how much it made. The wells were depleted.

So, half of our -- or a portion of our materials/bouds equation doesn't leave much doubt in calculating drainage area. We identify it, though, as follows:

We show how much primary gas production these wells have made on the first line. We show how much primary oil production was made. We, under note number one, we take this condensate production and convert it to equivalent Mcf at the rate of 3500 cubic feet per stock tank barrel.

Now we also have some small numbers under the first three wells, the GRM Units No. 1, 2, and 3, which are labeled Remaining Primary Reserves.

At the time we approached the State to enter into a unit agreement for purposes of storing gas, State might have had us over a barrel, and they said you've still got 21,000 Mcf remaining in there even though you only have 548 pounds bottom hole pressure, and they told us we still had the same amount in the No. 2. We were also informed that we had 318,519 Mcf remaining in the No. 3 at the time

we included it into the storage unit.

The Federal government, under GRM Unit No. 3, agreed with us that it was depleted.

Q. Was that No. 4 instead of No. 3, Mr. Klaar?

A. I want to say No. 4, yes, sir. The Federal government under GRM Unit No. 4 agreed with us that the well was depleted and the 2.6-billion, as indicated under the first line there, was the total amount that the well had made.

We add up these primary gas production figures, equivalent Mcf due to condensate production, the remaining primary reserves, to obtain the ultimate producable reserves line. We applied an 80 percent recovery efficiency, which for the Morrow in southeast New Mexico is a reasonable number, to obtain the original gas in place; therefore arriving at a number of 8.8-billion cubic feet for the No. 1; 7.5 for the No. 2; 2.7 for No. 3; 3.4, or 3.3, for No. 4; 1.9 for Llano's Government "A" Well in the Section 10.

Now I don't wish to mislead the Examiner, but on the Getty 35 we had to use a completely different approach, since the Getty 35 first started producing a month and a half ago. Llano had to use its expertise in being an intrastate gas pipeline and having more than 100 wells connected to it, and having followed the progress of production of these wells on a day-by-day basis, we have ana-

lyzed the resultant data submitted to us on the Getty 35, specifically being the 4-point pressure test, which ended up with, if I remember correctly, 11.1 calculated absolute open flow.

Experience has shown Llano that an 11.1 -- any absolute open flow obtained in the Morrow whereby the 4 points line up in a straight line and fall on a slope between point 5 and point 1, as we would want them to, experience has shown Llano that approximately 55 percent of a calculated absolute open flow is the initial stable maximum rate that the Morrow well will flow.

MR. NUTTER: What percent?

A. 55 percent.

That brings us to the fact that -- we looked at the Getty 35 and we came to a conclusion that the well initially stabilized would flow 6-million a day. I wish to point out to the Commission that in this instance Llano is also the transporter of gas, so we know day-by-day what the well has made, and it has made in the range of 3.9 to 4.1 million a day since -- since it was connected to the line or system.

To continue, though, further with -- with how we arrive at the -- at our estimate of reserves that can be attributed to the Getty 35 State, experience has shown Llano further that once a stabilized initial rate in

a Morrow well is obtained, thereafter the well will decline at a yearly rate of 35 percent per year.

So applying not only our 55 percent factor to the calculated absolute open flow as obtained -- as Getty obtained, but the 35 percent decline rate, we have come to the conclusion that the Getty 35 will actually produce 5-billion cubic feet plus 70,000 Mcf due to consideration for liquid production.

Applying the 80 percent recovery efficiency results in a figure of 6.337-billion cubic feet original gas in place as our estimate for this well.

Q. Did you hear the testimony previously given that the Getty 35 is an exceptional well?

A. Yes, sir, I heard that.

Q. And what is your opinion related to the Getty 35 Well?

A. The Getty 35 is a good well. It is not an exceptional well, in my opinion.

Q. Would you continue with Exhibit E, please?

A. Do you want me to expound on why I think that?

Q. Yes, if you'd like to. If you'd like to, go ahead.

A. In my estimation the Getty 35 falls into

the category, as I said, of 55 percent reduction from a calculated absolute open flow. A normal well in the Morrow will end up making between 2 to 3-1/2 billion cubic feet. Anything above that I classify as good.

An exceptional well in the Morrow will make in excess of 14 to 15 billion cubic feet, and I'm sure some of us know of some of these wells.

So I don't wish to haggle about what's good and exceptional, but I think the Commissioner -- the Examiner ought to realize what I classify as good and exceptional.

I wish to go on here and point out the fact that the column way on the right was averaged, considering that we are talking about here in Exhibit E, we're talking about six wells. We averaged the figures to come up with a resultant figure of 5.1 billion cubic feet per well to be the average original gas in place in the six wells considered.

To continue downward in Exhibit E, we have done an extensive study of the mechanisms and the net sand pays and have come to the following conclusions that we can assign as indicated, the net thickness or net -- thickness of the net productive sands, as indicated per well there, an average, weighted average porosity also is indicated individually per well. From core analysis, production and production data, mainly from our four wells, which were just about at the depletion point when we initiated injection,

we have concluded that the initial water saturation, the average formation water saturation, is 30 percent.

From past records we have found out and are listing the initial reservoir pressures per well. From past records, also, we have given you here the initial reservoir temperatures, as we have done with the specific gravity from gas analysis on record, and the supercompressability factor identified as Z, is nothing more than interpolation of the critical temperatures and pressures from published data.

The result of going and applying the material balance equation on a per well basis and trying to -- and figuring out drainage area is this, we indicate and think that the GRM Unit No. 1 drained approximately 358 acres. We think the GRM Unit No. 2 drained 407 acres. We're of the opinion that the No. 3 drained only 248 acres, and the No. 4, 285.

We think Llano's Government A has a good chance of draining 461 acres, but we also think that the Getty 35 State will only drain 262 acres.

Again, averaging the bottom half of this Exhibit E results in averaging thickness per well, the weighted average porosity per well, the pressure, and so on, the result being that after you average out these figures for the six wells that are demonstrated here, the

average well drained no more than 327 acres.

Q. If you -- what result would you get if you did assign extra credit to the Getty 35?

A. If one assumes that the 5-billion cubic feet that Llano looks forward to transporting from the Getty 35 out of the Morrow is actually low, and one goes and assumes, therefore, 8-billion cubic feet is what the well will make, utilizing the same data you come to the conclusion, or you calculate, that 331 acres is what the well will drain.

If you up that and say the well will actually make 10-billion cubic feet and run it through the figures, then run it through the same formula, you come to the conclusion that the well will drain 414 acres.

MR. NUTTER: How many cubic feet would you have to have if you're going to say 640?

A. We -- I don't have a calculator handy, but it would be --

MR. NUTTER: You didn't calculate that?

A. From there on it would be proportional. It would be approximately 13 or 13-1/4 billion cubic feet.

MR. NUTTER: And then you would have that -- you still wouldn't have an exceptional well by your --

A. No, sir, by my criteria you would have a very good well, an excellent well, but you would not have

an exceptional well.

MR. NUTTER: Still short of exceptional.

A. I think exceptional wells are wells such as the Indian Basin Cisco, one or two wells that are -- I'm sure that you're aware of, that were drilled in '58, which have cumulatives of 27-28 billion cubic feet.

MR. NUTTER: Some of the Carlsbad wells.

A. Or maybe even 40-billion cubic feet.

MR. NUTTER: Some of the Carlsbad wells.

A. Right.

Q. (Mr. Cox continuing.) Do you have anything else that you wish to add with regard to Exhibit E?

A. Yes. I do wish to add the fact that the net productive thickness, the average porosity, all of the parameters, all of the production in Exhibit E, has come and has only been considered from the top of the Morrow Clastics marke on down. None of these wells produce anywhere above the top of the Morrow Clastics zone.

VOIR DIRE EXAMINATION

BY MR. NUTTER:

Q. Now, while we're here on this exhibit, Mr. Klaar, you attributed 5-billion cubic feet to the Getty 35 No. 1 on the top line there.

A. Yes, sir.

Q. Now that 5-billion was derived by taking the absolute open flow, taking 55 percent of that, declining it at the rate of 35 percent.

A. That's correct.

Q. Is this a common practice with you in making analysis of how much gas you're going to obtain -- how much gas Llano is going to obtain from a well when you connect it?

A. This is a common practice after reviewing the 4-point test. First of all,in looking at a 4-point test the percent drawdown in reaching the highest point, meaning the highest volume point, is considered.

If 4 points, during this 4-point test, are achieved and the well flows several million cubic feet rate per day with only a 10 percent reduction, or a 15 percent reduction from shut-in wellhead pressure, a stabilized shut-in wellhead pressure for 72 hours prior to that, then we do not look at it the same way. But if that fourth point or the points decline to where the flowing pressure is less than 80 percent of the shut-in pressure, then we apply -- then we apply this formula here, because experience has shown us that any other type of material balance equation we use, and we try to justify on the basis of 80 feet of pay, et cetera, or 120 feet of net pay, after viewing an initial calculated absolute open flow, can lead you very

astray, and I'm specifically talking about instances where -- that have occurred where an initial absolute -- I mean calculated absolute open flow of 28-million came about and was published and was put into the public record, and the well was put on line and after producing 93-million cubic feet total -- now that's 93,000 Mcf -- the well was dead. It has 37 feet of net pay.

But if at the time the engineer would have looked at the fact that the fourth rate achieved on this calculated absolute -- or 4-point back pressure test, if he would have looked at it and seen that the fourth rate flowed at a wellhead pressure of something like 550 pounds, I think he would have realized that something was wrong.

Q. Okay, well now, when this Getty 35 No. 1 was tested, was the flowing pressure on the fourth point less than 80 percent of the shut-in pressure?

A. I will have to get the data to answer that question.

Yes, sir, I have it here. The shut-in pressure, as recorded on the Getty 35 State in the Morrow, was 7468. The flowing pressure on the fourth point was 58 -- what a minute, this is an absolute here, so it's 7468.2, and the fourth point was 5829.2.

Q. What percent was that?

A. It comes out to 78 percent, Mr. Examiner.

Or a drawdown of 22 percent, another way of looking at it.

You realize that we're talking in terms of being connected to -- two-thirds of the wells that Llano is connected to are Morrow wells. There is interpretation involved. One person might choose 85 percent or 15 percent drawdown as his swingover point; another might choose 20 percent.

In fact, I lean towards the 20 percent myself, and it indicates 22 percent.

Q. Now, this 327 acres that you've got here on the average well, is that an average of these figures across here, or is that calculated for these parameters here coming down?

A. That is an average of the figures, if I remember correctly, of the figures coming down.

Let me think a minute.

Q. It's calculated? Coming down here?

A. The individual parameters going into the formula were averaged.

Q. I don't know if mathematically it will make any difference. It probably shouldn't.

A. I don't know, either, but as I remember it, it was calculated on the basis of the average, sir.

Q. So you had all these average parameters and you calculated 327.

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A. Right. Right.

MR. COX: Are there any further questions, Mr. Examiner?

MR. NUTTER: No, no.

DIRECT EXAMINATION CONT'D

BY MR. COX:

Q. Mr. Klaar, do the producing sands in the Getty 35 State look similar to the producing sands in GRM Unit 1 and No. 2?

A. Yes, sir, they do. This is the -- this is, of course, one of the conclusions, or one of the reasons that Llano came to a conclusion that there is a better than even chance of having a fault between our wells and the Getty 35, because we have taken the Morrow sands below the top of the Morrow Clasic and we have identified them and broken them down into A through E zone, and it turns out that the main producing zone in the Getty 35 looks very similar and appears at the same place that our Morrow Zone A appears.

Q. Because they are similar would you -- would the reserves tend to be the same, also?

A. I would tend to think and in my opinion, I would think that the Getty 35 would end up being very close in producing history as some of our better wells, namely,

the Morrow -- GRM Unit No. 1 and GRM Unit No. 2.

Q. Would you restate the reserve figures from the Exhibit for the record, please?

A. Actually produced gas only from the GRM Unit No. 1 was 6.997-billion and from the GRM Unit No. 2, 5.897-billion.

Q. And for the Getty 35?

A. For the Getty, this compares to our estimate that the Getty 35 will produce 5.0-billion cubic feet.

Q. Anything further you wish to add related to Exhibit E?

A. No, sir, that's it.

Q. Were Exhibits, Llano's Exhibits A through E, inclusive, prepared by you or under your supervision?

A. Yes, they were.

MR. COX: Mr. Examiner, we offer Llano Exhibits A through E, inclusively.

MR. NUTTER: Exhibits A through E will be admitted in Case 6496.

Q. Mr. Klaar, in your opinion will the granting of Llano's application prevent waste, promote conservation, and protect the correlative rights of the parties involved?

A. Yes, sir, it certainly will, and in fact, it will also help us in one of our obligations, an obligation that we have.

Q. What obligation is that, please?

A. It becomes obvious, of course, after checking our exhibits here, that we think the east half of Section 34 and the east half of Section 3 are productive of primary gas in the same interval as we're storing gas.

Upon finalizing a unit for the purposes of storing gas in the Morrow below the top of the Morrow Clastics with the State of New Mexico, relevant to Section 3 in Township 22 South, Range 34 East, and Sections 33 and 34 in Township 21 South, Range 34 East, we signed a unit agreement, which is on file, which states in part that we have the obligation that any offset operator comes in and drills a well capable of producing primary oil or gas, and this is not gas coming from our storage unit, then we are obligated to offset that production, under -- under this unit agreement.

Q. For the record, is that paragraph fourteen of your unit agreement with the State of New Mexico?

A. Yes, sir, I'm reading from a document now called Unit Agreement for the Operation of the Grama Ridge-Morrow Unit Area, Lea County, New Mexico, which is dated the 25th day of April, 1973.

In part, on page twelve, Section 14, it states under the main heading of Drainage, "In the event a well or wells producing oil or gas in paying quantities should

be brought in on land adjacent to the unit area, draining unitized substances from the lands embraced therein, unit operator shall drill such offset well or wells as a reasonably prudent operator would drill under the same or similar circumstances."

Q. Is that unit agreement on file with the State Land Office?

A. Yes, sir, it is.

MR. COX: Pass the witness.

MR. NUTTER: Are there any questions of the witness?

MR. CARR: I have a few.

MR. NUTTER: Mr. Carr.

CROSS EXAMINATION

BY MR. CARR:

Q. Mr. Klaar --

A. Yes, sir.

Q. --what we consider an excellent well you may consider an excellent well. That's sort of like possible versus probable probable potash.

A. I thought I made it clear with what my interpretation was, sir.

Q. As I look at your Exhibit Number B --

A. Okay.

Q. -- you have a gas storage unit, which is limited on both the east and the west by faults, is that correct?

A. That's our latest interpretation.

Q. And that, in essence, is the core of what was originally the Grama Ridge-Morrow Pool, is that also correct?

A. Correct, with the inclusion of Section 10, and I wish to point out --

Q. Right.

A. -- that Section 10 is not a storage well at this time.

Q. Okay. Is it your testimony that these wells effectively isolate this area, seal it off, from both the acreage to the west and the acreage to the east? Is that your testimony?

A. Yes, sir.

Q. Now, in terms of this fault on the east side, how precisely can you place it? Could it be 100 feet either direction from the line? I just don't know, and how precise a line can you draw?

A. In placing the fault where I did, I wish to point out that this is -- this is the conclusion I and the people that have worked on this have drawn.

Whether this fault is 100 feet or 300 feet

to the west or to the east could be -- could be very possible.

Q. But this is -- this is where you would -- where you estimate the fault actually lies?

A. Yes, sir, this is where we estimate.

Q. It's an estimate?

A. Yes, sir.

Q. I'd like to direct your attention to Exhibit Number E. Now, across the bottom of the table you have calculated drained acreage -- or area, acres.

A. Right.

Q. Now, based on this table, is your testimony that the Llano Grama No. 1 in fact drained 358 acres?

A. My testimony is that based on a known number, which was the total production from the well, and my estimates of the parameters I need for the material -- material bounds equation to find out how much acreage I've drained, yes, we think, and I think, that 358 acres is all that the No. 1 Well drained. Correct.

Q. Likewise the No. 2 drained 407; the No. 3, 248, and so forth?

A. That is correct. Now, I wish --

Q. So these are actual acres drained.

A. Well, I don't know how I'm ever going to be able to prove it to you, because I'm using estimates for

net thickness; I'm using a weighted average porosity.

Q. Okay. Now, let me take you back to your Exhibit Number B.

A. Yes.

Q. If this -- if the faults, for the purpose of this testimony, are precisely where you've placed them, there would be acreage in Section 33 that could not be drained by the No. 3 Well, is that correct?

A. That is correct. There is -- to us it indicates that there is as much as half -- now are you talking about Section 3 or 33, I'm sorry.

Q. 33, where the --

A. 33, okay, yes, it inidicates that there's as much as half of that section which was not drained in the Morrow, that's correct.

Q. Because of that fault.

A. Sir?

Q. Because of that fault?

A. Because of that fault.

Q. And the same would apply in Section 34, that there is acreage to the east of the fault that couldn't be drained by the No. 2 Well.

A. That is correct.

Q. Well, how many acres would you guess there are in this area between the two faults that could be

drained by the four wells in Sections 33, 34, 3, and 4? I mean just a guess.

A. Well, let's see. Well, the conclusion I have reached, really, is that the four wells that in 1965, November, 1965, were assigned 640 acres by the pool rules being established at that time, that for all practical purposes 320 per well, or a total of 1280 acres, as far as our storage system is concerned, plus or minus a few acres, is essentially all that they ever drained.

Q. Okay, now the question that I have for you is that if the fault wasn't in 33, might the No. 3 Well have drained more than just the 240 acres which you say it actually drained?

A. No, sir.

Q. Why not?

A. Because the way I came to the 248 acres is I did not regard where that 248 acres was. For all I know, is that 248 acres is cigar-shaped and runs for three miles.

Q. If we could assume that it's -- the acreage you're draining lies within your storage unit by that well, I would ask you if you could give me an estimate of how many acres are in Sections 33, 34, 3, and 4, which are within your storage unit and which could be drilled by the four wells that are drilled and completed in those four sections?

A. I think an addition, if you will give me just a minute, --

Q. Sure.

A. -- an addition of these numbers here will get me the number I'm after, or that you're after.

I would estimate that roughly 1300 acres in the following sections between the two faults: Sections 33, 34, 3, and 4 were productive between the two faults, and contributed to the primary production of these four wells prior to injection.

Q. You said 1300?

A. Yes, sir.

Q. Would you total for me the number of acres that were drilled by the No. 2, 3, and 4, and 1 Wells?

A. 2, 3, 4, and 1?

Q. The four wells that lie -- the four storage wells, the ones in Sections 33, 34, 3, and 4.

MR. NUTTER: Now, Mr. Carr, you mean what would the sum of the acreage drained as per Exhibit Number E be?

MR. CARR: That is correct.

MR. NUTTER: In other words, you want the sum --

MR. CARR: Of the acreage that was drilled by the No. 1, No. 2, No. 3, and No. 4 Llano Grama Unit Wells.

A. That addition comes out to 1298 acres.

Q. That's out of the 1300 that were available, according to your testimony, is that correct?

A. I gave you an estimate of 1300. I did not go into detail.

Q. Okay. Now, if these could be cigar-shaped areas that are being drained, would you have put a storage unit in whereby that you could drain from sections miles away gas you are injecting?

Does that make sense that you would?

A. I think I can best answer your question by saying that Llano didn't have much choice. Llano needed a storage unit between a gas pipeline, as Llano is, between the major volume that we move during the winter versus other volumes that we move during the rest of the year, there is no way we could contract sufficient gas.

We studied the area and we came to a conclusion that, and this was a preliminary conclusion, and believe it or not, sometimes we have worried about having come to this preliminary conclusion, that these four wells were a field unto themselves, and when offset operators started drilling, I tell you, there were white knuckles, because of this very same thing that you've brought out. What if the area that is productive, it does not lie right around the wellbore but is lenticular, like we know and

suspect that all Morrow is, and what if a well gets drilled 2-1/2 miles away from the boundary of the gas storage unit and all of a sudden for no reason our pressure goes to pot.

Q. Is it still your position that the Grama Ridge-Morrow Storage Unit is a single storage unit?

A. Yes, sir, and I could be proven wrong tomorrow if somebody comes in and drills a well in the southwest quarter of Section 27 and hits our storage unit.

Q. But as of this date no such well has been drilled, is that correct?

A. No such well has been drilled, correct, and I think as you have -- also as Getty has amply testified in a previous case, Getty agrees with the fact that they did not drill into our storage system.

Q. Do you agree with that?

A. Wholeheartedly.

Tomorrow I might say something else.

Q. It's my understanding you would go to 320-acre spacing, is that correct?

A. Yes, sir, that is our desire.

Q. That would free up the west half of 34 for you to drill a well, I believe you testified.

A. The west half of 34?

Q. I'm sorry, the east half.

A. It would free up the east half, yes, sir.

Q. Now, under --

A. There's one thing to be pointed out, and I think the Examiner might correct me on this, we have four wells in the present Morrow Pool. Now, I think that if it changes to 320 acres, those four wells, they each got to have 320 acres assigned to it, is that correct, Mr. Examiner?

MR. NUTTER: Yes, sir.

Q. Mr. Klaar, are you familiar with the circumstances surrounding the drilling of the initial two wells in the Grama Ridge-Morrow Unit?

I believe they're the No. 2 and the No. 3.

A. No, sir, I am not familiar, but I wish to state that I think it's the No. 4 Well, the Federal Well in Section 4 that was the first well that was ever drilled in the field.

Q. All right, and then the No. 1.

A. And then I think it was the No. 1. At that time I was not associated with either Shell or Llano, and I'm sorry, I'm not in detail familiar with what happened during the time these wells were drilled.

Q. Would it surprise you to learn that there was immediate pressure response between the two wells when the No. 1 was finally produced?

A. No, sir, that would not surprise me at all.

Q. Showing communication between those two?

A. One thing that -- that has not been presented by Llano is the fact that the storage unit, the underground gas storage unit, exists as follows:

The No. 1 and the No. 2 Wells are injection and withdrawal wells.

The No. 3 and the No. 4 Wells are just withdrawal wells.

So it does not surprise me at all that since the pressure came up in 3 and 4 after I injected into the 1 and 2, no, sir, that does not surprise me.

Q. If your application is granted and special pool rules are rescinded, how close could you drill to the east line of Section 34 and still be at a standard location?

A. Okay, keeping in mind the fact that we would have to assign 320 acres to every existing well, we would be talking about an east half proration unit in Section 34, which, if the Commission would see fit to rescind the 640 rules and go to the statewide 320, we would then be operating under the statewide 320, which allow you to be 660 feet from the side, that's the closest distance, 1980 feet from the end, which would be the north and south end of the proration unit, and I think it further states to be 330 feet away from the inside quarter quarter section.

So, to answer your question, 660 feet away from the east line of Section 34 would be the closest that we

could legally come.

Q. Now how close could you drill to a side boundary under the present special pool rules?

A. I don't have a copy of that available, but I think it is 1650 feet, based upon 640-acre spacing.

Q. So by rescinding the rules an orthodox location moves 990 feet --

A. Further east.

Q. -- further east?

A. Yes, sir.

Q. Okay.

A. That is correct.

Q. Do you believe that in a situation where you were drilling -- you have a producing well 660 feet from the line in Section -- from the east line in Section 34, and you're offset by a well drilled at an orthodox location, which was 1650 feet from the west line of Section 35, do you believe you'd have a situation where you would -- all the drainage that would occur in Section 35 from your well would be compensated for by drainage from the well drilled in Section 35?

A. I don't know if I quite understand your question. Are you referring to the fact that we are 660 feet off of the lease line versus Getty being 1650 feet off the lease line, and is your question, if I might rephrase

it, that we will get as much by that fact, or I don't understand the rest of the question?

Q. My question is when you drill a well like this, it naturally drains not just a square 320, or a rectangular 320 acres.

A. Right.

Q. So it's draining adjoining properties. If everyone drills wells under uniform spacing rules, what you drain in an adjoining lease ought to be compensated for by counter-drainage from the offsetting well.

A. Okay.

Q. Do you believe when you're 660 feet from a line and the offsetting well is 1650, that the drainage you are -- that the property you're draining is being compensated for by counter-draining from the offsetting well?

A. Well, if -- if you equate the two wells, our well at 660, Getty's at 1650, and say they started producing at the same time, then I would certainly love to have our well at 660. That answers your question.

The fact of the matter is that the Getty 35 is now producing and started producing on the 14th of January, 1979, and we have not even had a chance to build a location yet, so who is draining who?

Q. Well, under the present rules, you have had a well, though, on the offsetting section.

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A. I have had a well which never drained what Getty 35 is producing from, and I have a well which is not draining what the Getty 35 is producing from.

Q. Do you believe, though, that if from the date that you start to produce, that the drainage from your well will be compensated for by counter-drainage by Getty? In their 35 Well?

A. That is really hard to say. The first thing I believe is that -- that I think the main producing zone in the Getty 35 will appear in a well on the east section of 34. I'm not trying to say it won't appear. By that time I also expect the well in the east half of 34 to encounter that formation at less of an initial pressure than what the 35 encountered, which was 7455.

Q. You're certainly not saying here today that by drilling with one well in 35 at an orthodox location and dedicating 640 acres to it, Getty gained any advantage on you, are you?

A. No, sir.

Q. Now let me ask you about this fault again.

Suppose it falls 300 feet west -- or east, I'm sorry, east, and I'm talking about the easternmost fault, the one that runs through Section 34, suppose it falls 300 feet to the east of where you have drawn it.

A. Uh-huh.

Q. Is that possible?

A. It's possible.

Q. If you drilled this section 1650 feet from the east line, is it possible that you could fall on the west side of that fault?

A. Yes, sir, that is very possible.

Q. So the fault could even move over to within 1650 feet of the east line of Section 34.

A. I wish to point out that this fault, as indicated through Section 34 and Section 3, was obtained after being only allowed to look at other people's, other operators' seismic data, and I wish to further point out that we wanted to purchase that seismic data and it was unavailable, so whether this is -- this fault is located right down the middle of 34 or whether it's located on the middle of the east half of 34, I just wish to state that this is my interpretation.

Q. Okay, now, if it were in the middle of the east half of 34, and that's possible, I guess, is that right?

A. A lot is possible.

Q. Is that possible?

A. Yes, sir.

Q. How many productive acres would you have in 34 that you could dedicate to a well?

A. You would probably end up with -- if under your assumption the fault ran in the east half, or through the middle of the east half of 34, you'd probably only have half the productive acres.

Q. You might only have a 160.

A. There is that possibility.

Q. In that situation do you believe that you would -- that Getty would see the drainage of your productive acreage in 34 equal to what you would be draining from Getty in 35?

A. I would hate to speculate on it.

Q. I won't ask you to.

A. It still depends on porosity, thickness of pay, and all of the rest of the parameters that I went through on Exhibit E.

You are trying, you know, I am trying to give you a cut and dried answer, but it's impossible for me to say.

Q. I appreciate that.

If you fall on the west side of this fault in 34, could that well be of some value to you in your storage project?

A. As far as the storage project goes, yes, it could be of some value. That's right.

MR. CARR: I have nothing further.

(There followed a discussion off the record.)

MR. NUTTER: We will continue the hearing in Case 6496 until 9:00 o'clock a. m. tomorrow morning.

(Hearing continued.)

