STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION COMMISSION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION COMMISSION FOR THE PURPOSE OF CONSIDERING:	
APPLICATION OF NEARBURG EXPLORATION COMPANY, L.L.C., FOR TWO NONSTANDARD GAS SPACING AND PRORATION UNITS, LEA COUNTY, NEW MEXICO	CASE NO. 12,622
IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR AN ORDER CREATING, CONTRACTING, REDESIGNATING AND EXTENDING THE VERTICAL AND HORIZONTAL LIMITS OF CERTAIN POOLS, LEA COUNTY, NEW MEXICO	CASE NO. 12,908-A
	(Consolidated)

REPORTER'S TRANSCRIPT OF PROCEEDINGS

COMMISSION HEARING (Volume II: Tuesday, October 22nd, 2002)

BEFORE: LORI WROTENBERY, CHAIRMAN
JAMI BAILEY, COMMISSIONER
ROBERT LEE, COMMISSIONER

ORIGINAL

October 21st and 22nd, 2002
Santa Fe, New Mexico

This matter came on for hearing before the Oil Conservation Commission, LORI WROTENBERY, Chairman, on Monday, October 21st, and Tuesday, October 22nd, 2002, at the New Mexico Energy, Minerals and Natural Resources Department, 1220 South Saint Francis Drive, Room 102, Santa Fe, New Mexico, Steven T. Brenner, Certified Court Reporter No. 7 for the State of New Mexico.

* * *

STEVEN T. BRENNER, CCR
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I N D E X

October 22nd, 2002 (Volume II)
Commission Hearing
CASE NOS. 12,622 and 12,908-A (Consolidated)

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* * *

A P P E A R A N C E S

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* * *

WHEREUPON, the following proceedings were had at 9:00 a.m.:

CHAIRMAN WROTENBERY: Go back on the record.

And Mr. Hall, do you have some information as requested by Commissioner Lee?

MR. HALL: Yes, Madame Chairman. Dr. Lee had requested that the Commission be provided with the dates of completions or specifically perforations in the Morrow formation.

What we did was review the Division's well files for each of the unit wells, and from the C-105 data in there we determined that the wells were completed or recompleted, apparently perforated in the Morrow formation on the following dates:

The Grama Ridge Morrow Unit Well Number 1 in Section 3, the information shows it was completed on August 19th, 1965.

The Unit Well Number 2 in Section 34 was completed on March 18th, 1966.

The Unit Well Number 3 in Section 33 was recompleted in the Morrow on December 1st, 1966.

The Unit Well Number 4 in Section 4 was completed on June 1st, 1965.

In addition to that, there was a well in Section 10. It's the Llano Government "A" 1, was completed --

recompleted, rather, in the Morrow on March 16th, 1966. That well was subsequently withdrawn from the unit.

We will prepare an exhibit consisting of all the C-105 forms for each of these wells, and we'll submit that as Raptor's Exhibit 16, and we would request the Division take administrative notice of its own files.

CHAIRMAN WROTENBERY: Okay. Does that answer your question?

COMMISSIONER LEE: (Nods)

CHAIRMAN WROTENBERY: Okay, thank you very much, Mr. Hall.

And I think we're ready to hear from Redrock --

MR. KELLAHIN: Yes, ma'am.

CHAIRMAN WROTENBERY: -- Mr. Kellahin.

MR. KELLAHIN: There's a couple of preliminary matters I need to discuss with you, the first of which deals with the seismic presentation that the two different groups were going to make.

In September when we received Nearburg's seismic displays, we went in response and contracted for the base seismic data, hired a geophysicist, made an evaluation of the seismic data, and we were going to present that to you.

On Friday I received the same letter that Mr. Carr came with from the seismic lawyer, indicating that we could not utilize it, and we tried to think of any possibly

way that we could use this. And they told us no, and then they told us yes, and last night they told us no.

So in order to avoid litigation with the seismic people over this, we simply have to withdraw it. It's unfortunate, I think, for both sides that you don't get to see the whole story, but we simply can't do it.

And so I'll ask you to return to me Exhibit C and get you C-1, it's in the book. And I'll get them after the hearing, you don't have to fuss with it now.

CHAIRMAN WROTENBERY: Okay.

MR. KELLAHIN: So we'd like to withdraw that, and we'll return all that data back to the licensing company.

CHAIRMAN WROTENBERY: That's Exhibit C and D-1?

MR. KELLAHIN: No, D is the engineering data, and C should be -- I think you're looking at it.

CHAIRMAN WROTENBERY: It's marked C-1 in my book.

MR. KELLAHIN: Yeah, it's this one. C-1 is the only exhibit. This is the seismic. If you'll exclude that.

CHAIRMAN WROTENBERY: We'll go ahead and pull those out while we're thinking about it. Thank you.

MR. CARR: May it please the Commission, I'd also like the record to show that Nearburg has also withdrawn the seismic data that was submitted to the Commission, and it has also been returned to us.

CHAIRMAN WROTENBERY: Yes, thank you, Mr. Carr. Okay.

MR. KELLAHIN: Madame Chairman, in order to avoid the litigation with the seismic people, we are only going to present to you the geologic interpretations that are derived from data independent of any seismic evaluation.

And to start off, I would like to suggest that everything I've submitted behind Exhibit Tab A -- which are orders of the Division, correspondence from Nearburg, the State Land Office, documentation in the chronology that I've provided -- be admitted, and you may look through that as you please.

And I would like to avoid talking about all those pieces of paper and go straight to the heart of the technical case and call my geologist, and let's talk about the geology. If there's no objection, I'd like to do that.

CHAIRMAN WROTENBERY: Is there any objection to the admission of the materials --

MR. CARR: May it --

CHAIRMAN WROTENBERY: -- under Tab A?

MR. CARR: May it please the Commission, we have no objection to the materials behind Tab A. It addresses certain matters that we didn't include in the summary that we presented yesterday, and we think it should be included for the purpose of completeness.

There is one document that we would like to add and offer at this time as our Exhibit Number -- we'll mark it Exhibit Number 23 [*sic*]. All it is is the records -- a certified copy of the records from the State Land Office, and it just shows the status of the spacing units in the east half of this section.

It just is off -- This shows the dates when the units were created and when they were terminated, and we think that it may have some bearing after the hearing to address the issues raised by Mr. Hall.

And I would tender to you the original, which bears the seal of Ray Powell, the Commissioner, showing that, in fact, are certified copies and they are admissible under the Rules of Evidence as public records certified by the...

If there is no objection, we would like to put that in.

And with that, we have no objection to Mr. Kellahin putting in Exhibit 1, the geologic presentation.

CHAIRMAN WROTENBERY: Okay.

MR. KELLAHIN: There's no objection to Mr. Carr's exhibit.