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(REPORTER'S NOTE: Thereafter and on the 15th day of March, 1979, the hearing was continued, as follows, to-wit:)

MR. NUTTER: The hearing will come to order. We'll now resume with Case Number 6496. I believe that Mr. Cox had finished your direct case yesterday afternoon?

MR. COX: We did, Mr. Nutter, however just at the end of the direct case we read a paragraph from a unit agreement between Llano and the State of New Mexico into the record.

Would you prefer that the entire unit agreement be made part of the record or perhaps that page?

MR. NUTTER: We have a copy of the unit agreement in our file, Mr. Cox.

MR. COX: All right.

MR. NUTTER: And you have read that particular paragraph into the record here, so if there's ever any need to, we can retrieve the unit agreement.

MR. COX: I see, so we won't bother making it further a part of this record.

MR. NUTTER: That's correct.

MR. COX: Thank you. Yes, we are now through.

MR. NUTTER: Mr. Carr?

MR. CARR: I would at this time call Chris Bosecker.

CHRIS BOSECKER

being called as a witness and having been previously sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. CARR:

Q. Will you state your name for the record, please?

A. Chris Bosecker.

Q. Mr. Bosecker, where do you reside?

A. Midland, Texas.

Q. By whom are you employed and in what position?

A. Getty Oil Company, Lead Reservoir Engineer for the Midland E & P District.

Q. Have you previously testified before this Commission, had your credentials accepted and made a matter of record?

A. Yes, I have.

Q. Are you familiar with the subject matter of this case?

A. Yes, I am.

MR. CARR: Mr. Examiner, are the witness' credentials acceptable?

MR. NUTTER: Yes, they are.

Q. (Mr. Carr continuing.) Mr. Bosecker, does your area of responsibility include the Grama Ridge-Morrow Pool?

A. Yes, it does.

Q. Will you refer to what has been marked for identification as Exhibit Number One and explain to the Examiner what it is and what it shows?

A. Exhibit Number One is simply a land map of the Grama Ridge-Morrow area in Lea County, New Mexico, as of March, '79, to the best of our knowledge.

The scale is one inch equals 2000 feet.

Q. Does this reflect the Getty wells drilled to the west of the Grama Ridge-Morrow Pool?

A. It reflects two Getty wells that have been drilled on the east flank of the Grama Ridge-Morrow Field, and one Getty well that is now drilling in Section 36.

Q. Have you been involved with the drilling of both of these wells?

A. Yes, I have.

Q. Mr. Bosecker, as the background for the testimony you're about to give, so that we can keep things sort of in some sort of order, would you briefly summarize

what the general geology is in the area?

A. Well, the Grama Ridge area is located in south central Lea County along the northeastern portions of the northwest shelf. Structurally this area is best described as a broad, anticlinorium associated with a large northeast/southwest down to the basin fault along its western flank.

This anticlinal ridge is most pronounced in Pennsylvanian and older strata, which are also broken up into numerous fault segments. These fault blocks serve as separate hydrocarbon reservoirs for the Lower Pennsylvanian-Morrow Sands.

This large structural feature was present during Pennsylvanian time and had an influence on sedimentation patterns as evidenced by the depositional thinning of the Morrow rocks as they gain structure on the ridge complex.

This structural influence on sedimentation is seen even over individual faults. The Grama area lies on the south end of that anticlinal complex and is well within the porous sand trends of the Lower Morrow Clastic interval.

In the Grama area the Lower Morrow Clastic contains sand units, which are the prime objective of this area. These sands are thought to represent various marine

sand environments associated with deltaic and shallow marine shoal complexes. In other words, the pay interval is relatively continuous as opposed to channel-type deposits of some other Morrow fields.

This interpretation has been supported by the dipmeter log run in Getty 35 State Well No. 1. The sands are characteristically grey to grey-white in color, poor to well sorted, and range from coarse to fine grain. Conglomerate horizons within these sands are common. Porosities range from 5 to 17 percent and average 8 to 11 percent in most commercial producers.

Gas production is primarily related tl stratigraphic entrapment with productivity being enhanced by increased structural position on a given structure.

Q. Mr. Bosecker, please refer to what has been marked as Exhibit Number Two and explain what it is to the Examiner.

A. Exhibit Number Two is a Form C-105 on the Getty Two State Well No. 1. This was the first well drilled by Getty in the Grama Ridge-Morrow Field, completed in February of 1978, located 1980 feet from the north and west boundaries of Section 2.

Q. That is a standard location?

A. Yes, it is.

Q. Please refer to Exhibit Three and explain

this to the Examiner.

A. Exhibit Number Three is a Form C-122, a multipoint back pressure test for a gas well, which was the official test for the Getty Two State Well No. 1, a gas well. Calculated absolute open flow, 1965 Mcf per day.

Q. Mr. Bosecker, I direct your attention to Exhibit Number Four and ask you to explain what this shows.

A. Exhibit Number Four is again a Form C-105, a well completion or recompletion -- a well completion report in this case, for the Getty 35 State No. 1, the second well Getty drilled in the Grama Ridge-Morrow Field. Its well location was 2310 feet from the south line and 1650 feet from the west line of Section 35; drilled and completed recently. The official completion for the Morrow zone was January of '79.

Q. Please refer to Exhibit Five and explain what it shows to the Examiner.

A. Exhibit Number Five is a C-122, a multipoint back pressure test for a gas well, particularly for Getty 35 State No. 1.

The calculated absolute open flow for this well was 11,107 Mcf per day.

MR. MUTTER: Now that's from the Morrow?

A. From the Morrow zone, yes.

MR. NUTTER: Okay. Let's go back to your Exhibit Number One, then, Mr. Bosecker.

I believe the legend on that map is incorrect to that well.

A. The legend.

MR. NUTTER: For that well, it says Morrow 1.1-million. It would be 11.1-million.

A. Yes, I guess it would. Sorry.

MR. NUTTER: Well, you didn't make the map.

A. Well, I should have caught it, though.

MR. NUTTER: Okay, go ahead.

Q. (Mr. Carr continuing.) Mr. Bosecker, you heard Mr. Klaar testify yesterday as to pressures encountered in the gas storage area. How does the pressure in this well compare with those?

A. The pressure of the Getty well, and wells, is higher than the operating pressure that now exists in the gas storage project.

Q. How do you explain this pressure variation?

A. Getty believes that there is a fault that separates the Llano Gas Storage Project from the Getty production.

Q. So you concur with Llano that there is a good possibility of a fault somewhere in the east half of Section 34?

A. I concur with Llano that there is a good possibility that a fault exists, and probably it's in the east half of Section 34, but I am not sure.

Q. Please refer to Exhibit Number Six and what it shows.

A. Exhibit Number Six is a Form C-101, Application to Permit to Drill a Well, and a Form C-102, Well Location and Acreage Dedication Plat. Both of these forms are for the Getty well, which is now drilling in Section 36.

Q. Are you drilling at a standard location?

A. Yes. It's 1980 feet from the north and 1650 feet from the west of Section 36.

Q. How long has Getty been actively exploring the Morrow formation in southeastern New Mexico in this area?

A. Well, at the Grama Ridge-Morrow Field a relatively short length of time. Our first well was drilled and completed, or was completed last year.

Q. And as you are exploring this, in this general area, what are your costs based on?

A. Well costs?

Q. Yes.

A. Well, our economics for exploration in general are developed on 640-acre spacing for exploratory efforts and purposes.

Q. Mr. Bosecker, would you refer to what has been marked for identification as Exhibit Number Seven and explain what it is and what it shows?

Mr. Bosecker, is Exhibit Number Seven the same cross section which was introduced in the Pogo case on March 14th?

A. Yes, it was.

Okay, Exhibit Number Seven is a structural cross section, cutting across the Grama Ridge-Morrow Field in Lea County, New Mexico.

The vertical scale is 1 inch is equal to 100 feet.

This cross section is made up of porosity logs, sonic logs, formation neutron density logs, and they are hung on a structural datum of -9000 feet.

Depicted between the well on the left, the No. 1 Well and the No. 2 Well, is the major down to the basin fault that has been discussed in prior testimony in another case, and then the two wells in the center represent two wells in the gas storage project, and the well to the east, which is on the right, represents the Getty 35 State Well No. 1.

And it shows that there is a probably Morrow displacing fault between the gas storage project wells and the Getty well.

And I believe that this fault separates the project, the storage project, and the Getty well.

Q. Does this fault also reveal other similarities from well to well in the Morrow formation?

A. Yes, I think that it does. There is some sand continuity with varying amounts of production in these intervals, but it does appear to relate sand continuity.

Q. Mr. Bosecker, would you refer to what has been marked as Exhibit Number Eight and explain what it shows?

A. Exhibit Number Eight is a big sheet of paper.

Q. Well, maybe we could put one up on the wall and identify it.

A. Exhibit Number Eight again is a cross section and we made this using the deep well porosity logs, records in the Getty 35 State No. 1 on the left, and the Getty Two State No. 1 on the right.

Again it's hung on a structural datum of -9000 feet, and the purpose of preparing this data and making a cross section, is to illustrate that the sands do have continuity between these two wells, geological continuity.

Q. Mr. Bosecker, would you refer to Exhibits Nine and Ten and explain what they are and what they show?

A. Okay, Exhibit Number Nine is a typical

Horner plot on the Getty Two State Well No. 1, a pressure build-up test run February of 1978.

This is a plot which plots wellbore bottom hole pressure on the left versus the log of T-plus-delta-T over-delta-T on the horizontal. And this was done to determine the reservoir pressure, the initial reservoir pressure in that well.

P* was extrapolated to be 8,270 pounds.

And the data sheet, I'll just touch on -- on some of the key things that this particular Horner plot illustrates. One is that the plot reflects a two-layer reservoir. I'll go back into that in a minute.

Another thing that it illustrates is the initial pressure, 8,270 psi; another thing is the -- that there is no boundary seen in the well. The permeability calculated to be moderate, about two millidarses. The reservoir parameters in the area of the wellbore we thought at this time could deplete a 640-acre proration unit.

Now, there's a little bit more to this. I hadn't planned to go into it, but in the prior testimony it was pointed out that it was witnessed that the lower zone was not contributing a significant amount of hydrocarbons when we perforated an upper section, and I didn't bring all the details. I didn't think that would be discussed, but I would like to point out in this Horner plot,

and from the work and the way this well was completed, we did perforate a lower section, which is in the Morrow Clastic Sand interval, and we treated it with 2500 gallons of 7-1/2 percent NE Acid, perforated it through the tubing with a small jet, and acidized it and attempted to swab it back and the well was not performing at rates sufficient to make a well that we were satisfied with.

Knowing that the othersand also was available, we went ahead and perforated it and then treated both intervals at the same time with another 2500 gallons of 7-1/2 percent NE Acid.

The second -- after the second perforating job that zone initially had higher permeability and contributed more production in the wellbore, and I'd like to add that that can be seen from this Horner plot. I didn't explain how it could be seen, but it's from the lowering effect where you have essentially two -- two straight lines develop and a humping type effect, I guess would be another way to describe it.

After this well was completed Getty elected to immediately offset it, thinking that the lower zone, even though it did not contribute at the rates we had hoped, was commercial, that it hadn't been cleaned up and really, for that matter, hadn't been heavily treated, and we elected to drill a well in Section 25 based upon this information,

and a lot of that basis was this test right here.

Some of our partners did not think we had that good a well, and all of our partners which had rather small interests elected to go nonconsent in this second well, with a 300 percent penalty.

And we drilled the second well, which we -- it was initially completed at a higher rate. The completion procedure on the second well was basically the same plan as on the first well. We intended to perforate the lower section. If we had ample production, we would leave it along at that point. If not, we were going to perforate the upper section. And we perforated the lower section; it was not treated, and the calculated absolute open flow of over 11-million and we're producing it in the second well.

And that's all I have to say about that at this time.

Q. All right. Mr. Bosecker, would you refer to Exhibits Eleven and Twelve and explain what they are?

A. Exhibit Number Eleven is a Horner plot on the same well but taken several months later in December of 1978. Now, as you can see, the humping effect is no longer there, and the reason for that is that the first one was in early transient behavior where we've reached semi-steady state here, and what this means is that the zones -- there

has been sufficient cross flow to where it's behaving as one reservoir.

The well has substantially improved and cleaned up, which we'll show later, from when it was initially completed until this point in time.

Going over a few of the things that -- in the data sheet that are of interest, this particular Horner plot at this time indicates a single layer reservoir, as compared to the two layer indicated before. The P* now is 8,270 psi, a decrease of 420 pounds, which is a result of pressure depletion from production. No boundary is indicated. The permeability calculated out to be moderate and is slightly increased compared to the permeability on the first test. This permeability calculated to be 2.2 millidarses per foot; on the first one it was 2.0, but close, very close.

And, again, we thought that this well could efficiently deplete 640-acre proration unit.

Q. Will you refer to Exhibits Thirteen and Fourteen and explain what they are?

A. Exhibit Number Thirteen, again, is a Horner plot, this time on Getty 35 State Well No. 1 in the Morrow zone. P* is 7,460 psig. Again, in this case it was taken very shortly after completion and it shows an indication of some layering effect.

As far as the data sheet, Exhibit Number Fourteen, I believe, it indicates -- some pertinent points are the plot reflects a two layer reservoir performance, p* 7,460, no boundary is indicated, the permeability is good, being greater than calculated for the Getty Two State, and 5.5 millidarses.

The reservoir parameters in the area of the wellbore should efficiently deplete a 640-acre proration unit, and also P* being 7,460, is a drop in the reservoir pressure on the east side of the fault from what was initially encountered in the Getty Two State of 8,270, and later found in the Getty Two State in December of 7,850, which to me shows that there is north-south communication in the reservoir on the east side of the fault.

Q. Mr. Bosecker, are you aware of evidence which would establish an east-west communication in that general pool -- general area?

A. Yes, I am, from examining previous testimony from previous people, particularly Shell Oil Company, when they asked for field rules back in 1965. They had drilled two wells, the State GRA No. 1 in Section 3, and the GR Federal No. 1 in Section 4, and they ran some reservoir limit tests to determine if this field could be effectively drained on develop of 640-acre spacing.

What they found out was that whoever ran

this test was, they produced the well in Section 3 at a 6-million a day rate for six days, and at the same time they monitored the pressure in the well in Section 4.

Now, this well in Section 4 was 3,645 feet from the other well, and they- received pressure response, or pressure disturbance in 10 hours from the one well to the other well.

Now, that is a rapid time to receive response for that length of time -- or for that distance, and to me that indicates that between those two wells you have good rock characteristics, porosity and permeability, particularly permeability.

Q. And this data is contained in Oil Conservation-- -- is from Oil Conservation Commission Case Number 3337, is that correct?

A. Yes, and that's the case in which Shell testified that they could drain 640 acres.

MR. CARR: We would ask that the Commission take notice of this.

MR. NUTTER: We will take administrative notice of Case Number 3337, I believe you said.

A. That's correct.

Q. Mr. Bosecker, would you refer to your Exhibit Number Fourteen and explain what it is and what it shows? This is Fifteen, I'm sorry; this is Fifteen.

Would you also like to consider Sixteen at the same time?

A. Yes. Yes. Exhibit Number Fifteen is a tabulation of production from the Grama Ridge-Morrow Field in one particular well, the Getty Two State Well No. 1, and it's by months since completion, through February.

And the February gas rate at the time this was prepared was estimated off of the field reports, so it might fluctuate minutely, but it shows the cumulative production as of March 1st, '79 to be already 429-million cubic feet a day -- or cumulative being 429-million cubic feet.

Also, I stated earlier that this well in Section 2 has improved as we had anticipated it would and its current rate is 1,700 Mcf per day, 17 barrels of condensate, flowing on a choke at 764 per inch, and tubing pressure of 3,175 psi.

You can relate that to the 4-point that was introduced earlier and see that that is a substantial improvement and this shows to me that the well is cleaning up, or has cleaned up, and that all or most of the sections are contributing production in commercial quantities.

Q. Now I would direct your attention to what has been marked as Exhibit Sixteen-B, and request that --

A. Is that -- what is that, Sixteen?

Q. The exhibit we previously referred to as Sixteen is Sixteen-A, and we're now going to refer to Exhibit Sixteen-B.

A. Well, Sixteen-A, I haven't discussed, but it --

Q. Just a minute, just a minute, please. The production graph should be Sixteen-A, and I'm getting ready to pass out Sixteen-B. Okay?

A. I want to discuss this first.

Q. Okay.

A. Sixteen-A is simply a plot of production in million cubic feet per month versus time, and it just helps substantiate that the well is performing and it's not declining. It has actually gotten a little better. The wellhead pressure has gone up somewhat.

Q. All right, Mr. Bosekcer, will you now refer to Exhibit Sixteen-B and explain what it is?

A. Sixteen-B is a tabulation of production by months for the Morrow zone in Getty 35 State Well No. 1 that is perforated. Its cumulative is only 112-million, the reason being the well was just potentialed in January and it's just going on stream. It now is flowing at a rate of 3,962 Mcf per day, 18 barrels of condensate on a 10/64th inch choke with a flowing tubing pressure of 4700 psi.

These rates were current some time last week

Q. Now, Mr. Bosecker, what conclusions can you draw from this data about the Grama Ridge-Morrow Pool and the formation in this area?

A. Well, basically, Getty, and I believe that one well in the east side of this fault will drain 640 acres.

Q. In your opinion are you dealing with the traditional old lenticular channel sands in the Morrow formation in this area?

A. Not the Morrow that is discussed in a lot of cases. This is more a deltaic or a point-bar deposit, and can be seen from its areal extent already, and so not only does it have areal extent, it has good rock properties, and the confining thing about it is the faults.

Q. I believe you heard Mr. Klaar testify yesterday concerning the gas storage project, where on his exhibit -- from his Exhibit Number B he estimated that there were 1300 productive acres in Sections 33, 34, 3, and 4, that could be drained by the four wells located thereon, and then noted on his Exhibit E that the four wells located in those sections have, in fact, drilled 1298 acres.

Are you familiar with that testimony?

A. Yes.

Q. Do you generally agree with the calculations set forth in Mr. Klaar's Exhibit Letter E?

A. Well, that portion of it I think I could

concur with.

Q. Now, let me ask you, referring to Llano's Exhibit B, in your opinion if the fault were --

MR. NUTTER: Which exhibit are you referring to?

MR. CARR: I'm referring to Llano Exhibit Number B, which is a structure of contours on top of the Morrow.

Q. In your opinion had the two faults, as indicated on this exhibit, not fallen exactly where they appear, and therefore, not traversing -- not traverse Sections 33, 34, 3, and 4, would in your opinion the four wells drilled thereon have drained those four 640-acre sections?

A. Assuming you have the same rock properties that you -- that we have seen evidence to between these wells, yes.

Q. Mr. Bosecker, it's my understanding that Getty has developed the acreage to the west of the -- to the east of the storage project on 640-acre drilling tracts.

A. That is correct.

Q. And that you have drilled at standard locations?

A. In all cases, yes.

Q. In your opinion, how would granting Llano's application to rescind the special pool rules effect Getty?

A. I think that if Llano's allowed to drill a well 660 feet from our lease line, then we have developed on the existing wells, which is 1650, that it will adversely affect Getty's position in the area.

Q. By going to the statewide rules, then, they would be able to move toward your lease line, is that correct?

A. Yes, and that is their intention from this.

Q. Do you believe that this will result in drainage of Getty's property that cannot be compensated for by counter drainage?

A. Yes.

Q. Are you familiar with the Commission's recently promulgated formula used to penalize wells drilled at unorthodox locations?

A. Somewhat familiar.

Q. In your opinion will this formula, if applied in this case, protect the correlative rights of Getty?

A. Not if we're on 320-acre spacing.

Q. And the reason for that is?

A. Well, if we had 320-acre spacing, they could drill an orthodox location 660 feet from our lease line.

Q. And as you understand their formula, if they drilled at the 660 location, would any penalty be assessed?

A. Not if it was an orthodox 660 location.

Q. Mr. Bosecker, in your opinion, will granting Llano's application to rescind the special pool rules for the Grama Ridge-Morrow Pool impair the correlative rights of Getty and other interest owners in this area?

A. Yes.

Q. Now, Mr. Bosecker, approximately how much did it cost Getty to drill the two wells located in Sections 35 and in Section 2?

A. Section 2 was the first well, which is completed in the Morrow, and the costs are approximately $1,000,000, or was $1,000,000.

In Section 35, this is a dual well in the Morrow and the Bone Springs, and we have spent to date over $2,000,000 on that well.

Q. In your opinion will the wells in Sections 35 and 2 drain their respective sections?

A. Yes.

Q. Do you believe that changing the spacing requirements in this pool will result in the drilling of unnecessary wells, thereby causing economic waste?

A. Yes, I do.

Q. Were Exhibits One through Sixteen-B prepared either by you or under your direction and supervision?

A. Yes.

MR. CARR: At this time, Mr. Examiner, I

would move the introduction of Getty Exhibits One through Sixteen-B.

MR. NUTTER: Getty Exhibits One through Sixteen-B will be admitted in evidence.

MR. CARR: And I have nothing further on direct.

MR. NUTTER: Are there any questions of the witness?

MR. COX: I've got a little here.

CROSS EXAMINATION

BY MR. COX:

Q. Mr. Bosecker, would you please refer back to Exhibit Seven?

A. What is Exhibit Seven?

Q. Exhibit Seven is your structural cross section, Pogo's well cross section.

A. Yes, I have it.

Q. Does this cross section show your perforation points for the Two State and the 35 Well?

A. No, it doesn't. This cross section shows no perforations and it just shows one of those two wells.

Q. Excuse me, which one is this?

A. This is Exhibit Seven.

Q. Perhaps it's Exhibit Eight, then, we want to

look at. Yes, sir, Exhibit Eight shows both of them.

Are perforations shown on Exhibit Eight? Are the perforation points on this?

A. Yes.

Q. Would you point them out?

A. Okay, the perforations for both of these wells were shown on the lefthand side of the center of the depth interval. And they're just small pencil marks, about a quarter of an inch horizontal marks. And those are individual perforations.

Q. Which well has completion below the Morrow Clastic zone?

A. Both wells.

Q. Okay. Which well has only perforations above the Morrow Clastic zone?

A. None.

Q. Referring to the Getty Two State at 12,762, what are -- what are these?

A. Those are two perforations at 12,761 and 62.

Q. Are they producing?

A. Yes, they are.

Q. Is that completed above the Morrow Clastics?

A. That's completed above the Morrow Clastic marker as we have shown on this cross section, yes.

Q. Did you not just say that none was completed

above the Morrow Clastics?

A. You said none -- what well was completed only above.

Q. All right. What do your Horner pressure data show on the lower zones on the Two State?

A. The -- in both cases in which the Horner plots were made from the pressure build-up information on the Getty Two State, all the perforations were open in that particular well.

Now, I discussed each of those and we can go over each of them separately, if you would like.

Q. Wasn't it your testimony that you felt that the lower members were not contributing significantly to this well in the Two State?

A. Not -- no, not -- I indicated that on the initial completion the perforations below the Morrow Clastic interval, those perforations were not cleaned up when we perforated the upper zone that did exhibit higher permeability. And it has taken some time for them to clean up, and I believe, and it can be seen from the Horner plot, that they are contributing now.

Q. When you initially treated the lower zone, wasn't it a fact that the well would not flow?

A. It would flow by heads. It made some gas and water and swabbed and it was not a well in which we were

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satisfied to stay with, without either giving it a larger treatment or going up the hole, and we decided that we would perforate the whole interval and then if we needed to give it a large treatment, which we have not as of yet, but we may, we would do it all at one time.

Q. Referring to Exhibit Nine, and Ten, you've testified to a two layering effect. Couldn't that effect also be because of the fact that the lower zone is not cleaned up and not producing?

A. Well, I testified that the lower zone was not cleaned up, that as a result of it not being cleaned up we encountered a layering effect. By layering I mean there's more than one zone of various thicknesses that have varying permeability.

Q. In the 35 do you have any perforations above the Morrow Clastics?

A. Not as yet.

Q. So that your main production in the Two State comes from the zone above the Morrow Clastics, is that right?

A. Initially, on initial completion without doubt that was the case.

Q. And your main production in the 35 comes from perforations below the Morrow Clastics, only.

A. Yes, that's the only --

Q. Yes.

A. -- perforations in the 35. At this point in time in Section 2 all the zones, to the best of our knowledge, are producing gas.

Q. Pardon me, would you state that again, the last part of your answer again?

A. Well, in the Getty Two State No. 1 now you can see that flowing tubing pressures increased, the well has cleaned up, and the perforations below the Morrow Clastics marker have cleaned up, and are contributing production in commercial quantities.

Q. How do you know that the ones below are?

A. We have good reason to believe they were not initially and I think you would agree with that. The well has improved. The upper zone, there was no problems with it initially, so I don't see how it could improve even more. The improvement would have to come from the zone that was -- was performing poorly initially.

Q. In your pressure data do you conclude that there is communication below the Morrow Clastics in 35 and Two State?

A. Yes.

Q. From your pressure data do you conclude that there is -- that there is communication between the 35 and the Two State above the Morrow Clastics?

A. There's no perforations as yet in the 35 above the Morrow Clastics interval. Probably there is areal extent, because you can see the same zone present in both wells, and I know of no reason why you wouldn't have communication, but you cannot either prove it or disprove it until you perforate it and monitor it.

Q. Isn't it just as possible to conclude that there are two separate zones instead of one in communication?

A. What well are you talking about?

Q. I'm talking about the communication between 35 and Two State.

A. If there are two separate zones in what?

Q. Isn't it just as possible to conclude there are two separate zones rather than communication between the zones?

A. Well, the Horner plot, the first Horner plot in the Getty State Two was in early transit behavior and it showed this humping effect that indicated layering that indicated more than one zone of growing permeability and pressure.

There was no common reservoir pressure at that immediate time of completion. The second Horner plot was in semi steady state behavior and with a common reservoir pressure at that point in time. No boundary effect could be seen or no layering effect could be seen.

Q. How long did it flow during the second test? Excuse me, for the first test. How long did it flow for the first test before you shut it in?

A. It's 15,000,20 minutes and I think that's about ten days. We've got a calculator, we'll have it shortly. 10.4.

Q. Isn't it possible that if you had flowed it longer that the boundary effect of the fault would have been seen on the build-up curve?

A. The boundary of the fault to the west?

Q. Yes.

A. It was produced at a longer time and shut-in in December, and it did not show the boundary at that time.

Q. How long was it produced, did you say?

A. Well, it produced from February to December and then shut-in, that length of time.

Q. How long was it?

A. Ten months, or something like that.

MR. COX: No more questions of the witness.

CROSS EXAMINATION

BY MR. NUTTER:

Q. Mr. Bosecker, on your Exhibit Number Eight, you have picked the top of the Morrow Clastics at 12,800

in the 35-1, and at approximately 12,829 feet in the Two State 1.

Now, I noticed on Mr. Klaar's Exhibit Number B in the 35-1 but not the Two State, that he has picked the top of the Morrow Clastics at identically the same point of 12,800.

Now, all of the Morrow Clastics you show approximately 210 feet or 20 feet of Morrow limestone -- no, correction, approximately 200 feet of Morrow limestone between the top of the Morrow and the Morrow Clastics.

Now, Mr. Klaar stated yesterday he thought your well was perforated in the Atoka. In your opinion is this clearcut Morrow formation right here where these upper perforations are in the Two State?

A. Let me elaborate a little, if I can.

Q. Okay.

A. The way Getty goes about its business is the exploratory geologist drills the first well, the wildcat well, and at that time they call the DST's and look at the samples and pick the tops, and et cetera.

After that first well is drilled and completed it goes over to the production group and it's carried on in the production group.

These tops on the first well that was drilled in the field was not picked by me or any of my staff. It

was picked by our exploratory team, and what we have done is extrapolate the information gained from the first well over to the second well, and it is the exploratory team's opinion that these are the correct markers.

Q. Well, you both agreed -- from the one well that you've got in common on your exhibits, you've both agreed that the Morrow Clastics are at the same point, the 12,800 here.

Now, you have picked the Morrow Clastics at 12,000, or your exploratory group has picked the Morrow Clastics at 12,830, 04 29 in the Two State.

A. That's a very good marker and I could see how we could agree on that.

Q. Well now, he has stated, then, that the upper perforations, which are at 12,761 feet, are in the Atoka, but this would be in the limestone interval and you've got 200 feet of lime above the marker.

A. It is lime.

Q. Is it the Morrow or is it the Atoka?

A. Again, our geologist says this is the Morrow lime, our exploratory geologists from their analysis, say that it's the Morrow limestone.

Q. There usually is some Morrow considered to be above the clastic.

A. Right, and let me -- it shows to be Morrow

limestone.

The interval that is porous and permeable is not a lime, it's a sand, I better mention that.

Q. All right, I see the sand now.

A. Uh-huh.

Q. All right. Mr. Klaar, where would you pick the top of the Morrow on Getty's Exhibit Number Eight on the Two State Well? You said that these perforations were Atoka.

MR. KLAAR: Okay, first of all, we seem to have no problem agreeing to the top of the Morrow Clastics.

MR. NUTTER: The Clastics seem to be agreeable.

MR. KLAAR: Fine. That, due to the fact that it's such an easily identifiable marker, everybody has agreed to that.

I would tend to pick the top of the Morrow, and there's a reason for why everybody goes on the top of the clastics, because the top of the Morrow is a hard place to pick, to say this is the top of the Morrow.

I would tend to pick the top of the Morrow just almost immediately below where the Getty Two State was perforated.

MR. NUTTER: Okay.

MR. KLAAR: I'd say that's the top of the

Morrow.

MR. NUTTER: So you'd give it approximately 50 feet of Morrow above the clastics.

MR. KLAAR: Yes, sir.

MR. NUTTER: Okay, well, I just wanted to resolve that difference there between whether the well was Atoka or Morrow.

MR. KLAAR: I want you to be aware that I'm not a paleontologist, so I cannot certify to --

A. I am not either, and don't want to be.

Q. (Mr. Nutter continuing.) Now, I would like to clarify the perforated interval, Mr. Bosecker, on that Two State.

On your Exhibit Number -- we've got two groups of perforations but they seem to kind of have an overlapping effect. Was the well perforated three different times?

A. To the best of -- well, to the best of my knowledge, it was perforated in two different stages. I don't know how many times the gun went into the hole, you know. It was a through tubing 1 11/16th inch jet charge, which had very poor penetration, from what I understand.

Q. Well, it was my understanding, also, from your direct testimony that the lower perforations were made, the well wasn't -- and treated -- the well did not perform

satisfactorily.

A. It was treated with 2500 gallons of 7-1/2 percent NE acid, if I remember right.

Q. Okay, and then you weren't satisfied with the performance, so you came up the hole to 12,700, reperforated, and then treated with another 2500 gallons over the gross interval.

A. Over the gross interval.

Q. But then this C-105, which is your exhibit Number Two, states that there was a treatment from 12,941 to 13,129. I presume that was the first treatment.

A. That was the first treatment.

Q. And then there was a treatment from 12,761 to 12,941 with 2500 gallons, so that would indicate that the upper section was treated separately.

A. Okay, now I really need to spread Exhibit Number Eight out.

The first treatment shows to be from 12,941 --

Q. To 129.

A. -- to 13,129. That's to the best of my recollection. That is true.

Q. And that was that initial perforated interval that's shown there under item 31 on that form.

A. Uh-huh. And the second treatment shows to be from 12,761, which is the top perf, down through 12,941.

Okay, that's not where I testified to. I, it's my understanding and memory that all this was done through the tubing and I do not believe we had a bridge plug in the hole, and that it was overall. I do not have the records here to double check that, but if that Form C-105 is exactly correct, it would indicate to be a bridge plug in number two.

Q. And treated the upper perfs separately.

A. And broke them down separately, yes, which is possible.

Q. And then what's the overall perforated interval in the 35-1, in your Exhibit Number Four, which shows they go from 12,907 down to 13,102, I presume?

A. Okay, now what's the question?

Q. What is the overall perforated interval in that well? From 12,907 to 13,102?

A. Yes, to the best of my knowledge.

Q. And then on your big exhibit there, these are not perforations, these little tics that are down here at lower intervals.

A. Those are -- well, no, that has something to do with the logging tools, the compensated neutron formation density.

Q. They're not perfs, though.

A. I think -- it's not perfs -- I think it has

to do with the volume of boreholes for computing your cement requirement. I think, I'm not sure of that, but I believe that's what those things are.

Q. Okay.

A. We should have put stars or something so we wouldn't confuse you there.

MR. NUTTER: Are there any further questions of Mr. Bosecker? He may be excused.

(Thereupon a recess was taken.)

MR. NUTTER: The hearing will come to order, please. We'll continue now with Case Number 6496. Mr. Cox, I believe you said you had a rebuttal witness.

MR. COX: Yes. We'd like to recall Mr. Klaar.

MR. NUTTER: Okay, Mr. Klaar is still under oath.

AL KLAAR

being recalled to the witness stand, and having been previously sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. COX:

Q. Are you the same Al Klaar that previously testified in this case?

A. Yes, sir.

Q. Do you have some comments to make to the Commission regarding the Horner plots that were introduced in evidence by Getty?

A. Yes, sir, I do.

Q. Okay, would you please go ahead?

A. The attention is called to Getty's Exhibit Number Nine and Number Eleven.

The first one, Number Nine, being the Horner plot which shows that the extrapolated bottom hole pressure at the time was 8270; the second one being the one taken eleven months later in December of 1978, showing that at that time the Horner plot indicates stabilized bottom hole pressure of 7850.

I have no difference with the fact of the way the tests were taken, and the plot thereof, but I do offer this interpretation.

It is a known fact that sand zones, productive sand zones, in the Atoka and in the Morrow, sustain what is called a damaged area when drilling into them, and my opinion, the first plot taken right after the well was potentialed --

Q. Is that Exhibit Nine?

A. Yes, that is Exhibit Nine, shows to me that instead of, as Getty interprets there being two zones in-

dicated through the hump there, what we are really seeing there is the affect of the damaged zone initially and right after being perforated.

I would like to further point out that this was obtained after the top zone, which Llano has called the Atoka zone, was perforated.

The conclusion that I come to is that we are talking whether either Exhibit Nine or Exhibit Eleven, we are still only talking about one zone being productive into the well, and that being the upper zone, which is, according to Getty interprets that as the Upper Morrow Zone and according to Llano as the Atoka Zone.

I think it's corroborated by the fact that cleanup has taken place when the second test was taken, under Exhibit Eleven, and it just shows you a clean, straight line at the end of the Horner plot there.

I think it is further corroborated by the fact, and I think that the Examiner will appreciate the fact of a well drilling immediately offsetting gas storage unit that the first thing we did was contact people in charge of exploration and production department of Getty and we obtained their approval to witness certain items which would take place on their well as it was being drilled.

We, of course, were very interested as the well was being drilled and as it was being completed. Our

Our initial interest was not in anything up above the top of the Morrow Clastics. It centered soleiy around the fact of what's happening below the Morrow Clastics because that's where we're storing our gas.

We were witness to the fact that when the first set of perforations were performed, perforating job was performed, the well did not come in, did not flow. The well was then swabbed down and after being swabbed down and having essentially no more than a couple of hundred feet, we're talking about 200 to 250 feet of fluid on the formation, the well would not flow more than 15 to 30 Mcf per day.

Pressurewise we're talking about a back pressure of no more than 100 to 125 pounds being on the formation at that time.

I would further want to point out that under G-13 -- by "G" I'm referring to the fact that we've got that down as Getty Number Thirteen Exhibit -- the point was made that the buildup pressure test on the Getty 35, and a Horner plot thereof, indicated a buildup pressure, stabilized buildup pressure, of 7460 pounds.

Please keep in mind that the initial pressure on the Getty Two State after perforating the upper zone and getting the well to flow, was 8270. Eleven months, almost twelve months later, the same Getty Two State was

down to a pressure of 7850, as extrapolated by the Horner plot, but yet barely a month later on the Getty 35, where we know and realize that a producing interval below the top of the Morrow Clastics is productive, we -- and Getty calculates 7460 pounds.

The point is it dropped 500 pounds in pressure in eleven, twelve, months by producing 300 and some odd thousand Mcf of gas, and yet, if we are to believe that these are in communication, in other words, that both the upper and the lower parts in the Getty Two State are productive, and one is draining the other, then we find it hard to explain the fact that in just one month 400 pounds less pressure is recorded on the Getty 35.

The implication being that the Getty Two State is the one that ought to be the lower, not the Getty 35.

MR. NUTTER: You're saying, in other words, that it looks like from here the 35-1 was draining the Two State.

A. If that's -- if that's a possibility, yes, sir.

MR. NUTTER: But it hasn't been proved.

A. But I don't think -- but I do not think that the lower portion, or the stuff below the top of the Morrow Clastics, is productive in the Getty Two State, so

the end result being in my opinion, we are talking about two separate reservoirs.

Number one, the upper zone has not been perforated in Getty 35. The producing interval below the top of the Morrow Clastics is not productive in the Getty Two State.

MR. NUTTER: Well now, Mr. Klaar, --

A. Yes, sir.

MR. NUTTER: Mr. Bosecker's interpretation of the Horner plot on the Getty 35-1 showed that he -- or he indicated that he interpreted this as also indicative of a two layer reservoir. Do you think again that this same situation you're talking about on the Exhibit Nine, that it's not a two layer reservoir on the Two-1 but simply a matter of wellbore cleanup?

A. It could be the identifical situation again.

MR. NUTTER: Now, do you agree with this interpretation of all of these Horner plots, that none of them shows a reservoir boundary, or limits?

A. Yes, sir, I do agree with that interpretation, that none show a reservoir boundary or a reservoir limit. The only difference of opinion I have is the two layer concept in the first one on the Getty Two State, and coming to the same conclusion that there are two layers productive in the Getty 35.

MR. NUTTER: Okay, is there any way to analyze a Horner plot in such a manner as to be able to tell whether you've got a two layer reservoir or whether you've got wellbore cleanup?

A. Well, a plot by itself, when you have more than one zone productive, or open to the wellbore, with a difference of several feet in between, and you get what is termed a hump here, the first conclusion you draw is that more than likely it's a two layer reservoir. I have no difference of opinion there.

But I'm of the opinion that the same type of data, the same type of conclusion, is also sustained when you are talking about the fact of having a damaged zone.

Now, there would be one further step after the Horner plot, and that would be the reverse data or to take the well and produce it for some time to convince yourself that you have cleaned up your damage, then shut the well in and obtained the same type of information.

This is why I say that I think the second plot on the Getty Two state is representative of what is really going on. It shows one layer. It shows one zone.

MR. COX: Exhibit Eleven you're referring to?

A. Yes, that's Exhibit Eleven.

All of these, all of these type tests and plots, Mr. Examiner, involve time, and it is of course the engineer's responsibility to choose the correct time so that he gets to see what is happening, and I submit that if possibly the well would have been cleaned up further and then the first plot obtained, that the same type of plot that is Exhibit Eleven would have been obtained for Exhibit Number Nine.

The point was made that Shell conducted an interference test and proved to themselves, and at the time to the Commission's satisfaction, that 640 acres could be drained back in 1965. I imagine this was just prior to the November, 1965, or maybe at the November, 1965, hearing to approve the rules governing the fact that it would be developed on 640.

I wish to point out, though, that we do not dispute the fact that there is communication between the wells. As I pointed out yesterday, there is definite communication between wells, otherwise how could our two west wells, who's never had an injection, be pressured up, I just --

Q. (Mr. Cox continuing.) Excuse me, Mr. Klaar, are you referring to the Llano wells in the storage unit?

A. Yes.

Q. Okay.

A. Yes, I am. I'm sorry.

How else could the No. 3 and No. 4 Wells in Llano's storage system be pressured up if injection only took place in Llano's No. 1 and No. 2 Wells?

The further analysis of the sand zones below the top of the Morrow Clastics indicates that when the four wells in Llano's gas storage unit are considered and are looked at as a whole, there are identified five sand zones, and some of these are even identified by Getty's exhibits.

We do not plan to go into detail except to state that, yes, there is a common gas zone which we label as "A", the first one that you run into, between the No. 1 and the No. 4 Wells.

We also not only admit but realize that there is communication between the No. 2 and the No. 3 in another gas zone. As I remember it, it was the Morrow "D" Sand.

But at the same time we wish to point out that, taking as an example the No. 3 Well, it has a zone identified as Morrow "C" Sand, which is not found in any of the other wells to be productive.

MR. NUTTER: Okay, well now, --

A. So the -- what I'm coming to in a long way,

is this: That we still feel, when all these zones are considered, and the fact of the -- of what we think are known faults in there, we still feel that we have only drained, as far as area and acreage goes, we feel we have only drained an average of 320 acres, where I had the feeling that Getty was through Shell's data, was stipulating that Shell had proved that 640 acres would be drained.

MR. NUTTER: Okay, well now, Mr. Bosecker in his interpretation, or in his computations of the data sheets on these Horner plots, came up with 2 millidarses on the Two-1 and increasing to 2.2 later.

He had 5.5 millidarses, I believe it was, on the 35-1.

A. Uh-huh.

MR. NUTTER: Now do you have any calculated permeabilities for the No. 3 in Section 33 or the No. -- correction, the No. 4 in Section 4 or the No. 1 in Section 3?

A. Okay, we have --

MR. NUTTER: That would indicate what those permeabilities are? Because Shell's data indicated high permeability, probably.

A. Right. We have core data, which was originally obtained by Shell or the original operator, and if Steve finds that particular data, I'm sure I can tell you

what the average permeability was.

It was obtained not through log interpretation but through cores.

Okay, I have to remember these are the old well names. Our well now called the GRM Unit No. 1, according to this data, has an average permeability -- had and has an average permeability of 6.7 millidarses.

The No. 2 Well, which is up in Section 3, calculated out to 2.2.

MR. COX: What section is that again, please?

A. The No. 2 --

MR. NUTTER: The No. 2 is in Section 34.

A. The No. 2 is in -- you're right, I was reading a date and not section here, I'm sorry. I was reading a completion date and thinking it was giving me the section.

The No. 2 Well is in 34, and this tabulation shows that it calculates out to average permeability 2.2.

The No. 3 Well, now called the No. 3, in Section 33, calculated out to an average permeability of 4.8.

MR. NUTTER: How about the No. 4?

A. The No. 4, 1.6.

MR. NUTTER: So that has a low permeability.

That has the lowest of any of your four wells then, doesn't it?

A. Yes, sir, it also, by Exhibit E, by Llano's Exhibit E, shows it had the lowest recovery.

MR. NUTTER: But that was one of the two wells on Shell's pressure interference test, I believe, wasn't it?

A. And that is also the well that has communication with the No. 1 Well, which has the highest permeability. There's one zone in No. 4 which is in direct communication with the No. 1 Well.

Just as there is one zone in the No. 2 that is in communication with the No. 3.

MR. NUTTER: And these permeabilities, these are average permeabilities for the entire --

A. These are -- these are weighted average permeabilities as per core, sir.

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

CROSS EXAMINATION

BY MR. CARR:

Q. Now, let me see if I can figure out what we're talking about here.

A. Okay.

Q. I believe in response to Mr. Nutter's question you stated that from the Horner plot it was really not possible to determine whether or not you had a damaged zone that was cleaning up or you had a two layer reservoir. Is that a correct understanding of your testimony?

A. It's a matter of interpretation.

Q. I would like for you to look at the figure on page 123 of Pressure Buildup and Flow Tests in Wells. It's Monograph Number One, Henry L. Daugherty Series, Society of Petroleum Engineers.

I'd like you to look at this plot and I'd like for the record, there are nine examples on this. And I'd like you to look at the plot in the top line in the center.

MR. NUTTER: Are these all contained on one page, Mr. Carr?

MR. CARR: Yes, sir, it is.

MR. NUTTER: We'll Xerox that page, then, and offer it as an exhibit, how about that?

MR. CARR: That would be fine with me. Would you like to stop and do that now?

MR. NUTTER: Yeah, let's do it so I can have one.

MR. CARR: Okay.

(Thereupon a short recess was had.)

Q. (Mr. Carr continuing.) Now, Mr. Klaar, I'd like you to direct your attention to what has been marked for identification purposes as Getty's Exhibit Number Seventeen, and I'd like you to look at the figure in the center of the top line, on which we have written "damaged zone". I think that bears up by the caption beneath the diagram.

A. Right, it bears up by the fact that it says "skinned and/or well fill-up."

Q. And that is correct for me to assume that means damaged zone?

A. Yes, sir.

Q. Okay. And then I'd like for you to look at the diagram in the bottom row in the center on which we have written "two layer". Below it it says "stratified layers or fractures with tight matrix."

A. Correct.

Q. And I would ask you to compare this to Getty's Exhibit Number Nine, and ask you if, in your opinion, that the example, textbook example, for a two layer reservoir doesn't seem to closely correlate with the plot on the Horner plot, Getty Exhibit Number Nine?

A. I can agree that the two layer exhibit closely approximates what Getty's Exhibit Number Nine shows, but at the same time I can also say that the same thing is essentially showed by the damage zone exhibit up at the top

of the page.

Q. But the damaged zone exhibit, do you seem to hit a straight line before you break loose and hump on the -- on the plot?

MR. NUTTER: What do you mean, Mr. Carr, "break loose and hump"?

A. I think I see what you're getting at, Mr. Carr, and I think I would further point out that if that's the interpretation to be made by the two criteria here, then how come there is no straight line exhibited on the two layer afterwards, after it makes the hump.

So what I'm saying is that you've essentially got just about the same thing indicated.

Q. Is it your testimony that you would not encounter a straight line after the hump in the --

A. No, sir, that's not what I said.

Q. Okay, was it your testimony that you would necessarily have a straight line prior to the rise in the plotting the second of the nine figures?

A. You can have a straight line before. You would most certainly hope to have a straight line after. All I'm saying is that these are idealized plots and that a well condition, an actual well condition, you can try to fit that to one of these nine examples to tell you what it is that you most likely have.

Q. Mr. Klaar, based on the plot that is contained on Getty Exhibit Number Nine, can you tell whether or not you have a damaged zone or a two layer zone?

A. On Exhibit Number Nine.

Q. Yes, sir.

A. I can tell you, if I were not sitting here and knowing as much as I do about the well, I would wonder whether I had either, whether I had a damaged zone or whether I had a two layer effect.

Q. But you're not able to tell based on this plot whether or not you have a damaged zone.

A. By assuming that I know nothing about the well and I'm just looking at that, I would wonder which way to go.

MR. CARR: Mr. Examiner, if there is no objection, we would like to offer what has been marked for identification as Getty Exhibit Number Seventeen.

MR. NUTTER: Getty Exhibit Number Seventeen will be admitted in evidence.

MR. CARR: I have no further questions of Mr. Klaar.

MR. NUTTER: Did you have any further questions, Mr. Cox?

MR. COX: Yes, just a couple, please.

REDIRECT EXAMINATION

BY MR. COX:

Q. Mr. Klaar, do you have a comment concerning the production data from the Getty Two State Well?

A. Yes, sir. As presented by Getty just a little while ago, the claim was made that Getty Two State got better. It was the reason that finally a one layer reservoir was interpreted through the Horner plot.

I wish to point out the fact that Getty Exhibit Three indicates that the well flowed at -- right at 2,000,000 a day on the initial 4-point test, and that Getty's Exhibit Fifteen and Sixteen-A show that the well did not really increase in production or become that much better. In fact, the well, according to GEtty's own figures, is flowing at 1700 Mcf per day at this time.

One further -- to summarize, really, what I'm -- what I'm saying, is that Getty has through the Horner plot and through assumptions therefrom, presented data which to them shows that 640 acres will be drained by one well.

I submit that Llano, not through assumptions but through calculations, has shown that 320 acres is the average drainage area for a well out there, and wish to state at this time that we still think 320 acres per well should be the way to develop the area.

MR. NUTTER: Well, Mr. Klaar, Llano is the purchaser from the Getty Two State, isn't it?

A. Yes, sir.

MR. NUTTER: You don't happen to have the number of days production it had on all these months that Mr. Bosecker had listed on Exhibit Fifteen and --

A. I do not have them with me, but I can say that practically every day of the month that the well was producing. Now, I imagine that for the shut-in tests, or to obtain the shut-in pressure in December for the Horner plot, it was not producing to us, but I do not have the data with me. There were no reasons to have the wells shut-in, Mr. Examiner.

MR. NUTTER: Well, the well declined from 53-million cubic feet in August to 39-million cubic feet in September; there's only one day's difference in the length of the month. That seems like a pretty sizeable decline, but then it jumped back up to 49-million for the month of October. I just wonder how much producing days had to do with this or possibly line pressure.

A. Well, at the same time that this production was taking place through that 12-month period there, there were surface problems that Getty had run into, but I'm not ready and I'm not able to tell you how many days that they did not deliver to us due to having stack-pack problems,

which is a device that we -- that we separate oil and gas, and the gas comes to us as purchaser and the oil goes to the tanks, and how many days Getty was down for various other reasons --

MR. NUTTER: There have been some mechanical problems at the surface?

A. Yes, sir, there have been. I am not prepared at this time to discuss, though, how many days there were. I just don't know.

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

MR. CARR: Mr. Carr has a question.

RECROSS EXAMINATION

BY MR. CARR:

Q. Mr. Klaar, the production would decline on a well if in fact there was a choke on the well, isn't that correct? Or production would be restricted if there was a choke on a well?

A. Yes, sir, and I can say that the choke is -- there is a choke, yes, sir.

Q. Thank you. And another point you made is that you've proven mathematically that the average number of acres that can be drained by a well in this area is approximately 320, is that a correct characterization of your

testimony?

A. Yes, sir, that is.

Q. And I assume you're referring to your Exhibit E when you say you have proven this.

A. Yes, sir.

Q. And on that you've averaged the production from seven wells.

A. I thought it was six.

Q. You're correct, it is six. And is it not also correct that of those six wells, four of them are drilled into sections where the number of productive areas are severely limited by faults?

A. I can agree with that.

MR. CARR: I have no further questions of Mr. Klaar.

MR. NUTTER: Do you have any?

MR. COX: We're through, sir.

MR. NUTTER: Does anyone have anything to offer in Case Number 6496? Mr. Carr, do you have a statement?

MR. CARR: Mr. Examiner, I believe there are several letters in the files. I have Xeroxed copies of them that were sent to me. We may also have the originals here.

Would the Commission prefer to read them or

I'll be glad to do it.

MR. NUTTER: You can just state what they are and then give them to us. We don't have any correspondence in that case file at all.

MR. CARR: Okay. We have a letter from Belco Petroleum Company, signed by Mr. Lee Nering, who is their Administrative Geologist, and it states Belco supports Getty in Case 6496. We further contend that rescission of the order is not taken in good faith in the spacing order. Getty, et al, undertook in good faith in applications conforming to rules for the drilling of the offsetting Getty Two State 1 in Section 2 and the Getty 35-1 in Section 35, which were drilled then in conformity to the existing spacing order. We contend that the spacing regulation provided for protection of offsetting correlative rights and would continue to do so.

In the absence of a waiver from the direct offsetting owners, Belco contends that approval of Llano's application in Case 6496 will violate the correlative rights of the offsetting owners of existing pool exterior wells which were drilled in conformity with the requirements.

MR. NUTTER: Mr. Carr, if you'd just state the essence of --

MR. CARR: Okay, all right.

MR. NUTTER: -- the correspondence rather

than read it.

MR. CARR: Phillips Petroleum Company, we have a letter from W. J. Maharg, M-A-H-A-R-G, Engineering Director. It in essence restates the same information contained in the Belco letter.

We also have a letter from Sabine Production Company, signed by C. H. Madson, and again this letter supports the position of Getty in this case.

MR. COX: Mr. Examiner, in relationship to those letters, I would ask that the owners of the non-operating interests in the Getty well be identified, if they are in fact some of those people who submitted letters.

MR. NUTTER: Mr. Carr, is Phillips Petroleum Company a part owner in Getty wells?

MR. CARR: I believe it states their interest in each of the letters. I didn't read all of them.

MR. NUTTER: Phillips has 25 percent working interest ownership.

MR. BOSECKER: In Section 36.

MR. NUTTER: In 36 No. 1, which is currently being drilled.

Sabine is a 1/4th working interest participant in the Getty 36 No. 1, which is being drilled.

Belco is a co-owner in -- with Getty in properties located in Section 35 and Section 2.

So presumably, they're a co-owner of those two producing wells.

Does anyone have anything further they wish to offer now?

Mr. Carr, a closing statement?

MR. CARR: Very briefly.

As the testimony has shown, in 1978, late 1978 and early 1979, Getty completed its No. 35 Well in Section 35, offsetting the Grama Ridge-Morrow Gas Pool to the east.

Soon after this Llano naturally wanted to drill a Morrow well in the east half of Section 34, which is understandable.

The Oil Conservation Commission has devised a new procedure for penalizing wells drilled in unorthodox locations, based on the amount the location varies from a standard location, and also based on the increased area of drainage in adjoining properties which results from the unorthodox location.

Now, the problem is that in the case before the Commission, Llano, if the application is granted, will be able to get around this procedure for penalizing wells, because in effect the rules of the game are going to be changed halfway through the game. They will be able to drill at an unorthodox -- or orthodox location 660 feet

from a lease line, where Getty has in good faith developed the land at orthodox locations 1650 feet from the lease line.

The problem here is further compounded by the fact that because there is, and I think everyone agrees, the great probability that a fault cuts through Section 34 at some point, there is a question as to how many productive acres are in 34 and can in fact be dedicated to a Llano well drilled in the east half of that section.

We submit that this fact situation must be weighed against the Commission's statutory duty to protect correlative rights. If you simply grant Llano's application rescinding the special pool rules, you are in effect, we believe, authorizing drainage of Getty's acreage, drainage that cannot be compensated for by counter drainage.

The only way this application could be granted and the correlative rights of Getty not severely impaired, would be to impose some sort of a meaningful penalty on the production from any well drilled in the east half of Section 34.

Now, we further urge the Commission to deny the application on the grounds that to develop this acreage on 320-acre spacing will result in the drilling of unnecessary wells, thereby causing economic waste.

The real question here is whether -- how

many acres will one well drill -- drain, and we believe that the evidence is clear that a well will drain 640 acres when it is not restricted by fault, and in view of this, we believe that the application must be denied as the evidence simply does not support it.

MR. NUTTER: Thank you. Mr. Cox?

MR. COX: Mr. Examiner, I don't want to belabor the case any more. We could respond totally to Mr. Carr's remarks, but we want to simply say that we think that the data which Llano has presented clearly establishes that 320 acres is all that can be drained, and remind you and the Commission of the fact that much of the data presented is real data, not assumed data or speculative data, in relationship to that.