CHAIRMAN WROTENBERY: Okay, so --

MR. HALL: I have no objection.

CHAIRMAN WROTENBERY: Thank you, Mr. Hall.

We'll admit into evidence the exhibits --

MR. CARR: And I will mark that as our Exhibit 24, and with your permission, I'll do that following the hearing.

MR. HALL: 23.

MR. CARR: I'm sorry, 23.

CHAIRMAN WROTENBERY: 23, okay. Okay, first we'll admit into evidence Redrock Exhibits A-1 through -22; is that correct --

MR. KELLAHIN: That's correct, ma'am.

CHAIRMAN WROTENBERY: -- Mr. Kellahin?

And then we'll also admit into evidence Nearburg Exhibit Number 23. Okay?

Would you like to introduce your first witness?

MR. KELLAHIN: Members of the Commission, Mr. Brezina and I have taken the exhibits that he provided in the prehearing filings. We've kept the same numbers. We're going to present them in a little different order.

We thought after the geology you saw yesterday we wanted to organize this in a way so that you could see our interpretations and not be lost in what may be extraneous detail.

So we want to focus right on what Mr. Brezina thinks are the heart of the geologic issues.

CHAIRMAN WROTENBERY: Okay.

JAMES BREZINA,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Brezina, for the record, sir, would you please state your name and occupation?

A. My name is James Brezina. I'm a consulting geologist out of Midland, Texas.

Q. How long have you been a consulting geologist?

A. Approximately 20 years.

Q. During that period of time, give us a short summary of your experience as a geologist.

A. I first started off professionally working, when I got out of college, for Superior Oil Company. Then I went to work Jake L. Hammond, which is a small independent. And then I worked for Clayton Williams Oil Company there in Midland. After that I became a consultant and independent geologist.

Q. Is the work we're about to see work that you have done personally?

A. Yes, it has.

Q. Is the data we're about to look at that forms the opinions expressed on the displays your work product?

A. Yes.

Q. Have you examined, to the best of your ability, all the available data?

A. Yes.

Q. And based upon that presentation, you have certain geologic conclusions?

A. Yes, I do.

Q. Were you retained by Redrock as a geologist after the Examiner Hearing last June?

A. Last June of what year?

Q. Last year?

A. Last -- Yes, I have.

Q. So after the Examiner Hearing you were retained to look at the geology?

A. Yes, sir.

Q. Okay. Have you had a chance to look at the Nearburg exhibits and displays over the last several weeks that those have been presented and made available?

A. Yes, I have.

MR. KELLAHIN: We tender Mr. Brezina as an expert petroleum geologist.

MR. CARR: No objection.

CHAIRMAN WROTENBERY: We find him so qualified.

THE WITNESS: Thank you.

Q. (By Mr. Kellahin) Mr. Brezina, let me ask you if you have formed an opinion about the gross GRE sand and how

it is oriented and distributed insofar as it affects Section 34?

A. Yes, I have. If you notice, if you go to that map at a later date, is that I used all the data points. I even used the well in the southeast quarter of Section 34, which is the Llano well. Nearburg essentially excluded the use of that well. In fact, they did not prepare a gross map.

And I used this map to help me determine a model, a geological model, as what I think the environment of the deposition was. And in this model, I came to the conclusion it was north-south, fluvial-deltaic-type system, incorporating mostly of the east half of Section 34.

Q. When we talk about Nearburg's nomenclature where he's identified this Morrow sand stringer as a GRE sand, is that the same interval we're about to see on your gross isopach?

A. Yes, it is. For the sake of having too much confusion I went ahead and incorporated some of their nomenclature, and one of them is, I used that same GRE nomenclature on my exhibits as their representative for Nearburg exhibits.

Q. Let's turn to your Exhibit B-4.

A. B-4.

MR. KELLAHIN: Give us a moment to pull that out

of the exhibit book.

MR. CARR: Mr. Kellahin, is this the middle Morrow GRE gross sand?

MR. KELLAHIN: Yes, sir.

Q. (By Mr. Kellahin) When you're looking for gross points on the logs of these various wells to get you the gross thickness of the GRE sand, what log are you looking at and what response are you trying to see?

A. The logs I'm looking at, for the most part, are the ones that has the gamma-ray logs. And what I've done is, I've made a map based on the -- what I call the clean sand and formulated this gross map.

Q. Have you honored all the data points that you could find that are applicable to the GRE sand?

A. Yes, I have, especially the well in the southeast quarter of Section 34, which is the Llano well. If you notice there, it has 6 feet of sand on the gamma-ray, clean sand, and that's what I used.

Q. Take us through the display and show us the data points and how these values, then, have been contoured and oriented.

A. Okay, let's -- We can follow the wells in Section -- for instance, in Section 34 on that cross-section A-A'. And when I looked at that it had zero presence of GRE sand located in that well, which is the southwest quarter of 34.

As I go further north in Section 27 along this A-A', I noted that we had 2 feet of net and 3 feet of gross, based on the gamma-ray. These values here, it's the second number. For instance, if when I said 2, that's the net porosity map, net value of 8 percent or better. What I'm contouring is the second value, on the other side of the slash, is number 3.

And I went through all these wells out here and determined, based on the gamma-ray, the net sand content, just to get an orientation of this sandbody.

And I can continue on, if you want to, on the third well. Again, the log, I mapped 19 feet of sand, continue down on the cross-section again in the southeast quarter of Section 34, 6 feet of sand, of gross sand, which Nearburg has sort of ignored altogether. Then at the other part of the cross-section, A', 7 feet of sand. And to the north of this is, again, 3 feet, 4 feet and zero, essentially, and to the south 2 feet of sand. Trying to honor all the data points based on the gamma-ray, on the gross GRE sand.

Q. Mr. Brezina, does your map represent what you consider to be the best geologic opinion that honors all the data points?

A. Yes, I do.

Q. Let's turn and compare this to the net map.

You've prepared a net map, have you not?

A. Yes, I have.

Q. And the net values are reproduced from the gross map that does show the net values?

A. That's correct.

Q. All right, let's go to Redrock B-5. let's talk about this in pieces, Mr. Brezina. Let's start with the porosity cutoff, the 8-percent number.

A. Yes.

Q. Why have you utilized that number?

A. Since Nearburg was using that number -- and I decided -- and it's a good number to use regionally out here and for the Morrow, and to keep less confusion so we'll be able to talk about the same thing, we're all on the same page.

Q. So if you use that value on the log -- and on what type of log are you going to try to find a positive value?

A. Mostly the porosity, and most of these wells that are out here use the compensated neutron density, and there's a few wells out here that have the sonic log, and I based my log evaluation at an 8-percent cutoff.

Q. Have you honored all the log data?

A. Yes, I have.

Q. And did you prepare this in a way that you have

incorporated the mud log data?