The evidence is before the Commission and we don't really wish to take any more time here today, and ask that the application be granted.

MR. NUTTER: If there's nothing further in Case Number 6496, we'll take that case under advisement.

(Hearing concluded.)

SALLY WALTON BOYD
CERTIFIED SHORTHAND REPORTER
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REPORTER'S CERTIFICATE

I, SALLY WALTON BOYD, a Court Reporter, DO HEREBY CERTIFY that the foregoing and attached Transcript of Hearing before the Oil Conservation Division was reported by me; that said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability, knowledge, and skill, from my notes taken at the time of the hearing.

Sally W. Boyd

Sally W. Boyd, C.S.R.

SALLY WALTON BOYD
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I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. ____ heard by me on _____ 19____.

_____, Examiner
Oil Conservation Division

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

JERRY APODACA
GOVERNOR

NICK FRANKLIN
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Re: CASE NO. 6496
ORDER NO. R-5995

Mr. Don Cox
Maddox, Maddox & Cox
Attorneys at Law
Broadmoor Building
Hobbs, New Mexico 88240

Applicant:

Llano, Inc.

Dear Sir:

Enclosed herewith are two copies of the above-referenced Division order recently entered in the subject case.

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

Copy of order also sent to:

Hobbs OCC x
Artesia OCC x
Aztec OCC

Other William F. Carr

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
DIVISION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 6496
Order No. R-5995

APPLICATION OF LLANO, INC. FOR
RESCISSION OF POOL RULES, LEA
COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on March 14, 1979, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 2nd day of May, 1979, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Llano Inc., is the owner of five wells in the Grama Ridge-Morrow Gas Pool, Lea County, New Mexico.

(3) That said pool was created and defined by Division Order No. R-3006 on December 3, 1965, comprising all of Sections 3 and 4, Township 22 South, Range 34 East, NMPM, and made subject to the special pool rules promulgated by said order, which include a provision for 640-acre spacing and proration units, with well locations prescribed as being no closer than 1650 feet to the outer boundary of the unit and no closer than 330 feet to any quarter-quarter section line.

(4) That said pool was extended by Order No. R-3080, effective July 1, 1966, to include all of Section 34, Township 21 South, Range 34 East, NMPM; by Order No. R-3152, effective December 1, 1966, to include all of Section 10, Township 22 South, Range 34 East, NMPM; by Order No. R-3195, effective

March 1, 1967, to include all of Section 33, Township 21 South, Range 34 East, NMPM; and by Order No. R-5729, effective June 1, 1978, to include all of Section 2, Township 22 South, Range 34 East, NMPM.

(5) That the applicant seeks the rescission of the Special Rules and Regulations for the Grama Ridge-Morrow Gas Pool to provide that said pool would be governed by the 320-acre spacing and acreage dedication requirements and well location requirements of Rule 104 of the Division Rules and Regulations.

(6) That the evidence in this case indicates that the five Morrow gas wells owned by the applicant, namely the Grama Ridge Unit Wells Nos. 2 and 3, located in Sections 34 and 33, respectively, of Township 21 South, Range 34 East, NMPM, and Grama Ridge Unit Wells Nos. 1 and 4, and Government "A" Well No. 1, located in Sections 3, 4, and 10, respectively, of Township 22 South, Range 34 East, NMPM, are all located within an upthrust fault block bounded on the west by a northeast-southwest trending fault and on the east by a north-south trending fault, and that they are not in communication with other wells recently drilled in the area, namely the POGO State L-922 Well No. 2 located in Section 28, or the Getty 35 State Well No. 1 located in Section 35, both in Township 21 South, Range 34 East, NMPM, or the Getty 2 State Well No. 1 located in Section 2, Township 22 South, Range 34 East, NMPM.

(7) That the evidence in this case indicates that the horizontal limits of the Grama Ridge-Morrow Gas Pool, as heretofore defined, are excessive and contain lands which are not producible by wells completed within said pool.

(8) That the horizontal limits of the pool should be contracted to approximately the known productive limits of the above-described fault block, and the pool should be redefined as comprising the following-described lands:

TOWNSHIP 21 SOUTH, RANGE 34 EAST, NMPM
Section 33: E/2
Section 34: W/2

TOWNSHIP 22 SOUTH, RANGE 34 EAST, NMPM
Section 3: W/2
Section 4: All
Section 10: W/2

(9) That the applicant has established that the drainage characteristics of the reservoir in the wells completed within the aforesaid fault block are not such as to support 640-acre spacing, and that 320-acre spacing is more appropriate for the Morrow wells completed therein.

(10) That the Special Rules and Regulations for the Grama Ridge-Morrow Gas Pool, as promulgated by Division Order No. R-3006, should be rescinded, and the pool, as hereinabove redefined, should be spaced, drilled, operated, and produced in accordance with Rule 104 of the Division Rules and Regulations and with such other Division rules and orders as may be applicable.

(11) That the three recently completed wells described in Finding No. (6) above are not completed in the Grama Ridge-Morrow Gas Pool as redefined, and a separate new pool should be created and defined for the POGO well located in Section 28, and a separate new pool should be created for each or both of the Getty wells located in Sections 35 and 2.

(12) That the owner of the aforesaid wells in said Sections 35 and 2 should be given a reasonable period of time in which to apply to the Division for a hearing to consider the creation of a new pool for said wells, and the promulgation of special rules therefor, if said owner wishes to pursue spacing and proration units of other than 320 acres, and 30 days after the entry of this order is a reasonable period of time for such purpose.

(13) That during such 30-day period, and during the time an application for other than 320-acre spacing has been filed, and a hearing, or an order following hearing, is pending, the following described lands should be placed on temporary 640-acre spacing for the Morrow formation, and no Morrow gas well drilling permits should be approved for said lands unless such permits are for wells to which 640-acres (being a single governmental section) is dedicated and which are located at least 1650 feet from the outer boundary of the unit and at least 330 feet from any quarter-quarter section line, or unless an exception to the provisions of this finding and the derivative order therefrom has been obtained after notice and hearing; the lands are:

TOWNSHIP 21 SOUTH, RANGE 34 EAST, NMPM
Section 26: All
Section 34: E/2
Sections 35 and 36: All

TOWNSHIP 22 SOUTH, RANGE 34 EAST, NMPM
Sections 1 and 2: All
Section 3: E/2
Section 10: E/2
Sections 11 and 12: All

(14) That in the event the owner of the wells in Sections 35, Township 21 South, Range 34 East, NMPM, and 2, Township 22 South, Range 34 East, NMPM, has not filed an application for creation of a new pool for said wells and the promulgation of special rules for said pool, including a provision for other than 320-acre spacing, within the above-described 30-day period, or in the event that spacing and proration units of other than 320 acres are denied, then all the lands described in Finding No. (13) above should be governed by the provisions of Rule 104 of the Division Rules and Regulations.

(15) That an order based on the above findings is in the interest of conservation and will prevent waste and protect correlative rights and should be approved.

IT IS THEREFORE ORDERED:

(1) That the Grama Ridge-Morrow Gas Pool in Lea County, New Mexico, as heretofore classified and defined, is hereby redefined to include only the following described lands:

TOWNSHIP 21 SOUTH, RANGE 34 EAST, NMPM
Section 33: E/2
Section 34: W/2

TOWNSHIP 22 SOUTH, RANGE 34 EAST, NMPM
Section 3: W/2
Section 4: All
Section 10: W/2

(2) That the Special Rules and Regulations for the Grama Ridge-Morrow Gas Pool, as promulgated by Division Order No. R-3006, are hereby rescinded, and said pool shall hereafter be spaced, drilled, operated, and produced in accordance with Rule 104 of the Division Rules and Regulations and with such other Division rules and orders as may be applicable.

(3) That the Morrow formation underlying all of Section 26, the E/2 of Section 34, and all of Sections 35 and 36, Township 21 South, Range 34 East, NMPM, and all of Sections 1 and 2, the E/2 of Section 3, the E/2 of Section 10, and all of

Sections 11 and 12, Township 22 South, Range 34 East, NMPM, are hereby placed on temporary 640-acre spacing, and no drilling permit shall be approved for any Morrow gas well proposed to be drilled on said lands unless such permit is for a well to which 640 acres (being a single governmental section) is dedicated and which is located at least 1650 feet from the outer boundary of the unit and at least 330 feet from any quarter-quarter section line, or unless an exception to the provisions of this Order No. (3) has been obtained after notice and hearing.

(4) That the provisions of Order No. (3) above shall be in force for a period of 30 days after the date of entry of this order, or provided Getty Oil Company has filed an application for creation of a new gas pool within the lands described in Order No. (3) above and for the promulgation of special rules for such new pool, including a provision for ier than 320-acre spacing, for so long thereafter as a hearing, or an order following a hearing, is perding.

(5) That upon expiration of the acreage dedication and well location requirements provisions of Order No. (3) above, and in the absence of special pool rules to the contrary, all Morrow gas wells completed on the lands described in Order No. (3) above shall be spaced, drilled, operated, and produced in accordance with the provisions of Rule 104 of the Division Rules and Regulations.

(6) That jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY,
Director

S E A L

dr/

Docket No. 10-79

Dockets Nos. 11-79 and 12-79 are tentatively set for hearing on March 14 and 28, 1979. Applications for hearing must be filed at least 22 days in advance of hearing date.

DOCKET: COMMISSION HEARING - WEDNESDAY - MARCH 7, 1979

OIL CONSERVATION COMMISSION - 9 A.M. - ROOM 205
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

CASE 6489: Application of J. V. Fritts and Wm. B. Barnhill for review of Order No. R-4831, Eddy County, New Mexico. Applicants, in the above-styled cause, seek the review and interpretation of Order No. R-4831 to permit them the opportunity to join in the drilling of the Federal "B" Well No. 1 located in Unit P of Section 1, Township 18 South, Range 26 East, Atoka-Pennsylvanian Pool, Eddy County, New Mexico, and to determine the applicability of the 200% risk factor.

CASE 6398: (DE NOVO)

Application of Texas Oil & Gas Corporation for an unorthodox gas well location, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location for the Wolfcamp and Pennsylvanian formations of its State Com Well No. 1, to be located 660 feet from the South and West lines of Section 18, Township 21 South, Range 26 East, Catclaw Draw Field, Eddy County, New Mexico, all of said Section 18 to be dedicated to the well in the Morrow formation.

Upon application of Texas Oil & Gas Corporation this case will be heard De Novo pursuant to the provisions of Rule 1220.

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Docket No. 11-79

DOCKET: EXAMINER HEARING - WEDNESDAY - MARCH 14, 1979

9 A.M. - OIL CONSERVATION DIVISION CONFERENCE ROOM,
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

The following cases will be heard before Daniel S. Nutter, Examiner, or Richard L. Stamets, Alternate Examiner:

ALLOWABLE: (1) Consideration of the allowable production of gas for April, 1979, from fifteen prorated pools in Lea, Eddy, and Chaves Counties, New Mexico.

(2) Consideration of the allowable production of gas for April, 1979, from four prorated pools in San Juan, Rio Arriba, and Sandoval Counties, New Mexico.

CASE 6490: Application of L. C. Harris for a unit agreement, Chaves and Eddy Counties, New Mexico. Applicant, in the above-styled cause, seeks approval for his Walnut Draw Unit Area comprising 9,797 acres, more or less, of Federal, state and fee lands in Townships 15 and 16 South, Ranges 23 and 24 East, Chaves and Eddy Counties, New Mexico.

CASE 6491: Application of C & E Operators, Inc. for an unorthodox well location and a non-standard proration unit, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks approval of an 80-acre non-standard gas proration unit comprising the E/2 SW/4 of Section 10, Township 30 North, Range 11 West, Aztec-Pictured Cliffs Pool, San Juan County, New Mexico, to be dedicated to a well to be located 1700 feet from the South line and 1760 feet from the West line of said Section 10.

CASE 6477: (Continued from February 28, 1979, Examiner Hearing)

Application of Sun Oil Company for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project on its East Millman Pool Unit Area by the injection of water into the Queen and Grayburg formations through eleven wells located in Sections 12 and 13 of Township 19 South, Range 28 East, East Millman Pool, Eddy County, New Mexico.

CASE 6492: Application of Yates Petroleum Corporation for compulsory pooling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the San Andres formation underlying the NE/4 NW/4 of Section 13, Township 17 South, Range 25 East, Eddy County, New Mexico, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision. Also to be considered will be the designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 6072: (Reopened and Readvertised)

In the matter of Case 6072 being reopened pursuant to the provisions of Order No. R-5643 which order created the Travis-Upper Pennsylvanian Pool, Eddy County, New Mexico, with provisions for 80-acre spacing. All interested parties may appear and show cause why the Travis-Upper Pennsylvanian Pool should not be developed on 40-acre spacing units.

CASE 6493: Application of Merrion & Bayless for gas well commingling, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks approval for the surface commingling, prior to measurement, of Pictured Cliffs production from the Hi Roll Wells Nos. 1 and 2 located in Units O and K of Section 35, Township 27 North, Range 13 West, San Juan County, New Mexico.

CASE 6494: Application of Morris R. Antweil for an unorthodox gas well location and simultaneous dedication, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of his Mesa Macho Well No. 1 located in Unit O of Section 24, Township 20 South, Range 27 East, Morrow formation, Eddy County, New Mexico, the E/2 of said Section 24 to be simultaneously dedicated to the aforesaid well and to applicant's Macho Norte Well No. 1 located in Unit G of Section 24.

CASE 6495: Application of Amax Chemical Corporation for the amendment of Order No. R-111-A. Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Order No. R-111-A to extend the boundaries of the Potash-Oil Area by the inclusion of certain lands in Sections 23 and 24, Township 19 South, Range 29 East, Sections 1, 4, 5, 6, 7, 11, 12, 13, 14, 19, 20, 23, 24, and 29, Township 19 South, Range 30 East, and Sections 7, 8, 17, 18, and 19, Township 19 South, Range 31 East, all in Eddy County, New Mexico.

CASE 6496: Application of Llano, Inc. for rescission of pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the rescission of Order No. R-3006, which promulgated 640-acre spacing for the Grama Ridge-Morrow Gas Pool, Lea County, New Mexico. Applicant proposes that said pool be developed and operated under 320-acre spacing and well location requirements.

CASE 6497: Application of Llano, Inc. for an unorthodox gas well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a well to be located 1650 feet from the South line and 660 feet from the East line of Section 34, Township 21 South, Range 34 East, Grama Ridge-Morrow Gas Pool, Lea County, New Mexico, the E/2 of said Section 34 to be dedicated to the well.

CASE 6498: Application of Pogo Producing Company to limit application of pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks to limit the application of the Grama Ridge-Morrow Gas Pool Rules to the horizontal limits of said pool, being all of Sections 2, 3, 4, and 10, Township 22 South, Range 34 East and Sections 33 and 34, Township 21 South, Range 34 East, Lea County, New Mexico.

CASE 6499: In the matter of the hearing called by the Oil Conservation Division on its own motion for an order creating and extending horizontal limits and contracting vertical limits of certain pools in Chaves, Eddy, Lea, and Roosevelt Counties, New Mexico:

(a) CREATE a new pool in Eddy County, New Mexico, classified as a gas pool for Morrow production and designated as the Antelope Sink-Morrow Gas Pool. The discovery well is Maddox Energy Corporation State 32 Well No. 1 located in Unit I of Section 32, Township 18 South, Range 24 East, NMPM. Said pool would comprise:

TOWNSHIP 18 SOUTH, RANGE 24 EAST, NMPM
Section 32: E/2

(b) CREATE a new pool in Eddy County, New Mexico, classified as a gas pool for Morrow production and designated as the Baldridge Canyon-Morrow Gas Pool. The discovery well is W. A. Moncrief, Jr., Baldridge Canyon Com Well No. 1 located in Unit C of Section 13, Township 24 South, Range 24 East, NMPM. Said pool would comprise:

TOWNSHIP 24 SOUTH, RANGE 24 EAST, NMPM
Section 13: E/2

(c) CREATE a new pool in Eddy County, New Mexico, classified as an oil pool for Delaware production and designated as the Burton Flat-Delaware Pool. The discovery well is Yates Petroleum Corporation Stonewall EP State Well No. 3 located in Unit N of Section 19, Township 20 South, Range 28 East, NMPM. Said pool would comprise:

TOWNSHIP 20 SOUTH, RANGE 28 EAST, NMPM
Section 19: SW/4

(d) CREATE a new pool in Lea County, New Mexico, classified as an oil pool for San Andres production and designated as the East Crossroads-San Andres Pool. The discovery well is MGF Oil Corporation Santa Fe Railway Well No. 1 located in Unit A of Section 13, Township 10 South, Range 36 East, NMPM. Said pool would comprise:

TOWNSHIP 10 SOUTH, RANGE 36 EAST, NMPM
Section 13: NE/4

(e) CREATE a new pool in Eddy County, New Mexico, classified as a gas pool for Atoka production and designated as the South Culebra Bluff-Atoka Gas Pool. The discovery well is Delta Drilling Company South Culebra Bluff Unit Well No. 1 located in Unit G of Section 23, Township 23 South, Range 28 East, NMPM. Said pool would comprise:

TOWNSHIP 23 SOUTH, RANGE 28 EAST, NMPM
Section 14: E/2
Section 23: All
Section 26: All

(f) CREATE a new pool in Eddy County, New Mexico, classified as a gas pool for Morrow production and designated as the Dublin Ranch-Morrow Gas Pool. The discovery well is J. C. Barnes Oil Company Big Chief Com Well No. 1 located in Unit F of Section 22, Township 22 South, Range 28 East, NMPM. Said pool would comprise:

TOWNSHIP 22 SOUTH, RANGE 28 EAST, NMPM
Section 22: All
Section 27: N/2

(g) CREATE a new pool in Eddy County, New Mexico, classified as a gas pool for Morrow production and designated as the Gardner Draw-Morrow Gas Pool. The discovery well is Phoenix Resources Company Gardner Draw Unit Well No. 1 located in Unit C of Section 20, Township 19 South, Range 21 East, NMPM. Said pool would comprise:

TOWNSHIP 19 SOUTH, RANGE 21 EAST, NMPM
Section 17: W/2
Section 19: N/2
Section 20: N/2

(h) CREATE a new pool in Chaves County, New Mexico, classified as a gas pool for Pennsylvanian production and designated as the Jubilee-Pennsylvanian Gas Pool. The discovery well is Tom L. Ingram Jubilee Well No. 1 located in Unit E of Section 28, Township 10 South, Range 29 East, NMPM. Said pool would comprise:

TOWNSHIP 10 SOUTH, RANGE 29 EAST, NMPM
Section 28: W/2

(i) CREATE a new pool in Lea County, New Mexico, classified as a gas pool for Mississippian production and designated as the King-Mississippian Gas Pool. The discovery well is Cabot Corporation J. L. Reed Well No. 1 located in Unit H of Section 35, Township 13 South, Range 37 East, NMPM. Said pool would comprise:

TOWNSHIP 13 SOUTH, RANGE 37 EAST, NMPM
Section 35: NE/4

(j) CREATE a new pool in Chaves County, New Mexico, classified as a gas pool for Atoka production and designated as the Lone Wolf-Atoka Gas Pool. The discovery well is Depco, Inc. Sundance A Federal Well No. 1 located in Unit J of Section 25, Township 12 South, Range 29 East, NMPM. Said pool would comprise:

TOWNSHIP 12 SOUTH, RANGE 29 EAST, NMPM
Section 25: S/2

(k) CREATE a new pool in Chaves County, New Mexico, classified as a gas pool for Strawn production and designated as the Lost Lake-Strawn Gas Pool. The discovery well is Texas Oil & Gas Corporation O'Brien Well No. 1 located in Unit I of Section 11, Township 9 South, Range 29 East, NMPM. Said pool would comprise:

TOWNSHIP 9 SOUTH, RANGE 29 EAST, NMPM
Section 2: S/2
Section 11: All
Section 14: N/2

(l) CREATE a new pool in Lea County, New Mexico, classified as a gas pool for Morrow production and designated as the West Mescalero-Morrow Gas Pool. The discovery well is Natomas North America, Inc. New Mexico State Well No. 1 located in Unit M of Section 19, Township 10 South, Range 32 East, NMPM. Said pool would comprise:

TOWNSHIP 10 SOUTH, RANGE 32 EAST, NMPM
Section 19: W/2

(m) CREATE a new pool in Eddy County, New Mexico, classified as a gas pool for Permo-Penn production and designated as the Penasco Draw Permo-Penn Gas Pool. The discovery well is Yates Petroleum Corporation La Cama Com Well No. 1 located in Unit F of Section 20, Township 18 South, Range 25 East, NMPM. Said pool would comprise:

TOWNSHIP 18 SOUTH, RANGE 25 EAST, NMPM
Section 18: S/2
Section 19: All
Section 20: All
Section 21: W/2
Section 30: All
Section 31: All

(n) CREATE a new pool in Eddy County, New Mexico, classified as a gas pool for Morrow production and designated as the Siegrest Draw-Morrow Gas Pool. The discovery well is Yates Petroleum Corporation Siegrest JS State Com Well No. 1 located in Unit C of Section 30, Township 19 South, Range 24 East, NMPM. Said pool would comprise:

TOWNSHIP 19 SOUTH, RANGE 24 EAST, NMPM
Section 30: N/2

(o) CREATE a new pool in Eddy County, New Mexico, classified as a gas pool for Atoka production and designated as the North Turkey Track-Atoka Gas Pool. The discovery well is Amoco Production Company State ER Com Well No. 1 located in Unit G of Section 6, Township 19 South, Range 29 East, NMPM. Said pool would comprise:

TOWNSHIP 19 SOUTH, RANGE 29 EAST, NMPM
Section 6: N/2

(p) EXTEND the Angell Ranch-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 27 EAST, NMPM
Section 35: E/2

(q) EXTEND the Buffalo Valley-Pennsylvanian Gas Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 15 SOUTH, RANGE 28 EAST, NMPM
Section 17: S/2

(r) EXTEND the Cato-San Andres Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 8 SOUTH, RANGE 31 EAST, NMPM
Section 5: NW/4 SW/4

(s) EXTEND the Cedar Lake-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 17 SOUTH, RANGE 30 EAST, NMPM
Section 25: W/2
Section 26: E/2
Section 36: NW/4

(t) EXTEND the East Chisum-San Andres Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 11 SOUTH, RANGE 28 EAST, NMPM
Section 9: E/2 NE/4
Section 10: W/2 NW/4

(u) EXTEND the South Corbin-Wolfcamp Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 33 EAST, NMPM
Section 20: SW/4

(v) EXTEND the Double I. Queen Associated Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 14 SOUTH, RANGE 29 EAST, NMPM
Section 24: NW/4 and E/2 SW/4
Section 36: NW/4 NW/4, S/2 NW/4 and SW/4

(w) EXTEND the Drinkard Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 22 SOUTH, RANGE 37 EAST, NMPM
Section 18: SE/4

(x) EXTEND the East Eagle Creek Atoka-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 26 EAST, NMPM
Section 7: N/2

(y) EXTEND the Grama Ridge-Morrow Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 21 SOUTH, RANGE 34 EAST, NMPM
Section 35: All

(z) REDEFINE the vertical limits of the Monument Tubb-Drinkard Pool in Lea County, New Mexico, to include only the Tubb formation and redesignate said pool as the Monument-Tubb Pool.

(aa) EXTEND the West Indian Basin-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 21 SOUTH, RANGE 22 EAST, NMPM
Section 23: E/2

(bb) EXTEND the Millman-Strawn Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 27 EAST, NMPM
Section 12: E/2

(cc) EXTEND the South Prairie-Wolfcamp Pool in Roosevelt County, New Mexico, to include therein:

TOWNSHIP 8 SOUTH, RANGE 36 EAST, NMPM
Section 20: N/2

(dd) EXTEND the Querecho Plains-Bone Spring Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 32 EAST, NMPM
Section 34: NW/4

(ee) EXTEND the Richard Knob Atoka-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 25 EAST, NMPM
Section 7: All
Section 18: N/2

(ff) EXTEND the Round Tank-Queen Associated Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 15 SOUTH, RANGE 29 EAST, NMPM
Section 30: NE/4

(gg) EXTEND the South Salt Lake-Morrow Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 21 SOUTH, RANGE 32 EAST, NMPM
Section 5: Lots 11, 12, 13, 14 and SW/4

(hh) EXTEND the North Teague-Devonian Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 23 SOUTH, RANGE 37 EAST, NMPM
Section 22: NW/4

(ii) EXTEND the Tomahawk-San Andres Pool in Roosevelt County, New Mexico, to include therein:

TOWNSHIP 7 SOUTH, RANGE 32 EAST, NMPM
Section 30: SW/4

(jj) EXTEND the Twin Lakes-San Andres Associated Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 8 SOUTH, RANGE 28 EAST, NMPM
Section 36: NE/4

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Docket No. 12-79

DOCKET: COMMISSION HEARING - THURSDAY - MARCH 15, 1979

OIL CONSERVATION COMMISSION - 9 A.M. - ROOM 205
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

CASE 6222: (Rehearing) (Continued from March 2, 1979, Commission Hearing)

Application of Paul Hamilton for salt water disposal well shut-in, Lea County, New Mexico. Upon application of Paul Hamilton there will be a rehearing of Case No. 6222, Order No. R-5753. This case involves the application of Paul Hamilton for an order shutting down salt water disposal operations in the Texaco Inc., New Mexico State "BO" SWD Well No. 3, located in Unit D of Section 24, Township 11 South, Range 32 East, Moore-Devonian Pool, Lea County, New Mexico. Pursuant to Commission Order No. R-5753-A, evidence at said rehearing shall be limited to evidence relating to data regarding water quality and water level obtained from an observation well completed next to the aforesaid SWD Well No. 3, and to other new evidence unavailable at the time of the original hearing of this case on May 31, 1978.

PHILLIPS PETROLEUM COMPANY
ODESSA, TEXAS 79762
4001 PENBROOK

NATURAL RESOURCES GROUP
Exploration and Production

March 12, 1979

Hearing Docket 11-79, Case 6496,
Grama-Ridge Morrow Gas Pool,
Lea County, New Mexico

State of New Mexico
Energy and Minerals Department
Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Attention: Mr. Joe D. Ramey,
Director

Gentlemen:

Case 6496 is the application of Llano, Inc., for rescission of pool rules (Order No. R-3006) which promulgated 640-acre spacing for the Grama-Ridge Morrow Gas Pool, Lea County, New Mexico. Llano's application proposes that said pool be developed and operated under 320-acre spacing and well location requirements.

Phillips Petroleum Company, as a 25 percent working interest owner in the Getty-operated State "36" COM No. 1, which is currently being drilled in Unit F, Section 36, T-21-S, R-34-E, hereby supports Getty's opposition to the Llano application in the subject case.

Phillips Petroleum Company believes that the geological and reservoir pressure continuity exhibited between the recently completed Getty-operated Grama-Ridge Morrow gas wells, located in Unit F, Section 2, T-22-S, R-34-E, and in Unit K, Section 35, T-21-S, R-34-E, will not warrant reduction in pool spacing to 320 acres at this time.