A. Yes, I have. If you look down here on the southeast quarter of Section 34, you know, I've got mapped zero feet of pay. That's based on the porosity log. But what I did was incorporated the data from the mud log to extend this GRE sand down to the southeast, because as we get later on, we'll see the mud log indicates that we're very close to a major reservoir of the GRE sand, based on its porosity, based on its show and based on its drilling rate.

Q. When you utilize the mud log and the available log data, you cannot exclude, in your opinion, the fact that the GRE sand extends down into the southeast quarter of Section 34?

A. That's correct.

Q. Okay. When we're looking at these density neutron logs, describe for me the areal extent of that data's investigation of the reservoir.

A. It's very limited, just slightly beyond the wellbore, a matter of inches. So what you're really doing on the gamma-ray neutron, you're only looking at a small radius around the wellbore that you're able to -- for that tool to interpret and come up with a porosity value.

Q. How do you take the net map for the GRE sand and satisfy yourself that you have oriented it in the right

directions?

A. Again, if you go back to the gross map, the gross map has more of the data where you could use -- that gross sand map indicates a model, it defines the geometry of this sandbody. So naturally the reservoir rock inside this sandbody has to line up like the main sandbody in the gross sand complex.

Q. When we look at Exhibit B-5, you have interpreted two faults on that display. There is a western fault, and then there's an eastern fault line that bisects Section 34 generally from the northeast to the southwest. Do you see those lines?

A. Yes, I do.

Q. Are those lines critical for you in determining what you think to be the size and the shape of the GRE net pay porosity that's produced in the Nearburg well?

A. No, it's not, because the faulting was post-depositional, and the deposition of the sand was here, the geometry of the sandbody was here, then the faulting occurred afterwards.

Q. Let's turn to, if you have it available to you, Mr. Brezina, let's look at Nearburg's Exhibit 21.

A. Twenty-one.

Q. Do you have that in front of you?

A. No, I don't.

Q. Well, let's take a minute and get one for you.

What I'm trying to do is get to the net map, and I think it's either 21 or 22.

A. Yeah, this one says 22, so...

Q. One of those maps has got some engineering numbers on it.

A. Right.

Q. But I'm trying to find the base map that Nearburg used to show you the net pay orientation of the GRE pod. Do you see that?

A. Yes, I do.

Q. Are we now looking at the same thing?

A. Pardon me?

Q. We're now looking at what, Nearburg --

A. Yes.

Q. We've seen just now, Mr. Brezina, how you have the GRE porosity stringer, that GRE pod.

I want you to look at Nearburg's exhibit, the one you have in front of you, and describe what in your opinion you think is wrong with their interpretation.

A. Well, the first thing is, again, if we go to reference that southeast quarter of Section 34, the Llano well, he does not honor -- Nearburg does not honor any of the data that comes from that well, either a mud log or from the gamma-ray.

And it's interesting that this geologist had zero and zero, other geologist had 6 feet of gross sand.

Another thing that's interesting is that if you look at this engineering map or this isopach, is that if there's a fault that travels through the north, northern part of 34, like I've got it drawn, then you've essentially wiped out a lot of reserves for Nearburg. And if you can demonstrate a fault across there, the size of the reservoir is very limited.

Q. With the existence of that fault through Section 34, it will separate out the western portion of the net pay values in the GRE sand that Nearburg's using?

A. Yes, it would.

Q. And so if their engineer has taken production and pressure data from the Nearburg well and has come up with a volume, he'll have to contain that volume east of the fault?

A. That is correct.

Q. Is that volume east of the fault on their map big enough to contain the amount of gas that it needs to contain in order to satisfy the engineering data?

A. No, it's not.

Q. If the fault disappears, then they can add the west portion of the pod into the eastern portion, and then the engineering data fits?

A. That's correct.

Q. Let's go to the fault, then. Let's start looking at your structure map. That's Exhibit B-2. Give us a moment to unfold our displays there, Jim.

A. Okay.

Q. Describe for us Exhibit B-2.

A. As you look on this map, you notice a plunging dip back to the southwest. But what's most notable is this two faults. You have a major fault back on the western of the map, and if you look specifically between the wells in Section 28 and 27, you've got a subsea depth on top of the middle Morrow of a minus 10,024, and back in the southwest of 27 you have a value of minus 9155.

Again, this is essentially the same that Nearburg has documented, and I also concur.

We also -- I put another splinter fault that comes across most of Section 34, and the reason I'm doing this is, if you look up here again, look up here on the northeastern portion of the map, and these are 50-foot contour intervals, as you're coming down you have a rate of dip about 300 feet per mile.

So when you get down here to the well in Section 26, you've got a subsea point of a minus 9063. And below that, especially on the eastern portion of the map, the rate of dip looks like it breaks from about 300 feet per

mile to about 100 to 150 feet a mile.

So when we go back to this well in Section 26, if you go down approximately a mile, again, we're looking at the Nearburg well in the southeast quarter of Section 34, has a value of minus 9040, which essentially shows that you've got, from that well in Section 26, at least 20 feet of anti-regional dip. If you would have taken a normal rate of dip that was established earlier, this well should have been down 150 or 300 feet lower.

So something's caused a structure here that shows this anti-regional dip, and I believe it's the presence of this fault, and this anomaly was caused by this splinter fault off this major fault.

Q. Let me interrupt you for a second, Mr. Brezina. You're talking about the Nearburg well. You located it in the southeast quarter of 34.

A. Oh, excuse me, I meant the Llano well in the southeast quarter.

Q. I did that yesterday. I guess I've infected you.

A. The minus 9040 in the southeast quarter of Section 34, that's what I meant. Because that distance between that well in Section -- the well in 26, is approximately a mile. And if you had a normal rate of dip, then that value should be at 150 too. It should have been at about a minus 9200 feet.

Q. Let me ask you a question, Mr. Brezina. You contoured this on 50-foot intervals?

A. Yes, I have.

Q. If you did what the Great Western geologist did and contoured on 100-foot intervals, this fault disappears, doesn't it?

A. It would be hard to find it, yes.

Q. Okay, go ahead.

A. And again, you've got an anomaly here, and I believe that this anomaly, this little structure, was caused by a little splinter fault that came over the major fault.

In fact, one of the prior exhibits by Nearburg, by Mr. Gawloski, he also documented a fault going across Section 34.

Q. Let's set this display aside for a moment, Mr. Brezina, and let me post on the board the structural cross-section. It's going to be Exhibit B-1. Go ahead and get organized, and we'll put this up.

Let me ask you about your methodology, Mr. Brezina. What is the datum point on which you have hung all these lines?

A. You can see on this cross-section the datum is a minus 9200 feet subsea.

Q. Is that a marker that you can consistently find

through the cross-section profile that you've displayed?

A. Yes.

Q. Is it hard to pick or find on the log?

A. No.

Q. Explain for us why you have chosen this particular sequence of wells to display on the structural cross-section.

A. If you look up here, it's sometimes easier to see on a picture. And again if you look up here at the upper Morrow, and you can see as you do on a cross-section where it shows an anomalous area of the well back up here, the Nearburg well, is a little high, with the Mineral well is high.

Okay, what I'm trying to show here visually, how this fault appears in relation to the cross-section. Right here you can look up there and you can see the break between the wells back to the west.

Q. Let's find the GRE sand so that we're --

A. Okay --

Q. -- visually oriented to you. Find us a way to see that.

A. Okay, let's go to the Nearburg -- I mean the Minerals well and the Llano well, and the GRE sand is at a depth around 13,050 feet. I'm talking about basically this sand across here, equivalent to the same GRE sand up here

in the Nearburg. And I've got it marked on the cross-section itself, the GRE sand.

Q. Let's identify that for the record, now. You're looking at the yellow-shaded line that corresponds to the red perforations indicated on the Nearburg log?

A. On the Nearburg log, yes.

Q. And if you continue that and pick up the Llano well in the southeast quarter, you can visually see the relationship of that zone between the two wells?

A. Yes.

Q. Now take us to the west from the Nearburg well and show us why it's not a continuation into the gas storage.

A. Well, the -- as you can see, the gas storage area, there's no evidence of the GRE sand in the west half of Section 34.

Q. In order to explain that absence, is it necessary to interpret a fault between those two wells?

A. No.

Q. Is it an explanation, though, as to the separation?

A. The fault itself?

Q. Yes.

A. Not necessarily, because the faulting was after -- post-depositional, so the --

Q. So what's the significance of the fault that you've depicted on the display?

A. The significance of the fault is that this will help demonstrate and show that there's a separation, a break, from the west half and the east half of Section 34. And also there's additional information here that can help substantiate the presence of this fault.

It was pointed to earlier on the RFT data that we had -- in the Minerals State well, essentially said that we had virgin pressures on all the zones except for the "B" 2 zone. And so the zone here that was produced out of the Minerals well right above the GRE sand showed it produced -- had virgin pressure -- It's really interesting that after this well essentially was flat to a well back up here, the Shell well, and yet the Shell well was perforated and produced 13 years prior to that and did not indicate any drainage at all. And so that would indicate that two separate pools...

Also it's interesting to note what Nearburg had said, that the -- in their well, the Nearburg well, would be what they call the lower "B" main sand, calculates wet, is that it's structurally higher or flat to the Shell well back in the southwest quarter, which indicates the presence of the fault. I can't have a zone there that's wet, essentially flat to another well, unless you have the

presence of a fault or something that separates the two reservoirs.

Q. Your best geologic judgement is, that separation is attributable to the existence of a fault?

A. Yes, it is.

Q. Mr. Gawloski at the Examiner Hearing, and then again yesterday Nearburg's advancing the possibility that the zones are separated from the gas storage based upon some degradation of the reservoir, either a permeability restriction or something, that causes the limitation of the Nearburg well to affect the gas storage well. Do you remember that?

A. No, could you -- I don't remember that, but go ahead. Could you repeat the question again?

Q. My question is, is there an alternative conclusion about the separation between the Nearburg well and the gas storage well in the southwest quarter of Section 34?

A. Yes, there is.

Q. There's a pressure point that separates them in a particular zone?

A. Yes, there is.

Q. And they're either fault-separated, or there is some permeability degradation between the two and they're not connected?

A. That's correct.

Q. And whether there's a fault or not, in your opinion would you add reservoir sand in the GRE zone in the Nearburg well that's located in the northwest quarter of the section?

A. No, there's no evidence that the GRE sand is present in the northwest quarter of Section 34.

Q. You've looked at the RFT data that Nearburg has presented?

A. Yes, I have.

Q. And their engineer concluded that based upon a comparison of the test with the well in the southeast of 34, and looking directly across the gas storage line to the Gas Storage Well Number 1 in the southwest quarter, that's where he says the pressure has been equalized.

Have you studied as a geologist to try to determine other possible sources for the pressure depletion in the Llano well?

A. Yes, I have.

Q. And how have you gone about doing that?

A. Investigating all the wells in that area and see if that particular zone, which they refer to as the "B" 2 zone, is present or productive in the general area.

Q. Have you prepared a supplemental map that addresses that issue?

A. Yes, I have.

MR. KELLAHIN: Madame Chairman, I believe this is Redrock's Exhibit E-8?

CHAIRMAN WROTENBERY: -8.

MR. KELLAHIN: Got it, E-8.

Mr. Brezina if you'll mark your copy E-8, and if the others will do that, we can hopefully keep track of these.

Q. (By Mr. Kellahin) Let me have you identify for us what we're looking at when we see Exhibit E-8, Mr. Brezina.

A. Okay, the cross-section here is a cross-section hung on the datum of the top of the middle Morrow, and as you look down here below that, what I've shaded in yellow is the top of the middle Morrow "B" sand, the same nomenclature that was described earlier by Nearburg.

And this cross-section here goes from the well in the southeast quarter of Section 34, the Llano well, down to the northwest of Section 10, the Government 1 "A" well.

Q. Let me ask you some questions.

A. Go ahead.

Q. If the Nearburg engineer is attributing this zone to pressure depletion from the well in the southwest quarter of 34, this would be an interpretation that would give you an answer to the pressure difference, would it

not?

A. Yes, it would.

Q. And in looking at possible sources for that communication, you've looked at the well in Section 10 that I talked with Mr. Horning about yesterday?

A. Yes.

Q. And when you look at it, how have you mapped it? Are they connected geologically?

A. Yes, it is. The well in the section southeast of 34, the Minerals well, is connected geologically to the well in the section -- the northwest of Section 10.

Q. Have you compiled a package of documents from the Division records and elsewhere to give us the pressure information on how these might be connected?

A. Yes, I have.

MR. KELLAHIN: Madame Chairman, we propose to mark and introduce this package of documents as Redrock Exhibit E-9.

Q. (By Mr. Kellahin) Mr. Brezina, we're not going to go through all these pages. Help us find the pages that are important and lead us through them in a sequence that makes sense.

A. Okay, would everybody turn to the second page, please? Sundry Notices and Reports on Wells. And please note on Number 8 that the GRM Unit Number 5 well, which is

the well we're talking about here in Section 10 on the cross-section -- Notice there at the bottom -- or in the middle of the page, it's highlighted right under Item Number 17, "Propose to temporarily abandon storage zone interval. (Perfs 12,985'-12,963')."

Q. When we look at this first page, do you remember the discussion yesterday about Mr. Al Klaar's memo on behalf of the Gas Storage people?