Very truly yours,

PHILLIPS PETROLEUM COMPANY

J. W. Maharg
Engineering Director, Odessa Area

WJM:dva

cc: Getty Oil Company
P. O. Box 1231
Midland, Texas 79702

10000 Old Katy Road
Suite 100
Houston, Texas 77055
Telephone (713) 932-4700
Cable: BELPETEX

Boucher

Belco Petroleum Corporation

Belco

March 9, 1979

New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico

RE: Case 6496
Docketed for 3-14-79
Application of Llano, Inc.
Rescission of Pool Rules
Gramma Ridge-Morrow Pool
Lea County, New Mexico

Gentlemen:

Belco Petroleum Corporation is an affected party by this case, being a co-owner with Getty Oil Company in properties located in Section 35, T21S, R34E, Lea County, New Mexico and Section 2, T22S, R34E, Lea County, New Mexico. Belco has been informed by Getty that Getty intends to object to and contest Llano's application for rescission of Order R-3006, which promulgated 640 acre Spacing for the Gramma Ridge-Morrow Pool, Lea County,

Belco supports Getty in this matter. We further contend that rescission of the Order is not taken with good faith in the Spacing Order. Getty et al undertook good faith in applications conforming to rules for the drilling of the offsetting Getty 2 State 1 in Section 2, and the Getty 35-1 in Section 35 which were drilled then in conformity to the existing Spacing Order. We contend that the spacing regulation provided for protection of offsetting correlative rights, and should continue to do so.

In the absence of a waiver from the direct offsetting owners, Belco contends that approval of Llano's application in Case 6496 will violate the correlative rights of the offsetting owners of existing pool exterior wells which were drilled in conformity with requirements.

Sincerely,

BELCO PETROLEUM CORPORATION

Lee G. Nering
Administrative Geologist

LGN:jlb

SABINE PRODUCTION COMPANY
901 Wall Towers East 201 Wall Street Midland, Texas 79701 (915) 683-5607

C. H. Madsen
District Geologist

March 12, 1979

Mr. Chris Boseker
Getty Oil Company
Post Office Box 1231
Midland, Texas 79702

RE: Gramma Ridge Field
Getty "36" State Com. #1
1980-N 1650-W, 36-21-34
Lea County, New Mexico

Dear Mr. Boseker:

Sabine Production Company is a 1/4 working interest participant in the subject well.

With reference to NMOCC Hearing 3-14-79, Case 6496, Sabine Production Company supports Getty Oil Company in the cause of retention of 640 acre spacing for the Gramma Ridge Field.

Further, on Case 6497, Sabine Production Company supports Getty Oil Company in the cause of unorthodox locations.

6497

Very truly yours,

SABINE PRODUCTION COMPANY

C. H. Madsen

C. H. Madsen

/wb

10000 Old Katy Road
Suite 100
Houston, Texas 77055
Telephone (713) 932-4700
Cable: BELPETEX

Belco Petroleum Corporation

Belco

March 9, 1979

New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico

RE: Case 6496
Docketed for 3-14-79
Application of Llano, Inc.
Rescission of Pool Rules
Gramma Ridge-Morrow Pool
Lea County, New Mexico

Gentlemen:

Belco Petroleum Corporation is an affected party by this case, being a co-owner with Getty Oil Company in properties located in Section 35, T21S, R34E, Lea County, New Mexico and Section 2, T22S, R34E, Lea County, New Mexico. Belco has been informed by Getty that Getty intends to object to and contest Llano's application for rescission of Order R-3006, which promulgated 640 acre Spacing for the Gramma Ridge-Morrow Pool, Lea County,

Belco supports Getty in this matter. We further contend that rescission of the Order is not taken with good faith in the Spacing Order. Getty et al undertook good faith in applications conforming to rules for the drilling of the offsetting Getty 2 State 1 in Section 2, and the Getty 35-1 in Section 35 which were drilled then in conformity to the existing Spacing Order. We contend that the spacing regulation provided for protection of offsetting correlative rights, and should continue to do so.

In the absence of a waiver from the direct offsetting owners, Belco contends that approval of Llano's application in Case 6496 will violate the correlative rights of the offsetting owners of existing pool exterior wells which were drilled in conformity with requirements.

Sincerely,

BELCO PETROLEUM CORPORATION

Lee G. Nering

Lee G. Nering
Administrative Geologist

LGN:jlb

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OPERATOR		

Form C-105
Revised 1-1-65

Redman
Lite

NEW MEXICO OIL CONSERVATION COMMISSION
WELL COMPLETION OR RECOMPLETION REPORT AND LOG

5-NMOCC
1-R.J. Starrak-Tulsa
1-A.B. Cary-Midland
1-J.D. Mc Coy-Houston
3 - WIO
Belco
Mesa
Southland
1-File
1-Engr

5a. Indicate Type of Lease: State [XX] Fee [ ]

5. State Oil & Gas Lease No.: LG-1207

1a. TYPE OF WELL
OIL WELL [ ] GAS WELL [XX] DRY [ ] OTHER

b. TYPE OF COMPLETION
NEW WELL [XX] WORK OVER [ ] DEEPEN [ ] PLUG BACK [ ] DIFF. RESVR. [ ] OTHER

7. Unit Agreement Name:

2. Name of Operator: GETTY OIL COMPANY

8. Farm or Lease Name: TWO STATE

3. Address of Operator: P. O. BOX 730, HOBBS, NEW MEXICO 88240

9. Well No.: 1

4. Location of Well
UNIT LETTER F LOCATED 1980 FEET FROM THE NORTH LINE AND 1980 FEET FROM

10. Field and Pool, or Wildcat: UNDESIGNATED

THE SOUTH LINE OF SEC. 2 TWP. 22-S RGE. 34-E NMPM

12. County: LEA

BWK JFE CFL CFL
ABC
LRH

GETTY OIL COMPANY
MAR 20 1978
MIDLAND DISTRICT
PRODUCTION DEPARTMENT

15. Date Spudded	16. Date T.D. Reached	17. Date Compl. (Ready to Prod.)	18. Elevations (DF, RKB, RT, GR, etc.)	19. Elev. Cashinghead
10-30-77	1-16-78	2-13-78	2608' GR	--

20. Total Depth	21. Plug Back T.D.	22. If Multiple Compl., How Many	23. Intervals Drilled By	Rotary Tools	Cable Tools
13,381'	13,360'		→	0 - TD	--

24. Producing Interval(s), of this completion — Top, Bottom, Name
12,759 - 13,322 MORROW

25. Was Directional Survey Made: YES

26. Type Electric and Other Logs Run
DUAL LATERLOG, BHC SONIC, COMP. NEUTRON, NEUTRON, NEUTRON DENSITY.

27. Was Well Cored: NO

28. CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT LB./FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13-3/8	48	402	17-1/2	500 CLASS C	-
10-3/4	40.5,45.5,51	5,577	12-1/4	2350 LITE & CLASS "C"	-
7-5/8	39,33.7,29.7	11,694	9-1/2	2165 LITE & CLASS H	-

29. LINER RECORD

SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN
5"	11,387	13,379	350	

30. TUBING RECORD

SIZE	DEPTH SET	PACKER SET
2-3/8"	12,638	12,638

31. Perforation Record (Interval, size and number)
12,941-13,129 9 - .25" Holes
12,761-13,322 7 - .25" Holes
12,759-12,763-1/2 8 - .25" Holes

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL	AMOUNT AND KIND MATERIAL USED
12,941-13,129	2,500 Gals. 7-1/2 NE Acid
12,761-12,941	2,500 Gals. 7-1/2 NE Acid

33. PRODUCTION

Date First Production	Production Method (Flowing, gas lift, pumping — Size and type pump)	Well Status (Prod. or Shut-in)
2-14-78	FLOWING	SHUT-IN

Date of Test	Hours Tested	Choke Size	Prod'n. For Test Period →	Oil — Bbl.	Gas — MCF	Water — Bbl.	Gas—Oil Ratio
2-14-78	24	VARIOUS					-

Flow Tubing Press.	Casing Pressure	Calculated 24-Hour Rate →	Oil — Bbl.	Gas — MCF	Water — Bbl.	Oil Gravity — API (Corr.)
1000	PKR.			1,965		

34. Disposition of Gas (Sold, used for fuel, vented, etc.)
WAITING ON GAS CONNECTION.

Test Witnessed By: [illegible]

35. List of Attachments
DEVIATION SCHEDULE

OIL CONSERVATION DIVISION
Getty DISTRICT NO. 2

36. I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.

ORIGINAL SIGNED BY
DALE R. CROCKETT

SIGNED Dale R. Crockett TITLE AREA SUPERINTENDENT DATE 3-15-78

/bh

3 - NMOCC - Santa Fe
1 - Midland
1 - Hobbs File

NEW MEXICO OIL CONSERVATION COMMISSION

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Form C-122
Revised 9-1-6

Type Test: XX Initial ☐ Annual ☐ Special				Test Date: 2-13-78	
Company: GETTY OIL COMPANY			Connection: NOT AVAILABLE		Unit
Pool: GAMMA RIDGE MORROW			Formation: MORROW		
Completion Date: 2-6-78	Total Depth: 13,381		Plug Back TD: 13,360	Elevation: 3608.2 GL	Lease Name: GETTY "2" STATE
Csg. Size: 5" / Wt.: 18.0 / d: 4.276 / Set At: 13,379			Perforations: From 12,759' To 13,322'		Well No.: 1
Tbg. Size: 2-3/8" / Wt.: 4.7 / d: 1.995 / Set At: 12,638			Perforations: From To		Unit: F / Sec.: 2 / Twp.: 22-S / Rge.: 35-E
Type Well – Single – Bradenhead – G.G. or G.O. Multiple: SINGLE			Packer Set At: 12,638'		County: LEA
Producing Thru: TUBING	Reservoir Temp. °F: 183 @ 13,322	Mean Annual Temp. °F: 60	Bar. Press. – P_a: 13.2		State: NEW MEXICO

L	H	Gg	% CO_2	% N_2	% H_2S	Prover	Meter Run	Taps
12,638'	12,638'	0.609	0.32	0.26	–	–	4"	FLANGE

NO.	FLOW DATA: Prover Line Size X Orifice Size	Press. p.s.i.g.	Diff. h_w	Temp. °F	TUBING DATA: Press. p.s.i.g.	Temp. °F	CASING DATA: Press. p.s.i.g.	Temp. °F	Duration of Flow
SI	4" X 1.5"				6467	58	PACKER		SI 78 Hr
1.	4" X 1.5"	630	10.2	95	4350	65			4.0"
2.	4" X 1.5"	640	19.0	94	2800	64			4.5"
3.	4" X 1.5"	600	28.0	92	1760	61			3.5"
4.	4" X 1.5"	630	31.0	92	1000	60			4.0"
5.									

RATE OF FLOW CALCULATIONS

NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P_m	Flow Temp. Factor Ft.	Gravity Factor Fg	Super Compress. Factor, Fpv	Rate of Flow Q, Mcfd
1	10.84	80.20	643.2	.9952	1.281	1.046	1159
2.	10.84	111.40	653.2	.9963	1.281	1.049	1617
3.	10.84	131.03	613.2	.9990	1.281	1.046	1901
4.	10.84	141.21	643.2	1.0000	1.281	1.049	2057
5.							

NO.	P_t	Temp. °R	T_c	Z
1.	6.49	555	1.45	0.877
2.	4.24	554	1.45	0.752
3.	2.67	552	1.44	0.755
4.	1.59	552	1.44	0.830
5.				

Gas Liquid Hydrocarbon Ratio _____ Mcf/bbl.
A.P.I. Gravity of Liquid Hydrocarbons _____ Deg.
Specific Gravity Separator Gas 0.609 XXXXXXXXXX
Specific Gravity Flowing Fluid XXXXX
Critical Pressure 671 P.S.I.A. _____ P.S.I.A.
Critical Temperature 362 R _____ R

P_c 6480.2 P_c^2 41,993

NO	P_t^2	P_w	P_w^2	$P_c^2 - P_w^2$
1		4358.4	18995.7	22997.3
2		2816	7929.9	34063.1
3		1790.5	3205.9	38787.1
4		1063.7	1131.5	40861.5
5				

(1) $\frac{P_c^2}{P_c^2 - P_w^2}$ = 1.233 $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n$ = 1.215

AOF = Q $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n$ = 1965

Absolute Open Flow 1965 Mcfd @ 15.025 Angle of Slope θ Slope, n 0.928

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Getty EXHIBIT NO. 3
CASE NO. 6496

Remarks:

Approved By Commission:	Conducted By:	Calculated By:	Checked By:
	GETTY OIL COMPANY	M. Y. MERCHANT	DALE R. CROCKETT

Form C-105
Revised 1-1-65

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NEW MEXICO OIL CONSERVATION COMMISSION
WELL COMPLETION OR RECOMPLETION REPORT AND LOG

5-NMOCC
1-R.J. Starrak-Tulsa
1-A.B. Cary-Midland
1-J.D. Mc Coy-Houston
3 - WIO
Belco
Mesa
Southland
1-File
1-Engr

5a. Indicate Type of Lease: State [XX] Fee [ ]

5. State Oil & Gas Lease No.: LG-1207

7. Unit Agreement Name:

1a. TYPE OF WELL: OIL WELL [ ] GAS WELL [XX] DRY [ ] OTHER

b. TYPE OF COMPLETION: NEW WELL [XX] WORK OVER [ ] DEEPEN [ ] PLUG BACK [ ] DIFF. RESVR. [ ] OTHER

8. Farm or Lease Name: TWO STATE

9. Well No.: 1

2. Name of Operator: GETTY OIL COMPANY

10. Field and Pool, or Wildcat: UNDESIGNATED

3. Address of Operator: P. O. BOX 730, HOBBS, NEW MEXICO 88240

4. Location of Well: UNIT LETTER F LOCATED 1980 FEET FROM THE NORTH LINE AND 1980 FEET FROM

12. County: LEA

THE SOUTH LINE OF SEC. 2 TWP. 22-S RGE. 34-E NMPM

15. Date Spudded	16. Date T.D. Reached	17. Date Compl. (Ready to Prod.)	18. Elevations (DF, RKB, RT, GR, etc.)	19. Elev. Cashinghead
10-30-77	1-16-78	2-13-78	2608' GR	--

20. Total Depth	21. Plug Back T.D.	22. If Multiple Compl., How Many	23. Intervals Drilled By	Rotary Tools	Cable Tools
13,381'	13,360'		→	0 - TD	--

24. Producing Interval(s), of this completion — Top, Bottom, Name: 12,759 - 13,322 MORROW

25. Was Directional Survey Made: YES

26. Type Electric and Other Logs Run: DUAL LATERLOG, BHC SONIC, COMP. NEUTRON, NEUTRON, NEUTRON DENSITY.

27. Was Well Cored: NO

CASING RECORD (Report all strings set in well)

28. CASING SIZE	WEIGHT LB./FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13-3/8	48	402	17-1/2	500 CLASS C	-
10-3/4	40.5,45.5,51	5,577	12-1/4	2350 LITE & CLASS "C"	-
7-5/8	39,33.7,29.7	11,694	9-1/2	2165 LITE & CLASS H	-

LINER RECORD

29. SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN
5"	11,387	13,379	350	

TUBING RECORD

30. SIZE	DEPTH SET	PACKER SET
2-3/8"	12,638	12,638

31. Perforation Record (Interval, size and number)
12,941-13,129 — 9 - .25" Holes
12,761-13,322 — 7 - .25" Holes
12,759-12,763-1/2 — 8 - .25" Holes

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL	AMOUNT AND KIND MATERIAL USED
12,941-13,129	2,500 Gals. 7-1/2 NE Acid
12,761-12,941	2,500 Gals. 7-1/2 NE Acid

PRODUCTION

33. Date First Production	Production Method (Flowing, gas lift, pumping — Size and type pump)	Well Status (Prod. or Shut-in)
2-14-78	FLOWING	SHUT-IN

Date of Test	Hours Tested	Choke Size	Prod'n. For Test Period →	Oil — Bbl.	Gas — MCF	Water — Bbl.	Gas — Oil Ratio
2-14-78	24	VARIOUS			P 1,965		

Flow Tubing Press.	Casing Pressure	Calculated 24-Hour Rate →	Oil — Bbl.	Gas — MCF	Water — Bbl.	Oil Gravity — API (Corr.)
1000	PKR.					

34. Disposition of Gas (Sold, used for fuel, vented, etc.): WAITING ON GAS CONNECTION.

Test Witnessed By

35. List of Attachments: DEVIATION SCHEDULE

36. I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.

SIGNED ORIGINAL SIGNED BY DALE R. CROCKETT Dale R. Crockett TITLE AREA SUPERINTENDENT DATE 3-15-78

/bh

GETTY OIL COMPANY
MAR 20 1978
MIDLAND PRODUCTION DEPARTMENT

INSTRUCTIONS

This form is to be filed with the appropriate District Office of the Commission not later than 20 days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radioactivity logs run in the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. The form is to be filed in quintuplicate except on state land, where six copies are required. See Rule 1105.

INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

Southeastern New Mexico				Northwestern New Mexico			
T. Anhy		T. Canyon	11,750'	T. Ojo Alamo		T. Penn. "B"	
T. Salt	1690'	T. Strawn	11,925'	T. Kirtland-Fruitland		T. Penn. "C"	
B. Salt	3600'	T. Atoka		T. Pictured Cliffs		T. Penn. "D"	
T. Yates	3790'	T. Miss		T. Cliff House		T. Leadville	
T. 7 Rivers		T. Devonian		T. Menefee		T. Madison	
T. Queen		T. Silurian		T. Point Lookout		T. Elbert	
T. Grayburg		T. Montoya		T. Mancos		T. McCracken	
T. San Andres		T. Simpson		T. Gallup		T. Ignacio Qtzte	
T. Glorieta		T. McKee		Base Greenhorn		T. Granite	
T. Paddock		T. Ellenburger		T. Dakota		T.	
T. Blinebry		T. Gr. Wash		T. Morrison		T.	
T. Tubb		T. Granite		T. Todilto		T.	
T. Drinkard		T. Delaware Sand		T. Entrada		T.	
T. Abo		T. Bone Springs		T. Wingate		T.	
T. Wolfcamp	11,230'	T. Morrow	12,440'	T. Chinle		T.	
T. Penn.		T. Morrow Classtics		T. Permian		T.	
T. Cisco (Bough C)		T.	@ 12,687'	T. Penn. "A"		T.	

XXXXXXXXXXXX XXXX OR GAS SANDS OR ZONES

No. 1, from	11,750'	to	11,820'	No. 4, from	13,022'	to	13,343'
No. 2, from	12,759'	to	12,764'	No. 5, from		to	
No. 3, from	12,938'	to	12,958'	No. 6, from		to	

IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from ..... to ..... feet. .....

No. 2, from ..... to ..... feet. .....

No. 3, from ..... to ..... feet. .....

No. 4, from ..... to ..... feet. .....

FORMATION RECORD (Attach additional sheets if necessary)

From	To	Thickness in Feet	Formation	From	To	Thickness in Feet	Formation
0	90	90	Surface - Redbed	9640	10698	1058	Lime, Shale
90	408	318	Redbed, Sand, Gravel	10698	10746	48	Chert, Shale, Lime
308	1326	918	Redbed, Anhydrite	10746	11250	504	Shale, Lime
1326	3146	1820	Anhydrite	11250	11378	128	Shale, Lime, Sand
3146	3690	544	Anhydrite, Salt	11378	11621	243	Shale, Lime
3690	4075	385	Sandstone	11621	11759	138	Shale
4075	4255	180	Dolomite	11759	11854	95	Lime
4255	4586	331	Sand, Dolomite	11854	11926	72	Lime, Chert
4586	4718	132	Lime, Sand, Dolomite	11926	11947	21	Lime
4718	5532	814	Sand, Lime	11947	11970	23	Lime, Shale
5532	5577	45	Lime, Dolomite	11970	12070	100	Lime, Sand, Shale
5577	6021	444	Sand	12070	12169	99	Shale
6021	7071	1050	Lime, Sand	12169	12542	373	Shale, Lime
7071	7429	358	Sand, Lime, Shale	12542	12565	23	Shale
7429	7808	379	Shale, Lime	12565	12584	19	Lime, Shale
7808	7948	140	Shale	12584	12593	9	Shale, Lime, Chert
7948	9268	1320	Shale, Lime	12593	12613	20	Shale
9268	9640	372	Lime	12613	12764	151	Shale, Lime

(CONTINUED)

3 - NMOCC - Santa Fe
1 - Midland
1 - Hobbs File

NEW MEXICO OIL CONSERVATION COMMISSION
MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Form C-122
Revised 9-1-65

Type Test: [XX] Initial [ ] Annual [ ] Special — Test Date: 2-13-78

Company: GETTY OIL COMPANY — Connection: NOT AVAILABLE

Pool: GAMMA RIDGE MORROW — Formation: MORROW — Unit:

Completion Date: 2-6-78 — Total Depth: 13,381 — Plug Back TD: 13,360 — Elevation: 3608.2 GL — Lease Name: GETTY "2" STATE

Csg. Size	Wt.	d	Set At	Perforations	Well No.
5"	18.0	4.276	13,379	From 12,759' To 13,322'	1

Tbg. Size	Wt.	d	Set At	Perforations	Unit	Sec.	Twp.	Rge.
2-3/8"	4.7	1.995	12,638	From To	P	2	22-S	35-E

Type Well – Single – Bradenhead – G.G. or G.O. Multiple: SINGLE — Packer Set At: 12,638' — County: LEA

Producing Thru	Reservoir Temp. °F	Mean Annual Temp. °F	Bar. Press. – P_a	State
TUBING	183 @ 13,322	60	13.2	NEW MEXICO

L	H	Gg	% CO_2	% N_2	% H_2S	Prover	Meter Run	Taps
12,638'	12,638'	0.609	0.32	0.26	-	-	4"	FLANGE

NO.	FLOW DATA: Prover Line Size	X	Orifice Size	Press. p.s.i.g.	Diff. h_w	Temp. °F	TUBING DATA: Press. p.s.i.g.	Temp. °F	CASING DATA: Press. p.s.i.g.	Temp. °F	Duration of Flow
SI	4"	X	1.5"				6467	58	PACKER		SI 78 Hr
1.	4"	X	1.5"	630	10.2	95	4350	65			4.0"
2.	4"	X	1.5"	640	19.0	94	2800	64			4.5"
3.	4"	X	1.5"	600	28.0	92	2760	61			3.5"
4.	4"	X	1.5"	630	31.0	92	2000	60			4.0"
5.											

RATE OF FLOW CALCULATIONS

NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P_m	Flow Temp. Factor Ft.	Gravity Factor Fg	Super Compress. Factor, Fpv	Rate of Flow Q, Mcfd
1	10.84	80.20	643.2	.9952	1.281	1.046	1159
2.	10.84	111.40	653.2	.9963	1.281	1.049	1617
3.	10.84	131.03	613.2	.9990	1.281	1.046	1901
4.	10.84	141.21	643.2	1.0000	1.281	1.049	2057
5.							

NO.	P_t	Temp. °R	T_r	Z
1.	6.49	555	1.45	0.877
2.	4.24	554	1.45	0.752
3.	2.67	552	1.44	0.755
4.	1.59	552	1.44	0.830
5.				

Gas Liquid Hydrocarbon Ratio _____ Mcf/bbl.
A.P.I. Gravity of Liquid Hydrocarbons _____ Deg.
Specific Gravity Separator Gas 0.609 XXXXXXXXXX
Specific Gravity Flowing Fluid XXXXX
Critical Pressure 671 P.S.I.A. _____ P.S.I.A.
Critical Temperature 362 R _____ R

P_c 6480.2 P_c^2 41,993

NO	P_t^2	P_w	P_w^2	$P_c^2 - P_w^2$
1		4358.4	18995.7	22997.3
2		2816	7929.9	34063.1
3		1790.5	3205.9	38787.1
4		1063.7	1131.5	40861.5
5				

(1) $\frac{P_c^2}{P_c^2 - P_w^2} = 1.233$ $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 1.215$

AOF = Q $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]$ = 1965

Absolute Open Flow 1965 Mcfd @ 15.025 — Angle of Slope θ — Slope, n 0.928

Remarks:

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
EXHIBIT NO. 3
CASE NO. 6496

Approved By Commission:	Conducted By:	Calculated By:	Checked By:
	GETTY OIL COMPANY	M. Y. MERCHANT	DALE R. CROCKETT

(Signed) D. R. CROCKETT

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LAND OFFICE		
OPERATOR		

Form C-105
Revised 11-1-58

NEW MEXICO OIL CONSERVATION COMMISSION
WELL COMPLETION OR RECOMPLETION REPORT AND LOG

3-NMOCC-HOBBS
1-R. J. STARRAK-TULSA
1-A. B. CARY-MIDLAND
1-FILE
1-MMI, ENGR.
1-BELCO-MIDLAND
1-SOUTHLAND-MIDLAND
1-MESA-MIDLAND
1-BH, FIELD CLERK

5a. Indicate Type of Lease: State [X] Fee [ ]

5. State Oil & Gas Lease No.: L-723

1a. TYPE OF WELL: OIL WELL [X] GAS WELL [X] DRY [ ] OTHER Dual

b. TYPE OF COMPLETION: NEW WELL [X] WORK OVER [ ] DEEPEN [ ] PLUG BACK [ ] DIFF. RESVR. [ ] OTHER

7. Unit Agreement Name: -

8. Farm or Lease Name: Getty "35" State

2. Name of Operator: Getty Oil Company

9. Well No.: 1

3. Address of Operator: P. O. Box 730, Hobbs, New Mexico 88240

10. Field and Pool, or Wildcat: Wolfcamp / Grama Ridge Morrow

4. Location of Well: UNIT LETTER K LOCATED 2310 FEET FROM THE South LINE AND 1650 FEET FROM

THE West LINE OF SEC. 35 TWP. 21S RGE. 34E NMPM

12. County: Lea

15. Date Spudded	16. Date T.D. Reached	17. Date Compl. (Ready to Prod.)	18. Elevations (DF, RKB, RT, GR, etc.)	19. Elev. Cashinghead
3-15-78 (w)	10-25-78	10-11-78 Wolfcamp 1-3-79 Morrow	3675.8 GR	-

20. Total Depth	21. Plug Back T.D.	22. If Multiple Compl., How Many	23. Intervals Drilled By	Rotary Tools	Cable Tools
13,355	13,265	Dual	——→	810'-13,355'	0-810'

24. Producing Interval(s), of this completion — Top, Bottom, Name

10,810-10,828 Wolfcamp - Oil
12,907-13,102 Morrow - Gas

25. Was Directional Survey Made: Yes

26. Type Electric and Other Logs Run: BHC, CNL-FDC; DLL; and Dipmeter 13,100-10,832',
Cement Bond Log: & PFC - Schlumberger

27. Was Well Cored: Yes

28. CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT LB. FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
20		29	24	3 yds. Ready Mix	
13 3/8	48	398	16	950 sxs Cement Circ.	
10 3/4	51,45.5 & 40.5	4496	12 ¼	2750 sxs Cement Circ.	575 sxs circ.
7 5/8	39,33.7 & 29.7	10832	9 ¼	1955 sxs	

29. LINER RECORD

SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN
5"	10,389	13,354	575 sxs	

30. TUBING RECORD

SIZE	DEPTH SET	PACKER SET
2 3/8 Dual	10,187	10,187
2 3/8	12,200	12,200

31. Perforation Record (Interval, size and number)

Wolfcamp: 10,810,12,14,16,18,20,22,24,26, & 28' = 10 (.36") holes.

Morrow: 12,907,09,11,14,16,18,20,22,24; 13,071,81,85,92,94,98,100, & 102 = 17 (.36") holes

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL	AMOUNT AND KIND MATERIAL USED
10,810-28' (Wolf.)	5000 gals. MOD 202 15% - 15 ball sealers.

33. PRODUCTION

Date First Production	Production Method (Flowing, gas lift, pumping - Size and type pump)	Well Status (Prod. or Shut-in)
Wolfcamp 11-10-78 Morrow 1-3-79	Flowing Flowing	Producing Producing

Date of Test	Hours Tested	Choke Size	Prod'n. For Test Period	Oil - Bbl.	Gas - MCF	Water - Bbl.	Gas - Oil Ratio
Wolfcamp 11-15-78	24 hrs.	20/64"	→	600	1,153	799	1921/1
Morrow 1-8-79	4 Pt.	Various		-	-	-	-

Flow Tubing Press.	Casing Pressure	Calculated 24-Hour Rate	Oil - Bbl.	Gas - MCF	Water - Bbl.	Oil Gravity - API (Corr.)
Wolfcamp 1765#	Packer	→	600	1,153	799	44.6
Morrow 4400#	Packer		-	AOF 11,107	-	

34. Disposition of Gas (Sold, used for fuel, vented, etc.): Sold — Test Witnessed By

35. List of Attachments: Deviation Schedule & 4 Point Test

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Getty EXHIBIT NO. 4
CASE NO. 6496

36. I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.

SIGNED Dale R. Crockett — TITLE Area Superintendent — DATE 1-25-79

INSTRUCTIONS

This form is to be filed with the ap[illegible]ate District Office of the Commission not lat[illegible] than 20 days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radioactivity l[illegible]gs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. The form is to be filed in quintuplicate except for state land, where six copies are required. See Rule 1105.

INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

Southeastern New Mexico		Northwestern New Mexico	
T. Anhy	T. Canyon	T. Ojo Alamo	T. Penn. "B"
T. Salt	T. Strawn 11,682'	T. Kirtland-Fruitland	T. Penn. "C"
B. Salt	T. Atoka (Lime) 12,151'	T. Pictured Cliffs	T. Penn. "D"
T. Yates 4,160'	T. Miss	T. Cliff House	T. Leadville
T. 7 Rivers	T. Devonian	T. Menefee	T. Madison
T. Queen	T. Silurian	T. Point Lookout	T. Elbert
T. Grayburg	T. Montoya	T. Mancos	T. McCracken
T. San Andres	T. Simpson	T. Gallup	T. Ignacio Qtzte
T. Glorieta	T. McKee	Base Greenhorn	T. Granite
T. Paddock	T. Ellenburger	T. Dakota	T.
T. Blinebry	T. Gr. Wash	T. Morrison	T.
T. Tubb	T. Granite	T. Todilto	T.
T. Drinkard	T. Delaware Sand	T. Entrada	T.
T. Abo	T. Bone Springs 8,342'	T. Wingate	T.
T. Wolfcamp (Shale) 10,070'	T. Morrow cl. 12,800'	T. Chinle	T.
T. Penn.	T. Morrow 12,907'	T. Permian	T.
T Cisco (Bough C)	T. Rustler 1,724	T. Penn. "A"	T.

OIL OR GAS SANDS OR ZONES

No. 1, from 10,810 to 10,832 No. 4, from 13,069 to 13,102

No. 2, from 11,778 to 11,836 No. 5, from ..... to .....

No. 3, from 12,733 to 12,924 No. 6, from ..... to .....

IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from None to ..... feet. .....

No. 2, from ..... to ..... feet. .....

No. 3, from ..... to ..... feet. .....

No. 4, from ..... to ..... feet. .....

FORMATION RECORD (Attach additional sheets if necessary)

From	To	Thickness in Feet	Formation	From	To	Thickness in Feet	Formation
			(See Attached Sheet)				

EXHIBIT V

NEW MEXICO OIL CONSERVATION COMMSSION

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Form C-122
Revised 9-1-65

Type Test: [x] Initial [ ] Annual [ ] Special				Test Date: 1-23-79	
Company: Getty Oil Company			Connection: Llano, Inc.		
Pool: Grama Ridge Morrow			Formation: Morrow		Unit: -
Completion Date: 1-3-79	Total Depth: 13,355'		Plug Back TD: 13,265'	Elevation: 3675.8 GL	Farm or Lease Name: Getty "35" State
Csg. Size: 5" / Wt.: 18.0 / d: 4.276 / Set At: 13,355			Perforations: From 12,907 To 13,102		Well No.: 1
Tbg. Size: 2 3/8" / Wt.: 4.7 / d: 1.995 / Set At: 12,200			Perforations: From - To -		Unit: K / Sec.: 35 / Twp.: 21-S / Rge.: 34-E
Type Well – Single – Bradenhead – G.G. or G.O. Multiple: Morrow Gas/Wolfcamp Oil - Dual			Packer Set At: 10,187'/12,200'		County: Lea
Producing Thru: Tubing	Reservoir Temp. °F: 175° @ 13,352	Mean Annual Temp. °F: 60	Baro. Press. – P_a: 13.2 psia		State: New Mexico

L	H	Gg	% CO_2	% N_2	% H_2S	Prover	Meter Run	Taps
12,200	12,200	0.599	0.592	0.511	-	-	3"	Flange

NO.	FLOW DATA: Prover Line Size X Orifice Size	Press. p.s.i.g.	Diff. h_w	Temp. °F	TUBING DATA: Press. p.s.i.g.	Temp. °F	CASING DATA: Press. p.s.i.g.	Temp. °F	Duration of Flow
SI					5970	57	Packer	-	SI 92 hrs & 15 min
1.	3" x 1.75" 4/64"	490	10	85	5500	64	-	-	30 min.
2.	3" x 1.75" 6/64"	500	21	84	5200	64	-	-	45 min.
3.	3" x 1.75" 8/64"	505	34	83	4775	63	-	-	45 min.
4.	3" x 1.75" 12/64"	530	62	83	4400	64	-	-	30 min.
5.									

RATE OF FLOW CALCULATIONS

NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P_m	Flow Temp. Factor Ft.	Gravity Factor Fg	Super Compress. Factor, Fpv	Rate of Flow Q, Mcfd
1	20.15	70.94	503.2	.9768	1.292	1.040	1876
2.	20.15	103.81	513.2	0.9777	1.292	1.040	2748
3.	20.15	132.74	518.2	0.9786	1.292	1.049	3547
4.	20.15	183.52	543.2	0.9786	1.292	1.045	4886
5.							

NO.	P_t	Temp. °R	T_f	Z
1.				
2.				
3.				
4.				
5.				

Gas Liquid Hydrocarbon Ratio _____ Mcf/bbl.
A.P.I. Gravity of Liquid Hydrocarbons _____ Deg.
Specific Gravity Separator Gas _____ XXXXXXXXX
Specific Gravity Flowing Fluid XXXXX
Critical Pressure 671 P.S.I.A. _____ P.S.I.A.
Critical Temperature 362 R _____ R

*P_c 7468.2 P_c^2 55.774

NO	P_t^2	P_w *	P_w^2	$P_c^2 - P_w^2$
1		6969.2	48.570	7.204
2		6538.2	42.748	13.026
3		6405.2	41.027	14.747
4		5829.2	33.980	21.794
5				

(1) $\frac{P_c^2}{P_c^2 - P_w^2}$ = 2.559 (2) $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n$ = 2.273

AOF = Q $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n$ = 11,107

RECEIVED
JAN 31 1979
O. C. D.
HOBBS, OFFICE

CASE NO. 6496

Absolute Open Flow 11,107 Mcfd @ 15.025 Angle of Slope θ _____ Slope, n .874

Remarks:
*Pc & Pw from bottom hole pressure recorder @ (-9329) 13005'

Approved By Commission:	Conducted By:	Calculated By:	Checked By:
	M.Y. Merchant	M.Y. Merchant	D. R. Crockett

API # 30-025-26236

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NEW MEXICO OIL CONSERVATION COMMISSION — Form C-101 — Revised 1-1-65

OCS-NMOCC - Hobbs — 1 - File
1-R.J. Starrak-Tulsa — 1 - [illegible]
1-A.B. Cary-Midland — 1 - Foreman
1-Ed, Field Clerk

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

Type of Work: Drill ☒ Deepen ☐ Plug Back ☐

Type of Well: Oil ☒ Gas ☐ Single Zone ☐ Multiple Zone ☒

Name of Operator: GETTY OIL COMPANY

Address of Operator: P.O. BOX 730, HOBBS, NEW MEXICO 88240

Location of Well: Unit Letter E, 1980 Feet From The NORTH Line and 1650 Feet From The WEST Line, Section 36, Township 21-S, Range 34-E, NMPM

Lease Name or Unit Agreement Name: GETTY "36" STATE COM

Well No.: 1

Field and Pool, or Wildcat: GRAMA RIDGE

Proposed Depth: 13,400

Formation: MORROW *

Rotary or C.T.: ROTARY

Elevations (Show whether DF, RT, GR, etc.): 3674' GL

Kind & Status of Plug Bond: BLANKET

Drilling Contractor: SHARP DRILLING COMPANY

Approx. Date Work will start: 2-17-79

PROPOSED CASING AND CEMENT PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	SACKS OF CEMENT	EST. TOP
20"	20"	94	40'	READY MIX	SURFACE
17-1/2"	13-3/8"	48	1100'	1000	SURFACE
12-1/4"	8-5/8"	36	5600'	2400	SURFACE
8-3/4"	7"	26	11700'	1500	5000'
6-1/8"	4-1/2"	11.6	13400'	600	11500' TOP

1. The above casing program will be used to drill and test the Morrow formation, and any other possible producing zones. A 3M system will be used, and mud weight will be gradually increased from 8.5#/gallon to 13.0#/gallon if necessary.
2. See attachments for BOP's and choke manifold.

* Deepest Zone will be Morrow - well could be dual in either Morrow-Strawn, or Morrow-Wolfcamp, depending on the productivity.

APPROVED
OIL CONSERVATION DIVISION
CASE NO. 6496
ORDER NO. R-6

I HEREBY CERTIFY that the information above is true and complete to the best of my knowledge and belief.

Signed: DALE R. CROCKETT — Title: AREA SUPERINTENDENT — Date: February 12, 1979

(This space for State Use)

APPROVED BY: [signature] — TITLE: SUPERVISOR DISTRICT II — DATE: FEB 14 1979

CONDITIONS OF APPROVAL, IF ANY:

/ch

C-3-NMOCC
-R.J. Starrak-Tulsa
-A.B. Cary-Midland
1-File
1-Foreman

NEW MEXICO OIL CONSERVATION COMMISSION
WELL LOCATION AND ACREAGE DEDICATION PLAT

Form C-102
Supersedes C-128
Effective 1-1-65

All distances must be from the outer boundaries of the Section

Operator: Getty Oil Co.	Lease: Getty "36" State		Well No.: 1
Unit Letter: F	Section: 36	Township: 21 South	Range: 34 East	County: Lea
Actual Footage Location of Well: 1980 feet from the North line and 1650 feet from the West line			
Ground Level Elev.: 3674.1	Producing Formation:	Pool: Grama Ridge	Dedicated Acreage: 640 Acres

1. Outline the acreage dedicated to the subject well by colored pencil or hachure marks on the plat below.

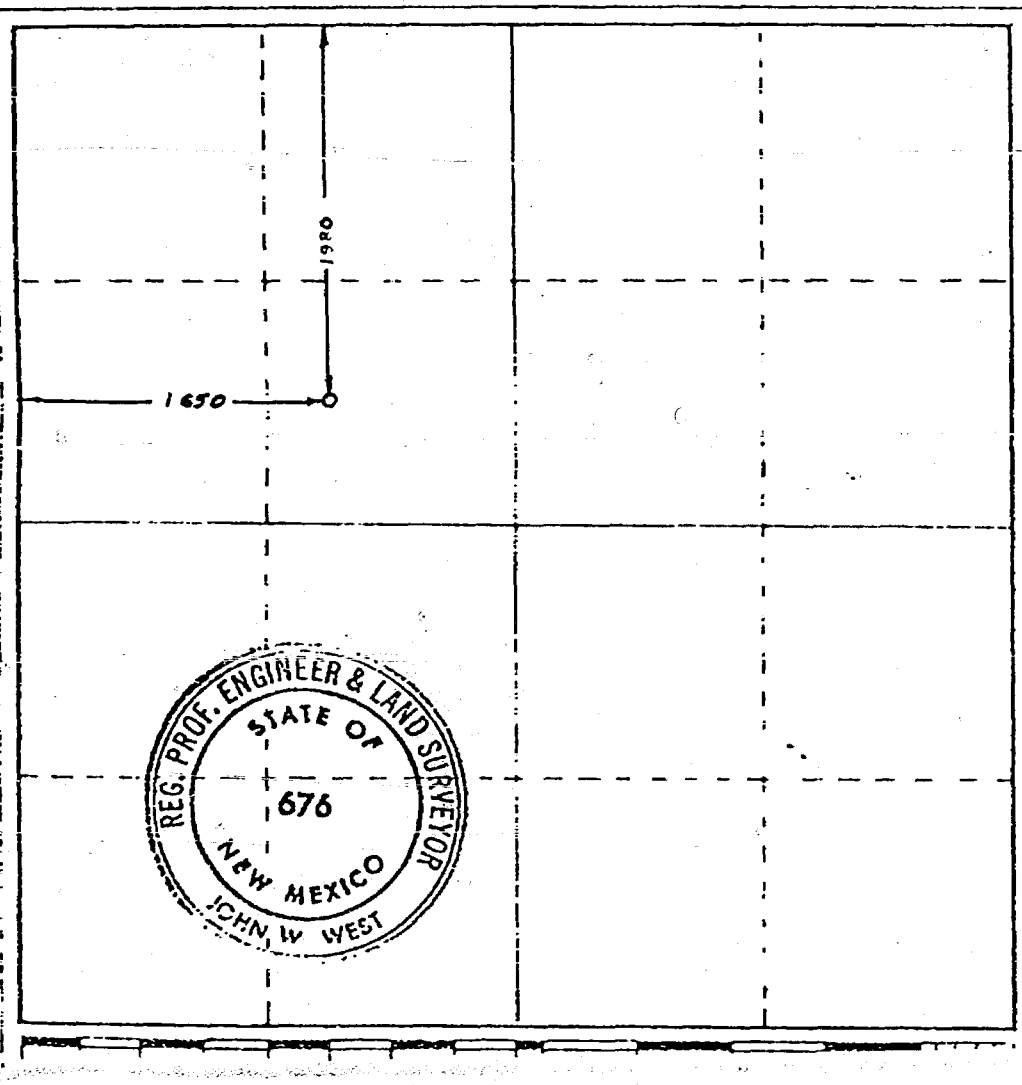
2. If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).

3. If more than one lease of different ownership is dedicated to the well, have the interests of all owners been consolidated by communitization, unitization, force-pooling, etc?

[XX] Yes [ ] No If answer is "yes," type of consolidation Communitization

If answer is "no," list the owners and tract descriptions which have actually been consolidated. (Use reverse side of this form if necessary.) _____

No allowable will be assigned to the well until all interests have been consolidated (by communitization, unitization, forced-pooling, or otherwise) or until a non-standard unit, eliminating such interests, has been approved by the Commission.



CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief.

ORIGINAL SIGNED BY
DALE R. CROCKETT

Name: Dale R. Crockett

Position: Area Superintendent

Company: Getty Oil Company

Date: February 12, 1979

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed: February 7, 1979

Registered Professional Engineer and/or Land Surveyor

Certificate No. John W. West

DATA SHEET

Getty Two State Well No. 1
Gramma Ridge Morrow Field
Pressure Buildup Test No. 1
February 14-17, 1978

Horner Plot of the captioned test is attached. The interpretation of this plot is as follows;

1. No boundaries are present.
2. The plot reflects a two-layer reservoir performance.
3. The P*, initial reservoir pressure, is 8,270 psig.

Summary of Kh calculations:

1. The stabilized production rate was 1798 MCF/D or 320,214 B/D.
2. Gas viscosity was 0.03484 cp.
3. Bg, reservoir gas volume factor, was 2.79 $(10)^{-3}$ ft/SCF.
4. Horner Plot slope is 75 psi/ cycle.
5. Kh is 67.5 md.-ft.
6. K based 33' net pay is 2.0 m.d.

Conclusion:

1. No boundary is indicated.
2. Permeability is moderate.
3. The reservoir parameters in the area of the wellbore should efficiently deplete a 640 acre proration unit.

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Getty EXHIBIT NO. 10
CASE NO. 6496

DATA SHEET

Getty Two State Well No. 1
Gramma Ridge Morrow Field
Pressure Buildup Test No. 2
December 9-12, 1978

Horner Plot of the captioned test is attached. The interpretation of this plot is as follows;

1. No boundaries are present.
2. A single-layer reservoir type plot is shown as compared to a two-layer type indicated by pressure buildup test No. 1.
3. P*, reservoir pressure, was 7850 psig compared to test No. 1 P* of 8270 psig, or a decrease of 420 psi.

Summary of Kh Calculations:

1. The stabilized production rate was 1,527 MCF/D or 271,950 Bbls. gas/D.
2. Gas viscosity was 0.03323 cp.
3. Bg, reservoir gas volume factor, was $(2.85)(10)^{-3}$ ft^3/ft^3
4. Horner Plot slope is 57 psi/cycle
5. Kh was 73.5 md. ft.
6. K based on 33 net feet pay is 2.2 m.d.

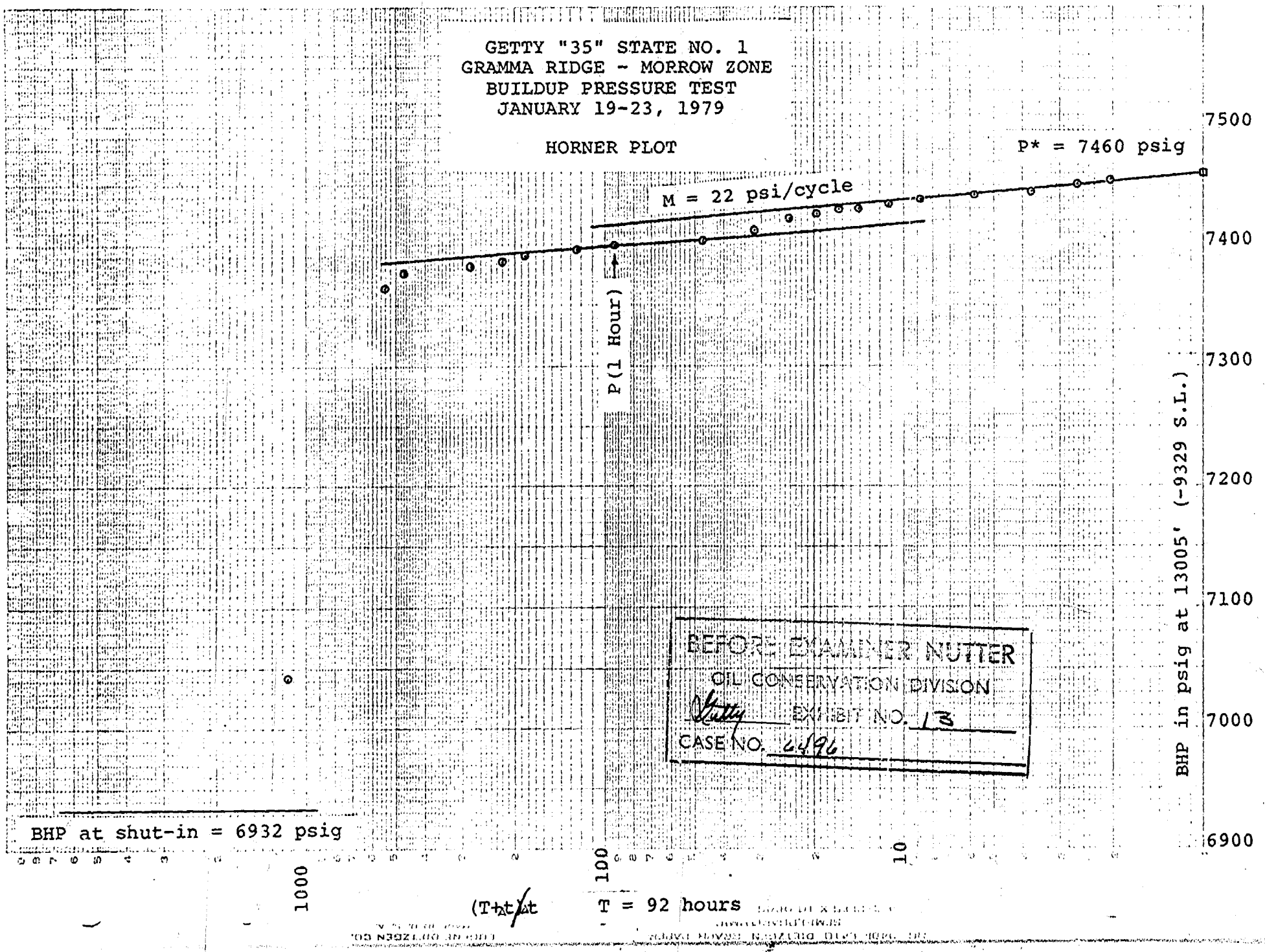
Conclusions:

1. No boundary is indicated.
2. The permeability is moderate and slightly increased as compared to the previous buildup test.
3. The reservoir parameters in the area of the wellbore should efficiently deplete a 640 acre proration unit.

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Getty EXHIBIT NO. 12
CASE NO. 6496

GETTY "35" STATE NO. 1
GRAMMA RIDGE - MORROW ZONE
BUILDUP PRESSURE TEST
JANUARY 19-23, 1979

HORNER PLOT



DATA SHEET

Getty "35" State Well No. 1
Gramma Ridge - Morrow Field
Pressure Buildup Test No. 1
January 19-23, 1979

Horner Plot of the captioned test is attached. The interpretation of this plot is as follows;

1. No boundaries are present.
2. The plot reflects a two-layer reservoir performance.
3. The P*, initial reservoir pressure, is 7,460 psig.

Summary of Kh calculations:

1. The stabilized production rate was 1437 MCF/day or 255,922 Bbls./Day.
2. The gas viscosity is 0.03224 cp at reservoir conditions.
3. Bg, reservoir gas volume factor, is 2.88×10^{-3} cuft./SCF
4. Horner Plot slope is 22 psi/cycle.
5. Kh is 175.6 m.d. - ft.
6. Based on 32 productive feet, permeability is 5.5 m.d.

Conclusions:

1. No boundary is indicated.
2. Permeability is good, being greater than calculated for Getty Two State Well No. 1
3. The reservoir parameters in the area of the wellbore should efficiently deplete a 640 proration unit.
4. The lower initial pressure at the Getty "35" State reflects pressure communication with the Getty Two State.

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Getty EXHIBIT NO. 14
CASE NO. 6496

TABULATION OF PRODUCTION
GRAMA RIDGE MORROW FIELD

		Condensate Bbls.	Gas MCF
Getty "2" State Well No. 1	May, 1978		488
	June		44,926
	July	294	54,354
	Aug.	497	53,410
	Sept.	367	39,074
	Oct.	355	48,991
	Nov.	364	45,131
	Dec.	476	43,649
	TOTAL	2,353	330,023
	Jan.	515	51,769
	Feb.	339	47,600*
CUM. (3-1-79)		3,207	429,392

CURRENT PRODUCTION RATE

1700 MCFPD, 17 BC, 7/64" ch., 3175 psi T.P.

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
Getty EXHIBIT NO. 15
CASE NO. 6496

GETTY OIL COMPANY
GETTY TWO STATE NO. 1
GRAMMA RIDGE MORROW FIELD
LEA COUNTY, NEW MEXICO

GAS PRODUCED

GAS PRODUCTION - MCF/MONTH

100

10

1978 1979 1980 1981 1982

BEFORE EXAMINER NUTTER
OIL CONSERVATION DIVISION
EXHIBIT NO. 16A
CASE NO. 6196

TABULATION OF PRODUCTION
GRAMA RIDGE MORROW FIELD

		Condensate Bbls.	Gas MCF
Getty "35" State Well No. 1	Nov. 1978	1,732	3,109
	Dec.	0	0
	TOTAL	3,419	3,109
	Jan.	121	22,015
	Feb.	1,566	87,164*
CUM. (3-1-79)		3,419	112,588

CURRENT PRODUCTION RATE

3962 MCFD, 18 BC, 52 BW, 10/64" ch., 4700 psi T.P.

*Estimated based on current rate.

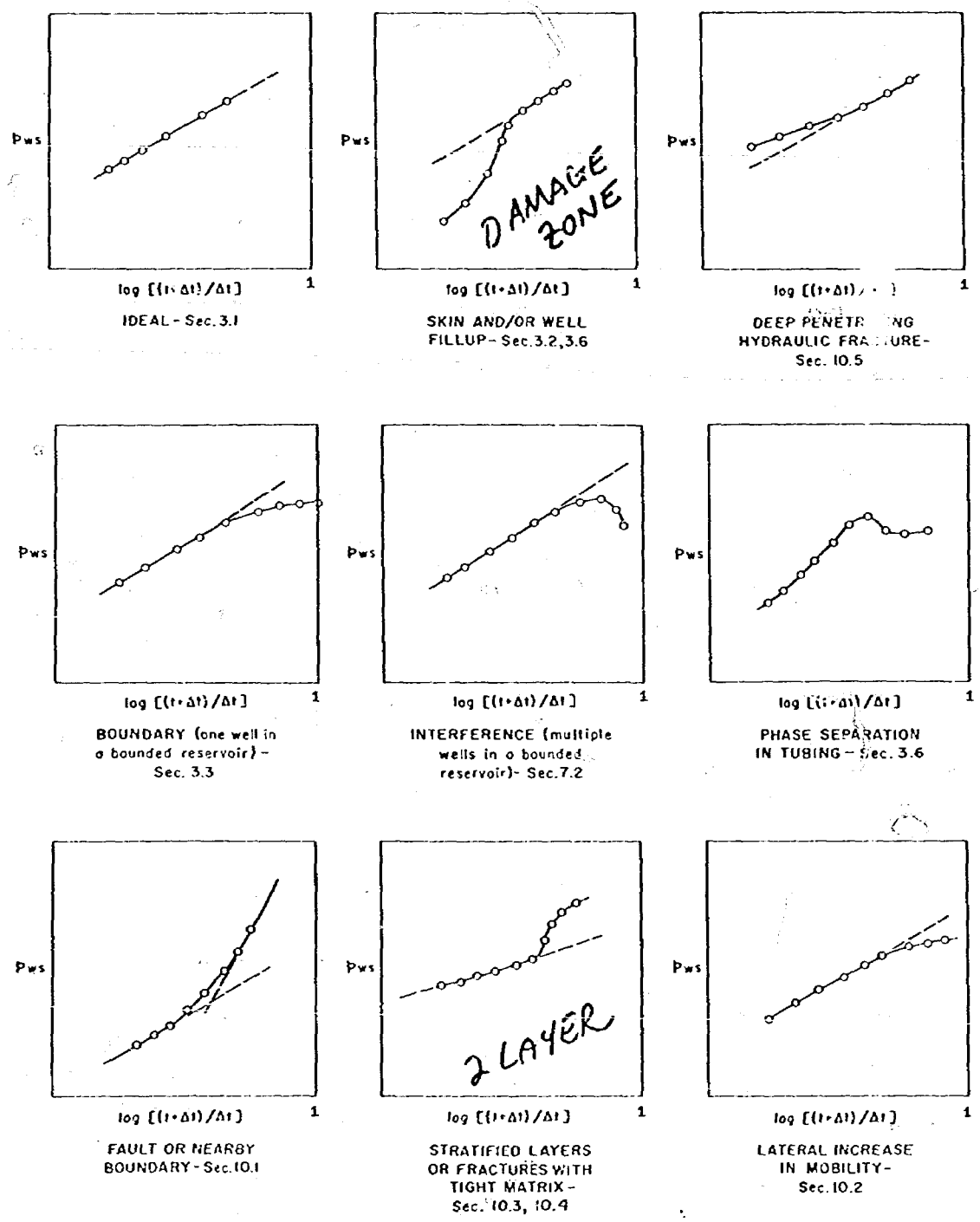


Fig. 11.6 Example buildup curves.

sure from Bottom Hole Pressure Build-up Characteristics", *Trans.*, AIME (1950) 189, 91-104.