A. Yes, sir.

Q. Who signed off on that?

A. Mr. -- Same gentleman, Mr. Klaar.

Q. When you review the memo that he filed, does he indicate in that memo that his association of the Llano well with the gas storage is directly attributed to any single gas storage well?

A. No, it's not. It just alludes to the fact that -- in connection with a gas storage well. It doesn't identify which gas storage well.

Q. I'm sorry, I think it says storage field.

A. Storage field, okay, excuse me.

Q. Now, the well in Section 10 at that point in time was part of the gas storage field, was it not?

A. Yes.

Q. Let me then have you turn to the next page that you want us to look at.

A. They go down to --

Q. I think it's in the back.

A. In the back? Yes, it is. It's --

Q. It's going to be page 6 of 11 --

A. Yes, it is, page 6 of 11.

Q. -- of the production report.

A. Page 6 of 11. Just note there on the 11th of 1979, year -- Excuse me, has everybody found it yet.

MR. KELLAHIN: It's the last set of dog ears.

THE WITNESS: Last set of dog ears.

CHAIRMAN WROTENBERY: Uh-huh.

Q. (By Mr. Kellahin) Go ahead, Jim.

A. If you go down here to the month of 11th of the year 1979, go over to the cumulative gas, it made approximately 2.2 BCF of gas. And what's critical, or what's interesting at this time, this was the time that the storage well -- at the time when the Llano had ran the RFT and had a pressure at around 3573 pounds. And if you look on the next page, 4 of 1983, that will give you the total amount of gas that's produced out of that particular zone. Then it was recompleted to another interval.

Q. What's the significance of this 1993 date in 4 of 1993 -- 1983?

A. Well, essentially, you're looking at 11 of 1979. This well has probably produced about 95 percent of its

gas, and it's pretty well completed. And it's interesting to note that the Llano well had a bottomhole pressure based on -- bottomhole pressure test on the RFT of 3573 pounds.

Q. At about this time?

A. About the same time.

Q. Let's go to the third point then, Mr. Klaar [*sic*].

A. Okay, let's go to the third point. It's back towards the front. It's the first, second, third, fourth, fifth -- about the sixth or seventh page. It should have a little dog ear. Has everybody found that?

Q. We're dealing now, still, with the March of 1983 time period?

A. Yes, we are.

Q. And what does the note at the bottom tell you when you go through this analysis?

A. It says, "This is an underground gas storage well in the Morrow..." The bottomhole pressure "is now 3450 PSI..." And it produced approximately about 200 million more of gas since 1979, so the bottomhole pressure probably was pretty close of what this figure was in 1979, and which the Llano well was tested with the R- -- the formation tester, about 3500, 3600 pounds. These pressures are very close in nature, suggesting that these -- another explanation for why you have such a low pressure in the

Llano well is maybe attributed to a well in Section 10.

Q. When we look at the production from this well, there's still some production that might have been otherwise produced, except for what appears to be wellbore damage?

A. That is correct. If you notice there at the second part of that -- second sentence, "Barite fines have ruined permeability and flow capacity." So actually this well could probably have produced a significant of -- more amount of gas, but it had formation -- it had damage there to the formation.

Q. If that's true, then that well in 10 still would have remaining pressure?

A. Yes.

Q. It was not taken all the way down to some abandonment pressure?

A. That's correct.

Q. Let's turn to a different topic. Let's go to your Exhibit B-3. It's the stratigraphic cross-section.

Mr. Brezina, this exhibit is your work product?

A. Yes, it is.

Q. Let's start with the datum point. Where is that?

A. Excuse me, the datum point?

Q. Yeah, for the stratigraphic cross-section?

A. It's the datum at the top of the middle Morrow.

Q. Is that any different than the datum point used on the structural cross-section?

A. Yes, it is.

Q. Okay, why is it different?

A. This will take out the structure, and it will show the stratigraphic sequence between the wells, and it's easier to see, particularly at this well.

Q. So what you're looking for in a stratigraphic cross-section is information devoid of structure and structural influence?

A. Yes.

Q. And the purpose is to do what?

A. Well, to show the relationship of the sands or the -- between the various wells.

Q. There would be standard geologic methods by which you could examine the logs for each well, make a judgment and then look at the next well and see if they were linked --

A. Yes.

Q. -- or continuous?

A. Yes.

Q. How did you do that for the GRE sand?

A. Well, if you look up here, on the middle log, which is the Nearburg well, the GRE sand is well developed. And if you go immediately to the next log right next to it

-- it's the Minerals, Incorporated, well -- you can see traces of that sand, 6 feet. And then it's easier to see, then, as you go across, further east, you'll see in that BTA well, oh, approximately 6 to 8 feet of sand.

What's interesting is, if you go west, that this GRE sand is not located in the west half of Section 34.

Q. Identify for us on your cross-section, Mr. Brezina, the zone that will equate to the information I want to talk about on the mud log.

A. We're talking about the zone in the Minerals well, and the zone approximately, if you look on the electric log -- excuse me, the porosity log, gamma-ray log, thirteen thousand and -- around 13,050 to around 13,056, highlighted in yellow.

Q. Why don't you leave that exhibit out, and let's pull out the mud log, which will be Redrock's Exhibit B-9.

Mr. Brezina, what does this mud log indicate, insofar as the Llano well is concerned?

A. If you look down here, it's highlighted, I've colored the GRE. This mud log shows that you have 6 feet of sand, but a fairly good drilling break.

Q. Can you conclude from the mud log that the GRE sand is present in the Llano "34" well?

A. Yes.

Q. What is the significance of the drilling rate?

A. Well, the drilling rate indicates porosity, and if you -- as the drill bit drills into a better formation that's got good porosity and permeability, it will take less time to drill, indicating, like I said, porosity.

Q. Let's define the point on the mud log where we're dealing with above and below the GRE sand, find that point. Where is it on the log?

A. On the mud log?

Q. Yes, sir.

A. The top of the GRE sand, it's approximately 13,060 feet.

Q. I want you to find the data point that shows you that the drilling rate was about 36 feet a minute.

A. Right above that -- actually, it's the drilling rate over a 2-foot interval, so -- right above there where drilling got hard, it was drilling approximately 36 feet over a 2-foot interval, which is about 18 minutes a foot.

Actually, you know, 2 feet drilled 38 minutes, another 2 feet drilled about 34 minutes.

Q. And then what happens?

A. Then you got into a drilling break. All of a sudden you went from -- drilling from about 18 feet a minute down to -- in this case it was drilling about five minutes a foot. It shows you're 10 minutes over a 2-foot interval.

So a significant drilling break, indicating a significant amount of porosity.