5. Russell, D. G. and Truitt, N. E.: "Transient Pressure Behavior in Vertically Fractured Reservoirs", *J. Pet. Tech.* (Oct., 1964) 1159-1170.
6. Odeh, A. S. and Nabor, G. W.: "The Effect of Production History on Determination of Formation Characteristics From Flow Tests", *J. Pet. Tech.* (Oct., 1966) 1343-1350.
7. Nisle, R. G.: "The Effect of a Short Term Shut-In on a Subsequent Pressure Build-up Test on an Oil Well", *Trans.*, AIME (1956) 207, 320-321.
8. Lozano, G. and Harthorn, W. A.: "Field Test Confirms Accuracy of New Bottom-Hole Pressure Gauge", *J. Pet. Tech.* (Feb., 1959) 26-29.
9. Jones, L. G.: "Reservoir Reserve Tests", *J. Pet. Tech.* (March, 1963) 333-337.
10. van Poollen, H. K.: "Radius of Drainage and Stabilization Time Equations", *Oil and Gas J.* (Sept. 14, 1964) 133.

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Form C-105
Revised 1-1-65

NEW MEXICO OIL CONSERVATION COMMISSION

WELL COMPLETION OR RECOMPLETION REPORT AND LOG

5-NMOCC 3 - WIO 1-File
1-R.J. Starrak-Tulsa Belco 1-Engr
1-A.B. Cary-Midland Mesa
1-J.D. Mc.Coy-Houston Southland

BWK JFE CF CFD ABC LRH

5a. Indicate Type of Lease: State [X] Fee [ ]

5. State Oil & Gas Lease No.: LG-1207

1a. TYPE OF WELL: OIL WELL [ ] GAS WELL [XX] DRY [ ] OTHER

b. TYPE OF COMPLETION: NEW WELL [XX] WORK OVER [ ] DEEPEN [ ] PLUG BACK [ ] DIFF. RESVR. [ ] OTHER

7. Unit Agreement Name:

2. Name of Operator: GETTY OIL COMPANY

8. Farm or Lease Name: TWO STATE

3. Address of Operator: P. O. BOX 730, HOBBS, NEW MEXICO 88240

9. Well No.: 1

4. Location of Well: UNIT LETTER F LOCATED 1980 FEET FROM THE NORTH LINE AND 1980 FEET FROM THE

10. Field and Pool, or Wildcat: UNDESIGNATED

THE SOUTH LINE OF SEC. 2 TWP. 22-S RGE. 34-E NMPM

12. County: LEA

GETTY OIL COMPANY
MAR 20 1978
MIDLAND, TEXAS
PRODUCTION DEPARTMENT

15. Date Spudded	16. Date T.D. Reached	17. Date Compl. (Ready to Prod.)	18. Elevations (DF, RKB, RT, GR, etc.)	19. Elev. Cashinghead
10-30-77	1-16-78	2-13-78	2608' GR	--

20. Total Depth	21. Plug Back T.D.	22. If Multiple Compl., How Many	23. Intervals Drilled By	Rotary Tools	Cable Tools
13,381'	13,360'		→	0 - TD	--

24. Producing Interval(s), of this completion — Top, Bottom, Name: 12,759 - 13,322 MORROW

25. Was Directional Survey Made: YES

26. Type Electric and Other Logs Run: DUAL LATERLOG, BHC SONIC, COMP. NEUTRON, NEUTRON, NEUTRON DENSITY.

27. Was Well Cored: NO

28. CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT LB./FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13-3/8	48	402	17-1/2	500 CLASS C	-
10-3/4	40.5,45.5,51	5,577	12-1/4	2350 LITE & CLASS "C"	-
7-5/8	39,33.7,29.7	11,694	9-1/2	2165 LITE & CLASS H	-

29. LINER RECORD

SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN
5"	11,387	13,379	350	

30. TUBING RECORD

SIZE	DEPTH SET	PACKER SET
2-3/8"	12,638	12,638

31. Perforation Record (Interval, size and number)

12,941-13,129 9 - .25" Holes
12,761-13,322 7 - .25" Holes
12,759-12,763-1/2 8 - .25" Holes

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL	AMOUNT AND KIND MATERIAL USED
12,941-13,129	2,500 Gals. 7-1/2 NE Acid
12,761-12,941	2,500 Gals. 7-1/2 NE Acid

33. PRODUCTION

Date First Production	Production Method (Flowing, gas lift, pumping — Size and type pump)	Well Status (Prod. or Shut-in)
2-14-78	FLOWING	SHUT-IN

Date of Test	Hours Tested	Choke Size	Prod'n. For Test Period →	Oil — Bbl.	Gas — MCF	Water — Bbl.	Gas — Oil Ratio
2-14-78	24	VARIOUS					-

Flow Tubing Press.	Casing Pressure	Calculated 24-Hour Rate →	Oil — Bbl.	Gas — MCF	Water — Bbl.	Oil Gravity — API (Corr.)
1000	PKR.			1,965		

34. Disposition of Gas (Sold, used for fuel, vented, etc.): WAITING ON GAS CONNECTION.

Test Witnessed By:

35. List of Attachments: DEVIATION SCHEDULE

36. I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.

ORIGINAL SIGNED BY
DALE R. CROCKETT

SIGNED Dale R. Crockett TITLE AREA SUPERINTENDENT DATE 3-15-78

/bh

Getty Ex 2 Case 6496

INSTRUCTIONS

This form is to be filed with the appropriate District Office of the Commission not later than 20 days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radio-activity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. The form is to be filed in quintuplicate except on state land, where six copies are required. See Rule 1105.

INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

Southeastern New Mexico		Northwestern New Mexico	
T. Anhy	T. Canyon	T. Ojo Alamo	T. Penn. "B"
T. Salt 1690'	T. Strawn 11,750'	T. Kirtland-Fruitland	T. Penn. "C"
B. Salt 3600'	T. Atoka 11,925'	T. Pictured Cliffs	T. Penn. "D"
T. Yates 3790'	T. Miss	T. Cliff House	T. Leadville
T. 7 Rivers	T. Devonian	T. Menefee	T. Madison
T. Queen	T. Silurian	T. Point Lookout	T. Elbert
T. Grayburg	T. Montoya	T. Mancos	T. McCracken
T. San Andres	T. Simpson	T. Gallup	T. Ignacio Qtzte
T. Glorieta	T. McKee	Base Greenhorn	T. Granite
T. Paddock	T. Ellenburger	T. Dakota	T.
T. Blinebry	T. Gr. Wash	T. Morrison	T.
T. Tubb	T. Granite	T. Todilto	T.
T. Drinkard	T. Delaware Sand	T. Entrada	T.
T. Abo	T. Bone Springs	T. Wingate	T.
T. Wolfcamp 11,230'	T. Morrow 12,440'	T. Chinle	T.
T. Penn.	T. Morrow Classtics	T. Permian	T.
T Cisco (Bough C)	T. @ 12,687'	T. Penn. "A"	T.

XXXXXXXXXXX OR GAS SANDS OR ZONES

No. 1, from 11,750' to 11,820' XXXXXXX No. 4, from 13,022' to 13,343'

No. 2, from 12,759' to 12,764' No. 5, from .... to ....

No. 3, from 12,938' to 12,958' No. 6, from .... to ....

IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from .... to .... feet. ....

No. 2, from .... to .... feet. ....

No. 3, from .... to .... feet. ....

No. 4, from .... to .... feet. ....

FORMATION RECORD (Attach additional sheets if necessary)

From	To	Thickness in Feet	Formation	From	To	Thickness in Feet	Formation
0	90	90	Surface - Redbed	9640	10698	1058	Lime, Shale
90	408	318	Redbed, Sand, Gravel	10698	10746	48	Chert, Shale, Lime
308	1326	918	Redbed, Anhydrite	10746	11250	504	Shale, Lime
1326	3146	1820	Anhydrite	11250	11378	128	Shale, Lime, Sand
3146	3690	544	Anhydrite, Salt	11378	11621	243	Shale, Lime
3690	4075	385	Sandstone	11621	11759	138	Shale
4075	4255	180	Dolomite	11759	11854	95	Lime
4255	4586	331	Sand, Dolomite	11854	11926	72	Lime, Chert
4586	4718	132	Lime, Sand, Dolomite	11926	11947	21	Lime
4718	5532	814	Sand, Lime	11947	11970	23	Lime, Shale
5532	5577	45	Lime, Dolomite	11970	12070	100	Lime, Sand, Shale
5577	6021	444	Sand	12070	12169	99	Shale
6021	7071	1050	Lime, Sand	12169	12542	373	Shale, Lime
7071	7429	358	Sand, Lime, Shale	12542	12565	23	Shale
7429	7808	379	Shale, Lime	12565	12584	19	Lime, Shale
7808	7948	140	Shale	12584	12593	9	Shale, Lime, Chert
7948	9268	1320	Shale, Lime	12593	12613	20	Shale
9268	9640	372	Lime	12613	12764	151	Shale, Lime

(CONTINUED)

3 - NMOCC - Santa Fe
1 - Midland ✓
1 - Hobbs File

NEW MEXICO OIL CONSERVATION COMMSSION

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Form C-122
Revised 9-1-6

Type Test: [XX] Initial [ ] Annual [ ] Special — Test Date: 2-13-78

Company: GETTY OIL COMPANY	Connection: NOT AVAILABLE		
Pool: GAMMA RIDGE MORROW	Formation: MORROW	Unit	
Completion Date: 2-6-78	Total Depth: 13,381	Plug Back TD: 13,360	Elevation: 3608.2 GL
Lease: GETTY "2" STATE			

Csg. Size	Wt.	d	Set At	Perforations	Well No.
5"	18.0	4.276	13,379	From 12,759' To 13,322'	1

Tbg. Size	Wt.	d	Set At	Perforations	Unit	Sec.	Twp.	Rge.
2-3/8"	4.7	1.995	12,638	From To	F	2	22-S	35-E

Type Well – Single – Bradenhead – G.G. or G.O. Multiple	Packer Set At	County
SINGLE	12,638'	LEA

Producing Thru	Reservoir Temp. °F	Mean Annual Temp. °F	Bar. Press. – P_a	State
TUBING	183 @ 13,322	60	13.2	NEW MEXICO

L	H	Gg	% CO_2	% N_2	% H_2S	Prover	Meter Run	Taps
12,638'	12,638'	0.609	0.32	0.26	–	–	4"	FLANGE

NO.	FLOW DATA: Prover Line Size X Orifice Size	Press. p.s.i.g.	Diff. h_w	Temp. °F	TUBING DATA: Press. p.s.i.g.	Temp. °F	CASING DATA: Press. p.s.i.g.	Temp. °F	Duration of Flow
SI	4" X 1.5"				6467	58	PACKER		SI 78 Hr
1.	4" X 1.5"	630	10.2	95	4350	65			4.0"
2.	4" X 1.5"	640	19.0	94	2800	64			4.5"
3.	4" X 1.5"	600	28.0	92	1760	61			3.5"
4.	4" X 1.5"	630	31.0	92	1000	60			4.0"
5.									

RATE OF FLOW CALCULATIONS

NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P_m	Flow Temp. Factor Ft.	Gravity Factor Fg	Super Compress. Factor, Fpv	Rate of Flow Q, Mcfd
1	10.84	80.20	643.2	.9952	1.281	1.046	1159
2.	10.84	111.40	653.2	.9963	1.281	1.049	1617
3.	10.84	131.03	613.2	.9990	1.281	1.046	1901
4.	10.84	141.21	643.2	1.0000	1.281	1.049	2057
5.							

NO.	P_t	Temp. °R	T_g	Z
1.	6.49	555	1.45	0.877
2.	4.24	554	1.45	0.752
3.	2.67	552	1.44	0.755
4.	1.59	552	1.44	0.830
5.				

Gas Liquid Hydrocarbon Ratio _____ Mcf/bbl.
A.P.I. Gravity of Liquid Hydrocarbons _____ Deg.
Specific Gravity Separator Gas 0.609 XXXXXXXXXX
Specific Gravity Flowing Fluid XXXXX
Critical Pressure 671 P.S.I.A. _____ P.S.I.A.
Critical Temperature 362 R _____ R

P_c 6480.2 P_c^2 41,993

NO	P_t^2	P_w	P_w^2	$P_c^2 - P_w^2$
1		4358.4	18995.7	22997.3
2		2816	7929.9	34063.1
3		1790.5	3205.9	38787.1
4		1063.7	1131.5	40861.5
5				

(1) $\frac{P_c^2}{P_c^2 - P_w^2} = 1.233$ (2) $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 1.215$

AOF = Q $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 1965$ AOF 1965 MCF/day

Absolute Open Flow 1965 Mcfd @ 15.025 | Angle of Slope θ _____ | Slope, n 0.928

Remarks: Kelly Ex 3 Cs 6496

Approved By Commission:	Conducted By:	Calculated By:	Checked By:
	GETTY OIL COMPANY	M. V. MERCHANT	DALE R. CROCKETT

(Signed) D. R. CROCKETT

NO. OF COPIES RECEIVED		
DISTRIBUTION		
SANTA FE		
FILE		
U.S.G.S.		
LAND OFFICE		
OPERATOR		

Form C-105
Revised 1-1-65

NEW MEXICO OIL CONSERVATION COMMISSION
WELL COMPLETION OR RECOMPLETION REPORT AND LOG

3-NMOCC-HOBBS
1-R. J. STARRAK-TULSA
1-A. B. CARY-MIDLAND
1-FILE
1-MYH, ENGR.
1-BELCO-MIDLAND
1-SOUTHLAND-MIDLAND
1-MESA-MIDLAND
1-BH, FIELD CLERK

5a. Indicate Type of Lease: State [X] Fee [ ]

5. State Oil & Gas Lease No.: L-723

7. Unit Agreement Name: -

8. Farm or Lease Name: Getty "35" State

9. Well No.: 1

10. Field and Pool, or Wildcat: Wolfcamp / Grama Ridge Morrow

1a. TYPE OF WELL: OIL WELL [X] GAS WELL [X] DRY [ ] OTHER Dual

b. TYPE OF COMPLETION: NEW WELL [X] WORK OVER [ ] DEEPEN [ ] PLUG BACK [ ] DIFF. RESVR. [ ] OTHER

2. Name of Operator: Getty Oil Company

3. Address of Operator: P. O. Box 730, Hobbs, New Mexico 88240

4. Location of Well: UNIT LETTER K LOCATED 2310 FEET FROM THE South LINE AND 1650 FEET FROM THE West LINE OF SEC. 35 TWP. 21S RGE. 34E NMPM

12. County: Lea

15. Date Spudded	16. Date T.D. Reached	17. Date Compl. (Ready to Prod.)	18. Elevations (DF, RKB, RT, GR, etc.)	19. Elev. Cashinghead
3-15-78 (w)	10-25-78	10-11-78 Wolfcamp 1-3-79 Morrow	3675.8 GR	-

20. Total Depth	21. Plug Back T.D.	22. If Multiple Compl., How Many	23. Intervals Drilled By	Rotary Tools	Cable Tools
13,355	13,265	Dual	⟶	810'-13,355'	0-810'

24. Producing Interval(s), of this completion — Top, Bottom, Name
10,810-10,828 Wolfcamp - Oil
12,907-13,102 Morrow - Gas

25. Was Directional Survey Made: Yes

26. Type Electric and Other Logs Run: BHC, CNL-FDC; DLL; and Dipmeter 13,100-10,832',
Cement Bond Log: & PFC - Schlumberger

27. Was Well Cored: Yes

28. CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT LB./FT.	DEPTH SET	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
20		29	24	3 yds. Ready Mix	
13 3/8	48	398	16	950 sxs Cement Circ.	
10 3/4	51,45.5 & 40.5	4496	12 ¼	2750 sxs Cement Circ.	575 sxs circ.
7 5/8	39,33.7 & 29.7	10832	9 ¼	1955 sxs	

29. LINER RECORD

SIZE	TOP	BOTTOM	SACKS CEMENT	SCREEN
5"	10,389	13,354	575 sxs	

30. TUBING RECORD

SIZE	DEPTH SET	PACKER SET
2 3/8	10,187	10,187
Dual 2 3/8	12,200	12,200

31. Perforation Record (Interval, size and number)
Wolfcamp: 10,810,12,14,16,18,20,22,24,26, & 28' = 10 (.36") holes.
Morrow: 12,907,09,11,14,16,18,20,22,24; 13,071,81,85,92,94,98,100, & 102 = 17 (.36") holes

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL	AMOUNT AND KIND MATERIAL USED
10,810-28' (Wolf.)	5000 gals. MOD 202 15% - 15 ball sealers.

33. PRODUCTION

Date First Production	Production Method (Flowing, gas lift, pumping - Size and type pump)	Well Status (Prod. or Shut-in)
Wolfcamp 11-10-78	Flowing	Producing
Morrow 1-3-79	Flowing	Producing

Date of Test	Hours Tested	Choke Size	Prod'n. For Test Period	Oil - Bbl.	Gas - MCF	Water - Bbl.	Gas - Oil Ratio
Wolfcamp 11-15-78	24 hrs.	20/64"	⟶	600	1,153	799	1921/1
Morrow 1-8-79	4 Pt.	Various		-	-	-	-

Flow Tubing Press.	Casing Pressure	Calculated 24-Hour Rate	Oil - Bbl.	Gas - MCF	Water - Bbl.	Oil Gravity - API (Corr.)
Wolfcamp 1765#	Packer	⟶	600	1,153	799	44.6
Morrow 4400#	Packer		-	AOF 11,107	-	

34. Disposition of Gas (Sold, used for fuel, vented, etc.): Sold — Test Witnessed By

35. List of Attachments: Deviation Schedule & 4 Point Test — Getty Ex 4 Cs 6496

36. I hereby certify that the information shown on both sides of this form is true and complete to the best of my knowledge and belief.

SIGNED Dale R. Crockett — TITLE Area Superintendent — DATE 1-25-79

INSTRUCTIONS

This form is to be filed with the appropriate District Office of the Commission not later than 20 days after the completion of any newly-drilled or deepened well. It shall be accompanied by one copy of all electrical and radioactivity logs run on the well and a summary of all special tests conducted, including drill stem tests. All depths reported shall be measured depths. In the case of directionally drilled wells, true vertical depths shall also be reported. For multiple completions, Items 30 through 34 shall be reported for each zone. This form is to be filed in quintuplicate except for state land, where six copies are required. See Rule 1105.

INDICATE FORMATION TOPS IN CONFORMANCE WITH GEOGRAPHICAL SECTION OF STATE

Southeastern New Mexico				Northwestern New Mexico			
T. Anhy		T. Canyon		T. Ojo Alamo		T. Penn. "B"	
T. Salt		T. Strawn	11,682'	T. Kirtland-Fruitland		T. Penn. "C"	
B. Salt		T. Atoka	(Lime) 12,151'	T. Pictured Cliffs		T. Penn. "D"	
T. Yates	4,160'	T. Miss		T. Cliff House		T. Leadville	
T. 7 Rivers		T. Devonian		T. Menefee		T. Madison	
T. Queen		T. Silurian		T. Point Lookout		T. Elbert	
T. Grayburg		T. Montoya		T. Mancos		T. McCracken	
T. San Andres		T. Simpson		T. Gallup		T. Ignacio Qtzte	
T. Glorieta		T. McKee		Base Greenhorn		T. Granite	
T. Paddock		T. Ellenburger		T. Dakota		T.	
T. Blinebry		T. Gr. Wash		T. Morrison		T.	
T. Tubb		T. Granite		T. Todilto		T.	
T. Drinkard		T. Delaware Sand		T. Entrada		T.	
T. Abo		T. Bone Springs	8,342'	T. Wingate		T.	
T. Wolfcamp	(Shale) 10,070'	T. Morrow cl.	12,800'	T. Chinle		T.	
T. Penn.		T. Morrow	12,907'	T. Permian		T.	
T. Cisco (Bough C)		T. Rustler	1,724	T. Penn. "A"		T.	

OIL OR GAS SANDS OR ZONES

No. 1, from 10,810 to 10,832 No. 4, from 13,069 to 13,102

No. 2, from 11,778 to 11,836 No. 5, from ..... to .....

No. 3, from 12,733 to 12,924 No. 6, from ..... to .....

IMPORTANT WATER SANDS

Include data on rate of water inflow and elevation to which water rose in hole.

No. 1, from None to ..... feet. .....

No. 2, from ..... to ..... feet. .....

No. 3, from ..... to ..... feet. .....

No. 4, from ..... to ..... feet. .....

FORMATION RECORD (Attach additional sheets if necessary)

From	To	Thickness in Feet	Formation	From	To	Thickness in Feet	Formation
			(See Attached Sheet)				

EXHIBIT V

NEW MEXICO OIL CONSERVATION COMMSSION

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Form C-122
Revised 9-1-65

Type Test: [X] Initial [ ] Annual [ ] Special						Test Date: 1-23-79			
Company: Getty Oil Company				Connection: Llano, Inc.					
Pool: Grama Ridge Morrow				Formation: Morrow				Unit: -	
Completion Date: 1-3-79		Total Depth: 13,355'			Plug Back TD: 13,265'		Elevation: 3675.8 GL	Farm or Lease Name: Getty "35" State	
Csg. Size: 5"	Wt.: 18.0	d: 4.276	Set At: 13,355	Perforations: From 12,907 To 13,102				Well No.: 1	
Tbg. Size: 2 3/8"	Wt.: 4.7	d: 1.995	Set At: 12,200	Perforations: From - To -				Unit: K	Sec.: 35 Twp.: 21-S Rge.: 34-E
Type Well – Single – Bradenhead – G.G. or G.O. Multiple: Morrow Gas/Wolfcamp Oil - Dual				Packer Set At: 10,187'/12,200'				County: Lea	
Producing Thru: Tubing	Reservoir Temp. °F: 175°@ 13,352		Mean Annual Temp. °F: 60		Baro. Press. – P_a: 13.2 psia			State: New Mexico	
L: 12,200	H: 12,200	Gg: 0.599	% CO_2: 0.592	% N_2: 0.511	% H_2S: -	Prover: -	Meter Run: 3"	Taps: Flange	

NO.	FLOW DATA: Prover Line Size X Orifice Size	Press. p.s.i.g.	Diff. h_w	Temp. °F	TUBING DATA: Press. p.s.i.g.	Temp. °F	CASING DATA: Press. p.s.i.g.	Temp. °F	Duration of Flow
SI					5970	57	Packer	-	SI 22 hrs & 15 min
1.	3" x 1.75" 4/64"	490	10	85	5500	64	-	-	30 min.
2.	3" x 1.75" 6/64"	500	21	84	5200	64	-	-	45 min.
3.	3" x 1.75" 8/64"	505	34	83	4775	63	-	-	45 min.
4.	3" x 1.75" 12/64"	530	62	83	4400	64	-	-	30 min.
5.									

RATE OF FLOW CALCULATIONS

NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P_m	Flow Temp. Factor Ft.	Gravity Factor Fg	Super Compress. Factor, Fpv	Rate of Flow Q, Mcfd
1	20.15	70.94	503.2	.9768	1.292	1.040	1876
2.	20.15	103.81	513.2	0.9777	1.292	1.040	2743
3.	20.15	132.74	518.2	0.9786	1.292	1.049	3547
4.	20.15	183.52	543.2	0.9786	1.292	1.045	4886
5.							

NO.	P_t	Temp. °R	T_t	Z
1.				
2.				
3.				
4.				
5.				

Gas Liquid Hydrocarbon Ratio _____ Mcf/bbl.

A.P.I. Gravity of Liquid Hydrocarbons _____ Deg.

Specific Gravity Separator Gas _____ XXXXXXXXX

Specific Gravity Flowing Fluid XXXXX _____

Critical Pressure 671 P.S.I.A. _____ P.S.I.A.

Critical Temperature 362 R _____ R

*P_c 7468.2 P_c^2 55.774

NO	P_t^2	P_w *	P_w^2	$P_c^2 - P_w^2$
1		6969.2	48,570	7,204
2		6538.2	42,748	13,026
3		6405.2	41,027	14,747
4		5829.2	33,980	21,794
5				

(1) $\frac{P_c^2}{P_c^2 - P_w^2} = 2.559$ (2) $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 2.273$

AOF = Q $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 11,107$ Getty EKE 6496

Absolute Open Flow 11,107 Mcfd @ 15.025 Angle of Slope θ _____ Slope, n .874

Remarks: *Pc & Pw from bottom hole pressure recorder @ (-9329) 13005'

Approved By Commission:	Conducted By:	Calculated By:	Checked By:
	M.Y. Merchant	M.Y. Merchant	D. R. Crockett

API # 30-025-26236

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FILE	
U.S.G.S.	
LAND OFFICE	
OPERATOR	

NEW MEXICO OIL CONSERVATION COMMISSION — Form C-101

OCC-HOBBS — 3 - File
1-R.J. Starrak-Tulsa — 1 - Well Engr.
1-A.B. Cory-Midland — 1 - Foreman
1-DM, Field Clerk

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

DRILL ☒ DEEPEN ☐ PLUG BACK ☐

SINGLE ☐ MULTIPLE ☐

Name of Operator: TEXACO Inc.

Address of Operator: P.O. BOX 728, HOBBS, NEW MEXICO 88240

Location of Well: Unit Letter J, 1980 Feet From The SOUTH Line and 1650 Feet From The WEST Line of Section 36, Township 21-S, Range 34-E, NMPM

Lease Name: SKELLY STATE COM

Well No.: 1

Field and Pool, if known: GRAMA RIDGE

County: LEA

Proposed Depth	Formation	Rotary or C.T.
13,400	MORROW *	ROTARY

Elevations (Show whether DF, RT, GR, etc.)	Kind & Status of Plug Bond	Drilling Contractor	Approx. Date Work will start
3674' GL	BLANKET	SHARP DRILLING COMPANY	2-17-79

PROPOSED CASING AND CEMENT PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	SACKS OF CEMENT	EST. TOP
26"	20"	94	40'	READY MIX	SURFACE
17-1/2"	13-3/8"	48	1760'	1760	SURFACE
12-1/4"	9-5/8"	36	5600'	2600	SURFACE
8-3/4"	7"	26	12700'	1000	5000'
6-1/8"	4-1/2"	11.6	13400'	600	12000' TOC

The above casing program will be used to test the Morrow formation, and any other possible producing zones. A 3M hydrostatic system will be used, and mud weight will be gradually increased from 8.5#/gallon to 12.0#/gallon if necessary.

See attachments for BOP's and choke manifold.

* Deepest Zone will be Morrow - well could be dual in either Morrow-Strawn, or Morrow-Wolfcamp, depending on the productivity.

Exhibit 6
Case 6496

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

Signed: DALE R. CROCKETT — Title: AREA SUPERINTENDENT — Date: February 12, 1979

(This space for State Use)

APPROVED BY: [signature] — TITLE: SUPERVISOR DISTRICT I — DATE: FEB 15 1979

CONDITIONS OF APPROVAL, IF ANY:

fch

C+3-NMOCC
1-R.J. Starrak-Tulsa
1-A.B. Cary-Midland
1-File
1-Foreman

NEW MEXICO OIL CONSERVATION COMMISSION
WELL LOCATION AND ACREAGE DEDICATION PLAT

Form C-102
Supersedes C-128
Effective 1-1-65

All distances must be from the outer boundaries of the Section

Operator: Getty Oil Co.	Lease: Getty "36" State		Well No.: 1
Unit Letter: F	Section: 36	Township: 21 South	Range: 34 East	County: Lea
Actual Footage Location of Well: 1980 feet from the North line and 1650 feet from the West line			
Ground Level Elev.: 3674.1	Producing Formation:	Pool: Grama Ridge	Dedicated Acreage: 640 Acres

1. Outline the acreage dedicated to the subject well by colored pencil or hachure marks on the plat below.

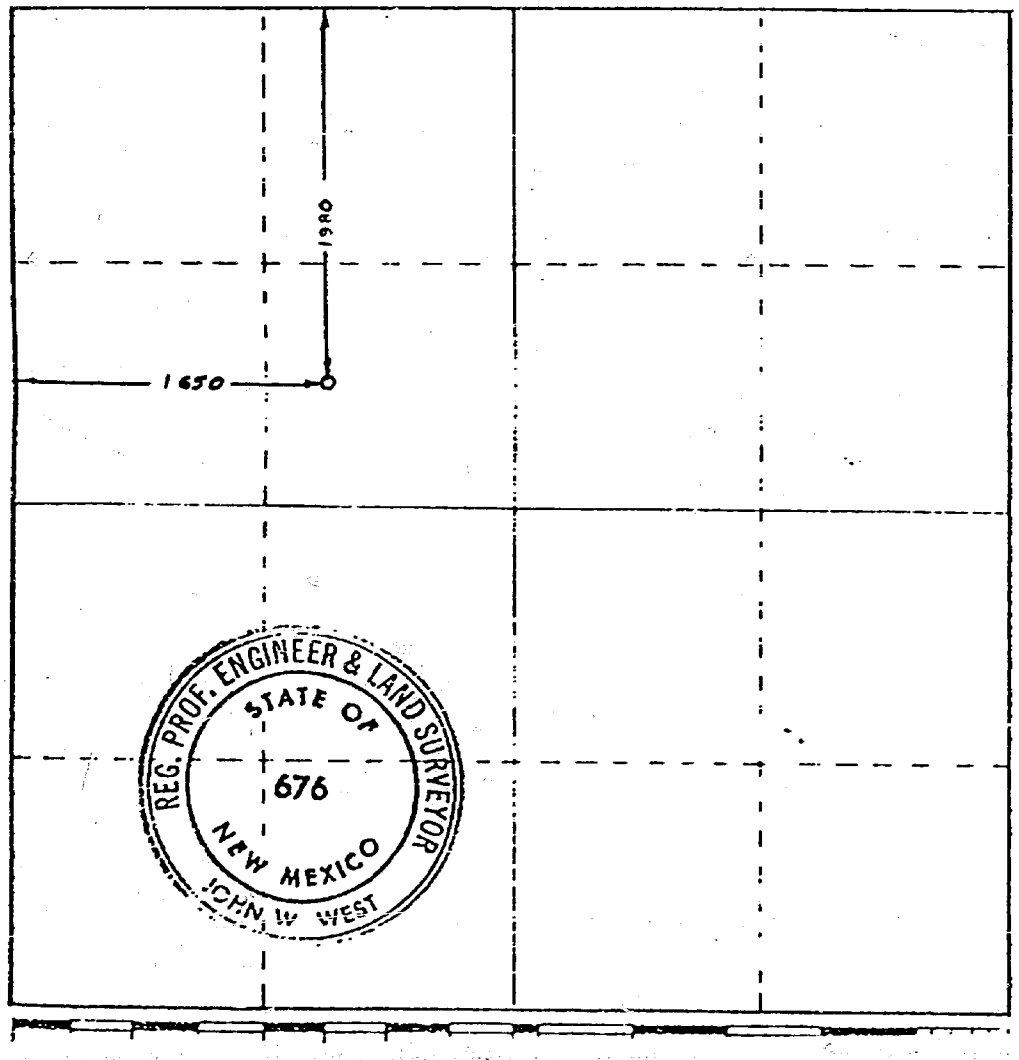
2. If more than one lease is dedicated to the well, outline each and identify the ownership thereof (both as to working interest and royalty).

3. If more than one lease of different ownership is dedicated to the well, have the interests of all owners been consolidated by communitization, unitization, force-pooling, etc?

[XX] Yes [ ] No If answer is "yes," type of consolidation Communitization

If answer is "no," list the owners and tract descriptions which have actually been consolidated. (Use reverse side of this form if necessary.) _____

No allowable will be assigned to the well until all interests have been consolidated (by communitization, unitization, forced-pooling, or otherwise) or until a non-standard unit, eliminating such interests, has been approved by the Commission.



CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief.

ORIGINAL SIGNED BY
DALE R. CROCKETT

Name: Dale R. Crockett

Position: Area Superintendent

Company: Getty Oil Company

Date: February 12, 1979

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my knowledge and belief.

Date Surveyed: February 9, 1979

Registered Professional Engineer and/or Land Surveyor

Certificate No. John W. West

DATA SHEET

Getty Two State Well No. 1
Gramma Ridge Morrow Field
Pressure Buildup Test No. 1
February 14-17, 1978

Horner Plot of the captioned test is attached. The interpretation of this plot is as follows;

1. No boundaries are present.
2. The plot reflects a two-layer reservoir performance.
3. The P*, initial reservoir pressure, is 8,270 psig.

Summary of Kh calculations:

1. The stabilized production rate was 1798 MCF/D or 320,214 B/D.
2. Gas viscosity was 0.03484 cp.
3. Bg, reservoir gas volume factor, was 2.79 $(10)^{-3}$ ft/SCF.
4. Horner Plot slope is 75 psi/ cycle.
5. Kh is 67.5 md.-ft.
6. K based 33' net pay is 2.0 m.d.

Conclusion:

1. No boundary is indicated.
2. Permeability is moderate.
3. The reservoir parameters in the area of the wellbore should efficiently deplete a 640 acre proration unit.

Exhibit 10
case 6496

#10

DATA SHEET

Getty Two State Well No. 1
Gramma Ridge Morrow Field
Pressure Buildup Test No. 2
December 9-12, 1978

Horner Plot of the captioned test is attached. The interpretation of this plot is as follows;

1. No boundaries are present.
2. A single-layer reservoir type plot is shown as compared to a two-layer type indicated by pressure buildup test No. 1.
3. P*, reservoir pressure, was 7850 psig compared to test No. 1 P* of 8270 psig, or a decrease of 420 psi.

Summary of Kh Calculations:

1. The stabilized production rate was 1,527 MCF/D or 271,950 Bbls. gas/D.
2. Gas viscosity was 0.03323 cp.
3. Bg, reservoir gas volume factor, was $(2.85)(10)^{-3}$ ft^3/ft^3
4. Horner Plot slope is 57 psi/cycle
5. Kh was 73.5 md. ft.
6. K based on 33 net feet pay is 2.2 m.d.

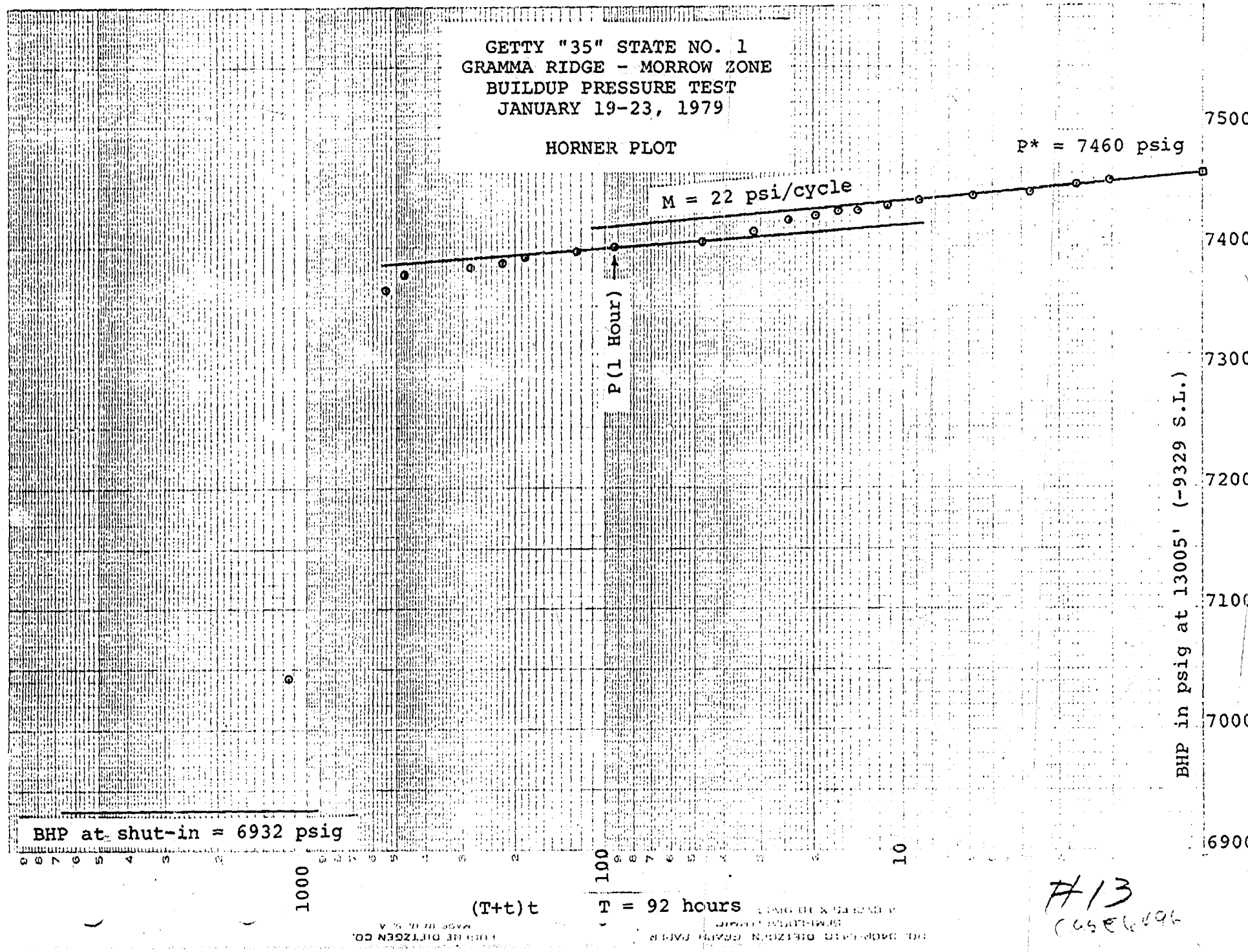
Conclusions:

1. No boundary is indicated.
2. The permeability is moderate and slightly increased as compared to the previous buildup test.
3. The reservoir parameters in the area of the wellbore should efficiently deplete a 640 acre proration unit.

Case 6496
#12

GETTY "35" STATE NO. 1
GRAMMA RIDGE - MORROW ZONE
BUILDUP PRESSURE TEST
JANUARY 19-23, 1979

HORNER PLOT



#13

DATA SHEET

Getty "35" State Well No. 1
Gramma Ridge - Morrow Field
Pressure Buildup Test No. 1
January 19-23, 1979

Horner Plot of the captioned test is attached. The interpretation of this plot is as follows;

1. No boundaries are present.
2. The plot reflects a two-layer reservoir performance.
3. The P*, initial reservoir pressure, is 7,460 psig.

Summary of Kh calculations:

1. The stabilized production rate was 1437 MCF/day or 255,922 Bbls./Day.
2. The gas viscosity is 0.03224 cp at reservoir conditions.
3. Bg, reservoir gas volume factor, is 2.88×10^{-3} cuft./SCF
4. Horner Plot slope is 22 psi/cycle.
5. Kh is 175.6 m.d. - ft.
6. Based on 32 productive feet, permeability is 5.5 m.d.

Conclusions:

1. No boundary is indicated.
2. Permeability is good, being greater than calculated for Getty Two State Well No. 1
3. The reservoir parameters in the area of the wellbore should efficiently deplete a 640 proration unit.
4. The lower initial pressure at the Getty "35" State reflects pressure communication with the Getty Two State.

#14
Case 6496

TABULATION OF PRODUCTION
GRAMA RIDGE MORROW FIELD

		Condensate Bbls.	Gas MCF
Getty "2" State Well No. 1	May, 1978		488
	June		44,926
	July	294	54,354
	Aug.	497	53,410
	Sept.	367	39,074
	Oct.	355	48,991
	Nov.	364	45,131
	Dec.	476	43,649
	TOTAL	2,353	330,023
	Jan.	515	51,769
	Feb.	339	47,600*
CUM. (3-1-79)		3,207	429,392

382,521
42,392
811,844.8

CURRENT PRODUCTION RATE

1700 MCFPD, 17 BC, 7/64" ch., 3175 psi T.P.

#15
Case 6496

GETTY OIL COMPANY
GETTY TWO STATE NO. 1
GRAMMA RIDGE MORROW FIELD
LEA COUNTY, NEW MEXICO

GAS PRODUCED

GAS PRODUCTION - MCF/MONTH

100

10

Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

19 78 | 19 79 | 19 80 | 19 81 | 19 82

Case 6446 #16A

TABULATION OF PRODUCTION
GRAMA RIDGE MORROW FIELD

		Condensate Bbls.	Gas MCF
Getty "35" State Well No. 1	Nov. 1978	1,732	3,109
	Dec.	0	0
	TOTAL	3,419	3,109
	Jan.	121	22,015
	Feb.	1,566	87,164*
CUM. (3-1-79)		3,419	112,588

CURRENT PRODUCTION RATE

3962 MCFD, 18 BC, 52 BW, 10/64" ch., 4700 psi T.P.

*Estimated based on current rate.

Case 6496

#16B

EXHIBIT V

NEW MEXICO OIL CONSERVATION COMMSSION

MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Form C-122
Revised 9-1-65

Type Test: [x] Initial [ ] Annual [ ] Special						Test Date: 1-23-79				
Company: Getty Oil Company				Connection: Llano, Inc.						
Pool: Grama Ridge Morrow				Formation: Morrow				Unit: -		
Completion Date: 1-3-79		Total Depth: 13,355'		Plug Back TD: 13,265'		Elevation: 3675.8 GL		Farm or Lease Name: Getty "35" State		
Csg. Size: 5"	Wt.: 18.0	d: 4.276	Set At: 13,355	Perforations: From 12,907	To 13,102			Well No.: 1		
Tbg. Size: 2 3/8"	Wt.: 4.7	d: 1.995	Set At: 12,200	Perforations: From -	To -			Unit: K	Sec.: 35	Twp.: 21-S Rge.: 34-E
Type Well – Single – Bradenhead – G.G. or G.O. Multiple: Morrow Gas/Wolfcamp Oil - Dual				Packer Set At: 10,187'/12,200'				County: Lea		
Producing Thru: Tubing		Reservoir Temp. °F: 175° 13,352		Mean Annual Temp. °F: 60		Baro. Press. – P_a: 13.2 psia		State: New Mexico		
L: 12,200	H: 12,200	Gg: 0.599	% CO_2: 0.592	% N_2: 0.511	% H_2S: -	Prover: -	Meter Run: 3"	Taps: Flange		

NO.	FLOW DATA: Prover Line Size x Orifice Size	Press. p.s.i.g.	Diff. h_w	Temp. °F	TUBING DATA: Press. p.s.i.g.	Temp. °F	CASING DATA: Press. p.s.i.g.	Temp. °F	Duration of Flow
SI					5970	57	Packer	-	~~31~~ 92 hrs & 15 min
1.	3" x 1.75" 4/64"	490	10	85	5500	64	-	-	30 min.
2.	3" x 1.75" 6/64"	500	21	84	5200	64	-	-	45 min.
3.	3" x 1.75" 8/64"	505	34	83	4775	63	-	-	45 min.
4.	3" x 1.75" 12/64"	530	62	83	4400	64	-	-	30 min.
5.									

RATE OF FLOW CALCULATIONS

NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P_m	Flow Temp. Factor Ft	Gravity Factor Fg	Super Compress. Factor, Fpv	Rate of Flow Q, Mcfd
1	20.15	70.94	503.2	.9769	1.292	1.040	1876
2.	20.15	103.81	513.2	0.9777	1.292	1.040	2748
3.	20.15	132.74	518.2	0.9786	1.292	1.049	3547
4.	20.15	183.52	543.2	0.9786	1.292	1.045	4886
5.							

NO.	P_t	Temp. °R	T_t	Z
1.				
2.				
3.				
4.				
5.				

Gas Liquid Hydrocarbon Ratio _____ Mcf/bbl.
A.P.I. Gravity of Liquid Hydrocarbons _____ Deg.
Specific Gravity Separator Gas _____ XXXXXXXXXX
Specific Gravity Flowing Fluid XXXXX _____
Critical Pressure 671 P.S.I.A. _____ P.S.I.A.
Critical Temperature 362 R _____ R

*P_c 7468.2 P_c^2 55,774

NO	P_t^2	P_w *	P_w^2	$P_c^2 - P_w^2$
1		6969.2	48,570	7,204
2		6538.2	42,748	13,026
3		6405.2	41,027	14,747
4		5829.2	33,980	21,794
5				

(1) $\frac{P_c^2}{P_c^2 - P_w^2} = 2.559$ (2) $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 2.273$

AOF = Q $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 11,107$

Absolute Open Flow 11,107 Mcfd @ 15.025 | Angle of Slope θ _____ | Slope, n .874

Exhibit 5
Case 6406

Remarks: *Pc & Pw from bottom hole pressure recorder @ (-9329) 13005'

Approved By Commission:	Conducted By:	Calculated By:	Checked By:
	M.Y. Merchant	M.Y. Merchant	D. R. Crockett

ROUGH

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
DIVISION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 6496

Order No. R-5995

APPLICATION OF LLANO, INC., FOR RESCISSION OF POOL RULES, LEA COUNTY, NEW MEXICO

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on March 14, 19 79, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this _____ day of ~~April~~ May, 19 79, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Llano Inc., is the owner of five wells in the Grama Ridge-Morrow Gas Pool, Lea County, New Mexico.

(3) That said pool was created and defined by Division Order No. R-3006 on December 3, 1965, comprising all of Sections 3 and 4, Township 22 South, Range 34 East, NMPM, and made subject to the Special Pool Rules promulgated by said order, which includes a provision for 640-acre spacing and proration units, with well locations prescribed as being no closer than 1650 feet to the outer boundary of the unit and no closer than 330 feet to any quarter-quarter section line.

(4) That said pool was extended by Order No. R-3080, effective July 1, 1966, to include all of Section 34, Township 21 South, Range 34 East, NMPM; by Order No. R-3152, effective December 1, 1966, to include all of Section 10, Township 22 South, Range 34 East, NMPM; by Order No. R-3195, effective March 1, 1967, to include all of Section 33, Township 21 South, Range 34 East, NMPM; and by Order No. R-5729, effective June 1, 1978, to include all of Section 2, Township 22 South, Range 34 East, NMPM.

(5) That the applicant seeks the rescission of the Special Rules and Regulations for the Grama Ridge-Morrow Gas Pool to provide that said pool would be governed by the 320-acre spacing and acreage dedication requirements and well location requirements of Rule 104 of the Division Rules and Regulations.

(6) That the evidence in this case indicates that the five Morrow gas wells owned by the applicant, namely the Grama Ridge Unit Wells Nos. 2 and 3, located in Sections 34 and 33, respectively, of Township 21 South, Range 34 East, NMPM, and

Grama Ridge Unit Wells Nos. 1 and 4, and Government "A" Well No. 1, located in Sections 3, 4, and 10, respectively, of Township 22 South, Range 34 East, NMPM, are all located within an upthrust fault block bounded on the west by a northeast-southwest trending fault and on the east by a north-south trending fault, and that they are not in communication with other wells recently drilled in the area, namely the POGO State L-922 Well No. 2 located in Section 28, or the Getty 35 State Well No. 1 located in Section 35, both in Township 21 South, Range 34 East, NMPM, or the Getty 2 State Well No. 1 located in Section 2, Township 22 South, Range 34 East, NMPM.

(7) That the evidence in this case indicates that the horizontal limits of the Grama Ridge-Morrow Gas Pool, as heretofore defined, are excessive and contain lands which are not producible by wells completed within said pool.

(8) That the horizontal limits of the pool should be contracted to approximately the known productive limits of the above-described fault block, and the pool should be redefined as comprising the following-described lands:

TOWNSHIP 21 SOUTH, RANGE 34 EAST, NMPM
Section 33: E/2
Section 34: W/2

TOWNSHIP 22 SOUTH, RANGE 34 EAST, NMPM
Section 3: W/2
Section 4: All
Section 10: W/2

(9) That the applicant has established that the drainage characteristics of the reservoir in the wells completed within the aforesaid fault block are not such as to support 640-acre spacing, and that 320-acre spacing is more appropriate for the Morrow wells completed therein.

(10) That the Special Rules and Regulations for the Grama Ridge-Morrow Gas Pool, as promulgated by Division Order No. R-3006, should be rescinded, and the pool, as hereinabove redefined, should be spaced, drilled, operated, and produced in accordance with Rule 104 of the Division Rules and Regulations and with such other Division rules and orders as may be applicable.

(11) That the three recently completed wells described in Finding No. (6) above are not completed in the Grama Ridge-Morrow Gas Pool as redefined, and a separate new pool should be created and defined for the POGO well located in Section 28, and a separate new pool should be created for each or both of the Getty wells located in Sections 35 and 2.

(12) That the owner of the aforesaid wells in said Sections 35 and 2 should be given a reasonable period of time in which to apply to the Division for a hearing to consider the creation of a new pool for said wells, and the promulgation of special rules therefor, if said owner wishes to pursue spacing and proration units of other than 320 acres, and 30 days after the entry of this order is a reasonable period of time for such purpose.

(13) That during such 30-day period, and during the time an application for other than 320-acre spacing has been filed, and a hearing, or an order following hearing, is pending, the following described lands should be placed on temporary 640-acre spacing for the Morrow formation, and no Morrow gas well drilling permits should be approved for said lands unless such permits are for wells to which 640-acres (being a single governmental section) is dedicated and which are located at least 1650 feet from the outer boundary of the unit and at least 330 feet from

any quarter-quarter section line, or unless an exception to the provisions of this finding and the derivative order therefrom has been obtained after notice and hearing; the lands are:

TOWNSHIP 21 SOUTH, RANGE 34 EAST, NMPM
Section 26: All
Section 34: E/2
Sections 35 and 36: All

TOWNSHIP 22 SOUTH, RANGE 34 EAST, NMPM
Sections 1 and 2: All
Section 3: E/2
Section 10: E/2
Sections 11 and 12: All

(14) That in the event the owner of the wells in Sections 35, Township 21 South, Range 34 East, NMPM, and 2, Township 22 South, Range 34 East, NMPM, has not filed an application for creation of a new pool for said wells and the promulgation of special rules for said pool, including a provision for other than 320-acre spacing, within the above-described 30-day period, or in the event that spacing and proration units of other than 320 acres are denied, then all the lands described in Finding No. (13) above should be governed by the provisions of Rule 104 of the Division Rules and Regulations.

(15) That an order based on the above findings is in the interest of conservation and will prevent waste and protect correlative rights and should be approved.

IT IS THEREFORE ORDERED:

(1) That the Grama Ridge-Morrow Gas Pool in Lea County, New Mexico, as heretofore classified and defined, is hereby redefined to include only the following described lands:

TOWNSHIP 21 SOUTH, RANGE 34 EAST, NMPM
Section 33: E/2
Section 34: W/2

TOWNSHIP 22 SOUTH, RANGE 34 EAST, NMPM
Section 3: W/2
Section 4: All
Section 10: W/2

(2) That the Special Rules and Regulations for the Grama Ridge-Morrow Gas Pool, as promulgated by Division Order No. R-3006, are hereby rescinded, and said pool shall hereafter be spaced, drilled, operated, and produced in accordance with Rule 104 of the Division Rules and Regulations and with such other Division rules and orders as may be applicable.

(3) That the Morrow formation underlying all of Section 26, the E/2 of Section 34, and all of Sections 35 and 36, Township 21 South, Range 34 East, NMPM, and all of Sections 1 and 2, the E/2 of Section 3, the E/2 of Section 10, and all of Sections 11 and 12, Township 22 South, Range 34 East, NMPM, are hereby placed on temporary 640-acre spacing, and no drilling permit shall be approved for any Morrow gas well proposed to be drilled on said lands unless such permit is for a well to which 640 acres (being a single governmental section) is dedicated and which is located at least 1650 feet from the outer boundary of the unit and at least 330 feet from any quarter-quarter section line, or unless an exception to the provisions of this Order No. (3) has been obtained after notice and hearing.

(4) That the provisions of Order No. (3) above shall be in force for a period of 30 days after the date of entry of this order, ~~and for so long thereafter as a hearing or order following hearing is pending,~~ or provided Getty Oil Company has filed an application for creation of a new gas pool within the lands described in Order No. (3) above and for the promulgation of special rules for such new pool, including a provision for other than 320-acre spacing, for so long thereafter as a hearing, or an order following a hearing, is pending.

(5) That upon expiration of the acreage dedication and well location requirements provisions of Order No. (3) above, and in the absence of special pool rules to the contrary, all Morrow gas wells completed on the lands described in Order No. (3) above shall be spaced, drilled, operated, and produced in accordance with the provisions of Rule 104 of the Division Rules and Regulations.

(6) That jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year herein-above designated.

LLANO, INC.

PHONE 393-2153 P.O. DRAWER 1320
HOBBS, NEW MEXICO 88240

G. W. EDWARDS
EXECUTIVE VICE PRESIDENT

February 22, 1979

Case 6496

New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501
Attention: Mr. Joe D. Ramey

Re: OCD Hearing
Grama Ridge Morrow
Gas Pool

Gentlemen:

Llano, Inc. respectfully requests a hearing to be docketed in March 1979 to consider rescinding the existing 640 acre Grama Ridge Morrow Gas Pool Special Rules to allow development under applicable 320 acre Statewide Rules.

Very truly yours,

LLANO, INC.

G. W. Edwards

G. W. Edwards

AK:jh

Llano File No.:E2.73.79

xc: Donald L. Garey
Don Maddox
D. M. File

Llano, Inc.

Mar 14

called in by Al Klaer 10 am 2/22

Application of Llano, Inc for Rescission of Pool Rules, Lea County, New Mexico

Applicant, in the above-styled cause, seeks the rescission of Order NO. R-3006, which promulgated 640-acre spacing for the Drama Ridge Morrow Gas Pool, Lea County, New Mexico. Applicant proposes that said pool should be developed ~~on~~ under 320-acre spacing and well location requirements.