Q. And that porosity is going to be associated with the area that you've defined as the GRE sand?

A. Yes.

Q. Do you log and see any other drilling breaks observable in the Morrow "B" sand?

A. Yes, I do. If you notice right above the GRE sand, you have another drilling break, and someone has shaded in dark pencil a significant amount of drilling break. And if you notice, the GRE sand is pretty close, and the drilling rate is the lower Morrow "B" main sand.

Q. What sand is that? Can you give us a footage so we know?

A. Yes, the lower Morrow "B" main sand, the base of that sand is -- on the mud log is at 13,056 feet. And the top of that sand, based on the mud log, is twelve thousand nine hundred and approximately ninety-four feet.

Q. How much gas was produced out of that sand?

A. Over four BCF.

Q. We talked a little bit yesterday about the fact that the mud log could give you indications of lithology?

A. Yes.

Q. Describe that for us insofar as it affects the GRE sand.

A. If you notice here on the sample description, they describe sand clear to milky to white, very fine grain, subangular, consolidated.

And if you notice, to the right of that is a little bitty black box. And if you look back up here on the -- indicates the porosity. So it indicates a trace of porosity, heading back up here on top.

So the individual geologist or some sort of mudlogger logs sand with visible porosity. But you also notice, they also allow some additional sand with some shale in a granular mixture. Well, that's second little bitty small drilling break, approximately 4 or 5 feet below the GRE sand.

When they were looking at that sand, when they getting those samples, it sometimes mix. And as you can see, even on the compensated neutron density, the gamma-ray log just immediately to your -- joining to it, is a very shaly sand. But in the GRE sand itself, it's logged visible porosity.

Similar, if you look above, this black marker, visible porosity in the lower Morrow "B" main sand.

Q. And that's the one that you go back up and know has produced 4 BCF?

A. It has produced 4 BCF of gas.

Q. Go up to the top of that log. There's a header

that says percentage lithology?

A. Yes.

Q. And you go down that, and the coding changes in various ways. Read the coding for me when we get down to the interval that corresponds to the GRE sand.

A. If you notice, there is a series -- the sand designation is the little dots, and the majority of that interval that was logged, it's logged as sand.

There's a little shale, but again, that shale is probably coming from above you, that little 4 feet that separates you from the lower Morrow "B" main sand, from the GRE sand.

Q. Have the technicians that are involved in doing the mud log work -- have they visually seen the presence of this sand at this point?

A. Yes, they have.

Q. Is there information on this mud log that deals with the indication of hydrocarbons?

A. Yes, it has.

Q. Where do we do that?

A. If you go back up there to the top of the heading, you have a chromatograph. And what it does, it shows -- indicates gases being measured while they were drilling, and the background gas, if you look at the scale of 1000, 2000, 3000.

And as you -- going through the lower Morrow "B" sand, main sand, you notice you had a little increase of gas from about, oh, 1800 to almost 2800 units. And it came back and settled down around, oh, 1700, 1800 units. When we got back into the GRE sand, it appeared that we had an increase of gas, based on this mud log.

Q. When you read this part of the log, you can see correlative to the GRE sand an increase in these values?

A. Yes.

Q. How does that percentage or increased number compare to the number derived when the main "B" sand was crossed through, the one that produced the 4 BCF?

A. Well, about the time you got through the main sand, if you notice, you had a decrease in your gas. It looked like it broke down, back down, to, oh, around 1200 units and came back up to around 2000 units, came back down, but it still went over 2000 units, increasing that there's some gas that's coming into the form- -- into the wellbore. So the GRE sand --

Q. The chromatograph indicates that the GRE sand is equal to or not -- equal to or better than the pay in the "B" sand that produced the 4 BCF?

A. Yes.

Q. When you look at the density neutron, can you find that information for us?

A. Yes, it's the log that's immediately to your left of the mud log.

Q. Yeah, and let's find the GRE sand.

A. I've got it marked, it's approximately 13,052 feet.

Q. Now, we're over on the left-hand side of the display?

A. Yes, we are.

Q. Does the density neutron cross over in the GRE sand?

A. No, it doesn't.

Q. That indicates porosity, does it not?

A. Yes, and also sometimes a gas effect.

Q. Is that a common signature of a thin sand like this?

A. One of the problems when you log in a thin sand, the compensated neutron takes an average porosity. So when you get to the thinner sands, sometimes it averages it out and you don't see a good, true porosity reading. And it's also an inferred data. They run a tool down there and try to measure that porosity.

Q. When you reviewed the Nearburg maps, based upon the testimony that they presented to you yesterday, they did not use the mud log in their interpretations, did they?

A. That's correct.

Q. Mr. Brezina, let's go back now to your Exhibit B-5.

CHAIRMAN WROTENBERY: Mr. Kellahin, do you need B-3?

MR. KELLAHIN: You may have it if it's --

CHAIRMAN WROTENBERY: Thank you for helping out our engineer and our attorney.

Q. (By Mr. Kellahin) Mr. Brezina, do you have the Redrock GRE net sand map before you?

A. Yes, I do.

Q. All right. Let's go through and summarize, then, your geologic opinions and conclusions about this map.

A. Does everybody have the map there in front of them?

MR. CARR: Tom, which map are you on?

MR. KELLAHIN: Going back to the first one. It's that GR --

CHAIRMAN WROTENBERY: B-5.

MR. KELLAHIN: B-5.

Q. (By Mr. Kellahin) I want to talk about all the reasons that support your conclusion that the GRE sand is oriented and distributed in the manner that you've mapped it. Let's start with the fact that you've included the GRE sand portion down into the southeast quarter of the section.

A. If you notice that --

Q. Why did you do that?

A. Pardon me?

Q. Why did you carry it down there?

A. Why did I carry it down there? It's based -- because of the mud log. You know, the electric log gives you a pretty precise information, as long as the tools are working properly. But the mud log itself is raw data. It's drilling breaks, it shows -- It has visual porosity.

And the reason I extended this pod down to the southeast quarter is that you have to honor those points, honor that data. That mud log indicated that well is nearby the gas reservoir, with the shows and everything else.

Unfortunately the wells have been plugged. It would have been interesting to perforate that log, because you have a little conflict between the mud log and the electric log. And I think based on that mud log that you have to carry that pod down to the south, because I think that minerals well is so close to the reservoir itself.

Q. Has your map honored all the data points?

A. Yes, it has. If you look at, I honored the value up here on the Llano well in the southeast quarter of 6. Nearburg did not include any of this data from this well.

Q. In your opinion, is this the most probable

correct interpretation of the GRE sand --

A. Yes, it is.

Q. -- the one which honors all the available data?

A. Yes, it is.

Q. How does your orientation of the GRE sand data fit with the rest of the geology in this area?

A. I believe that these sands that are coming from the north, causing a fluvial deltaic system, the orientation of these sands is north and south. In fact, if you look at Nearburg's exhibits, all their exhibits except for one generally show a north-south orientation. Only one exhibit from Nearburg shows an east-west orientation, and that is on the GRE sand.

I believe that based on looking at all the value, all the data points, this is the correct and logical interpretation of the depositional sequence in Section 34.

Q. When Dr. Lee is looking for a control point, is the Llano well a control point?

A. Yes, it is.

Q. And the Nearburg well in the northeast quarter is a control point?

A. Yes.

Q. And based upon those control points, is there any evidence that the GRE sand is in the west half?

A. No, there is not.

Q. Is there any evidence that it's in the northeast quarter?

A. In the northeast quarter? Yes, it is.

Q. How about the northwest quarter?

A. Not in the northwest quarter.

Q. How about the southeast quarter?

A. Yes, it is in the southeast quarter.

Q. If you were going to orient a spacing unit that would maximize dedication of the GRE sand to that wellbore and were utilizing standard 320-acre spacing sizes, which orientation would you use?

A. It would be the east half.

MR. KELLAHIN: That concludes my examination of this witness.

We move the introduction of his exhibits behind the exhibit tab that's numbered B-1 through B-9. And then I have some E exhibits that I've lost track of.

CHAIRMAN WROTENBERY: Well, did we -- I don't believe we've covered B-6 through B-8.

MR. KELLAHIN: He did not specifically talk about them. We have them in there. They're maps of the "A" zone and stuff. He's not going to talk about it. They're all his documents.

CHAIRMAN WROTENBERY: Okay, any objection to the introduction into evidence of B-1 through B-9 and E-8 and

-9?

MR. CARR: I have no objection.

MR. HALL: No objection.

CHAIRMAN WROTENBERY: Then B-1 through -9 and E-8 and -9 are admitted into evidence.

MR. KELLAHIN: We pass the witness.

MR. CARR: I need five minutes, please.

CHAIRMAN WROTENBERY: Okay, we might take a ten-minute break here.

(Thereupon, a recess was taken at 10:13 a.m.)

(The following proceedings had at 10:28 a.m.)

CHAIRMAN WROTENBERY: I guess we're ready. Mr. Carr?

MR. CARR: Thank you.

CROSS-EXAMINATION

BY MR. CARR:

Q. Mr. Brezina, let's start with the -- I'm going to try and go in the same order, but I'm not sure. Start with what I believe is B-4. That's the gross sand isopach map on the middle Morrow GRE sand.

A. B-4.

Q. I think that's B-4. Now, if I understand these maps, the numbers below each of the well spots indicated on the map show the net porosity feet and then the gross thickness; is that correct?

A. Yes.

Q. And would you agree with me that if you're going to have producible reservoir, that you really need to have net sand present at the wellbore?

A. To have -- Excuse me, could you --

Q. To have a producible reservoir in the wellbore, you have to have some net sand?

A. Net sand as defined as what?

Q. Well, why don't you tell me what you mean by these numbers? What is the difference, in your opinion --

A. Okay.

Q. -- between net sand and gross sand?

A. Net sand as indicated here, that net porosity, that the -- based on the electric logs, it has 8-percent porosity or better. Gross sand does not take into account porosity.

Q. And so if you're going to have a well that you can -- a producible well in this area, would you want to have a well that had a net sand or a porosity in excess of 8 percent?

A. Yes, you would.

Q. Below that, would you expect to have producible reservoir, with a porosity below 8 percent?

A. It varies, but generally 8 percent is good. I've seen it where it does produce lower than 8 percent.

Q. Is this 8 percent generally a reasonable cutoff that you need porosity above that to have producible reservoir?

A. Well, I was trying to be consistent with the exhibits that Nearburg has because they used 8 percent and so I thought that was a reasonable one, so I used their cutoff.

Q. And my question is, using that cutoff, do you need to be above that cutoff, in your opinion, to have actually a producible reservoir at the wellbore?

A. Above 8 percent?

Q. Yes, sir.

A. In this area, this well?

Q. Yes, that's what we're talking about.

A. Generally you like to have that, and generally you should.

Q. Now, if we look at Exhibit B-4, it appears to me that this is a gross isopach map?

A. Yes.

Q. And what you have done is, you are orienting the sandbodies in a general north-south direction; is that correct?

A. Yes.

Q. That's the general dip orientation of the Morrow throughout this area; is that correct?

A. Yes.

Q. And if I look at this, you're actually interpreting the Morrow in this area to be -- is it fair to say a channelized sand? Is that what we have here?

A. Fluvial deltaic system, complex.

Q. And what this initial mapping is, is mapping of the gross sands, not net sands?

A. Yes.

Q. And as you have mapped this, you have in Section 35 broken out what appears to be mapped as a separate GRE sand. Do you see that?

A. Section 35?

Q. Yes, there's a separate small pod.

A. Yes.

Q. Is there anything that you have, any of the subsurface information that you have, that would show you that that portion of the GRE sand is, in fact, separated from the GRE sand in the well in the northwest quarter of that section?

A. Could you repeat the question, please?

Q. Is there anything that would cause you to separate that pod from the rest of the GRE sand as mapped?

A. Yes, because I have it mapped -- my interpretation is an abandoned channel, that the -- it just was abandoned channel.

Q. Is there a cross-section that you have that shows that?

A. No, I have not.

Q. You're working from just subsea information?

A. Sub- -- you mean subsea --

Q. Well data?

A. Well data, yes.

Q. You don't have a seismic line that shows the channel?

A. No, I don't.

Q. You have a point -- you have data on the well where you have 2 feet of gross in the northwest quarter of Section 35; is that correct?

A. Excuse me, 35 --

Q. I'm sorry, you have 17 feet of gross and 2 feet of net; is that right?

A. Yes.

Q. And then you come down to the one well spot that you have in the little pod in Section 35, and again you have 2 feet of net and 17 feet of gross, correct?

A. Seven feet -- 17 -- 7 feet.

Q. Okay, 17 there and 7 feet, I'm sorry --

A. Yes.

Q. -- up in the northwest.

A. Yes.

Q. Do you have any other information that would show that channel?

A. No.

Q. This is just your interpretation?

A. Yes.

Q. If we go to Exhibit Number 23 -- I'm sorry, Nearburg Exhibit Number 22 -- Do you have that before you?

A. Exhibit 22, yes.

Q. As I understood your testimony, it was your testimony that this map did not honor all the data; is that correct?

A. Honor the -- all the data, especially in the southeast quarter of 34, yes.

Q. Now, this, if you'll look at the caption, is a net isopach map; isn't that correct?

A. Yes.

Q. And doesn't a net isopach map honor net data, not gross?

A. Yes.

Q. And if you look at just the net data, isn't that what is actually mapped here?

A. Yes.

Q. And would you agree with me that on this interpretation there is no channel that breaks off the easternmost part of this pod in Section 35? This

interpretation doesn't show it?

A. This interpretation, no, it does not show that.

Q. And so there's just a difference here in interpretation between geologists, I guess?

A. Yes.

Q. Okay. You testified that the reservoir as mapped here was too small to contain the volume that you anticipate is in this reservoir; is that correct?

A. If it's faulted, if there was a fault there.

Q. But if there isn't a fault?

A. Then it's sufficient.

Q. And that is, of course, assuming that the engineering data is correct?

A. Yes, I'm just basing that on...

Q. Now, we were talking about the general strike of the Morrow through this area, and I believe you testified it's generally a north-south-running channel system; is that fair?

A. In this area, yes.

Q. And if I understood your testimony, you commented that even Nearburg was mapping most of the sands in a north-south direction, until they got to the GRE sand. Is that a fair characterization?

A. Well, overall, if you look at all the exhibits they had, generally, you have, you know, more or less

north-south, except for this.

Q. If you have a north-south-running channel and that channel hits strike-oriented sands, what happens?

A. When that channel hits strike-oriented sands?

Q. If the channel hits a marine beach or shoreline or something of that nature, what will happen to that sand deposit? Does it continue to run north-south?

A. No.

Q. If it's a marine sand or a shoreline deposit, would that, in turn, then, run in a -- could that run in a direction perpendicular to the base channel?

A. Yes.

Q. Would you go to what is marked as B-7, your total Morrow sand -- gross sand isopach?

A. B-7?

Q. Yes, sir. What I have is a map that says "Total Morrow Sands, Gross Sands". I'm not sure that's --

A. No, that -- this is -- B-7 is this map. Are we --

Q. I've got a different number mine. Mr. Kellahin and I had a heck of a time with the numbers. Mine is called "Total Morrow Sands, Gross Sands". Either that or B-8, which we could use.

A. Okay, let me look. Maybe... Okay, B-7, yes, sir.

MR. KELLAHIN: Same thing, B-7.

MR. CARR: Mr. Kellahin is helping me with my numbers.

(Laughter)

Q. (By Mr. Carr) All right, Mr. Brezina, if I look at this map and I look at the top two tiers of sections, that looks to me like a Morrow sand channel trending pretty much north to south; is that right? In those north two tiers of sections?

A. North two tiers, yes.

Q. Yes, sir. And then if I get into the next two tiers of sections, it seems to me that in your mapping it sort of breaks up at that point; is that fair to say?

A. What do you mean by breaking up?

Q. Well, does it -- It seems to not be such a direct north-south channel, but we see perhaps some marine shoreline influence in that area.

A. Not according to my interpretation, I don't see that.

Q. You don't see a change in your mapping, the northern two sections as compared to the rest of that map?

A. No, I don't.

Q. Let's go to B-5. Now, this is a net map of the GRE sand.

A. Yes.

Q. It has a porosity cutoff of 8 percent.

A. Yes.

Q. We discussed that porosity cutoff a few minutes ago. You have mapped a channel generally in a north-south direction; is that fair to say?

A. Yes.

Q. And you did that by honoring data from the mud log in the south half of Section 34. That was a key element in your analysis?

A. Well, the gross isopach map, first, is showing a geometry of the sandbody.

Q. And so the gross geometry or the geometry you've mapped is north-south; is that correct?

A. Yes.

Q. Now, I'd like for you to go with me, and let's look at the wells in this sand -- in this reservoir as you've mapped it, that have net sand. Would you do that with me?

A. Go ahead.

Q. Let's go to the northernmost well. I think the northernmost well falls in the southwest quarter of Section 27; is that correct?

A. Yes.

Q. If we move to the east, where is the next well in the GRE sand that has net sands?

A. Nearburg well.

Q. And so we're moving to the southeast; is that correct?

A. Yes.

Q. Now, what would be the next well coming across this section or this area that would have gross -- I'm sorry, net sand in the GRE sand?

A. Based on electric logs, right?

Q. Based on the information you've shown.

A. It would be in the northwest of 35.

Q. So now we're moving to the east, slightly to the south, from the Nearburg well?

A. That's correct.

Q. Where would be the next well that would have net sand?

A. It depends if you want to go west or east. If you go east, the closest one is there in Section 35. You've also got it back in Section 33 and back in Section 23 to the north.

Q. And when you say 23 to the north, we're talking about a separate reservoir two miles north, right?

A. Right.

Q. But if we look at the wells that are in the immediate area of the Nearburg well, there are only four with net sand; isn't that right?

A. In the immediate area -- Well, in the immediate area it's just three. That one in 35, I've got it mapped as a separate unit.

Q. It's closer, though, to the other wells than the well in 27 is to the Nearburg well; isn't that fair to say?

A. The well in 35, yes, it's closer than the well in Section 33 or 23.

Q. And so the four wells in the area with net sand in the GRE trend northwest-southeast?

A. Well, the well in the southwest of 35, I've got it mapped on a separate sand geometry.

Q. I understand that, but I'm not asking you how you mapped it. I'm asking if it has -- if you've indicated there are net sands in that well?

A. Yes, there are net sands in that well.

Q. And if we look at the wells that have net sands, they trend northwest-southeast; isn't that true?

A. In this immediate area.

Q. Now, you used the information on the mud log to pull this contour down into the southeast of Section 34; is that correct?

A. That is correct.

Q. I think we'll go to that now and jump out of the order that you used, if we could.

A. Whatever. Do you want a mud log now, sir?

Q. Yes, sir, I think so, and we'll also be looking at your -- I think your stratigraphic cross-section, but not initially.

CHAIRMAN WROTENBERY: Are we going to the mud log?

MR. CARR: Yes, we are, please, the mud log being Exhibit B-9, I believe.

CHAIRMAN WROTENBERY: B-9.

Q. (By Mr. Carr) Now, you have used this mud log to establish that there is potentially producible GRE sands in the south half of Section 34; is that correct?

A. Southeast quarter, yes, that's correct.

Q. And you have -- if you've looked at this -- I believe you testified that when you encounter -- that you had encountered drilling breaks, and that suggested to you that, in fact, there were producible sands in the general area; is that correct?

A. You have good porosity, and that in turn could give you producible sands --

Q. And that -- Go ahead, I'm sorry.

A. I said just -- You have porosity, and that could give potential hydrocarbons.

Q. Have you looked at the electric log on this well?

A. Are you talking about the porosity log?

Q. Yes, uh-huh.

A. Yes, I have.

Q. And doesn't that, in fact, show that there's only a 4-percent porosity on this zone?

A. Four percent, well, if you look on the density, the density looks like you've got, right off the bat, between 4 and 6 percent --

Q. Okay.

A. -- on this log. But I'm not a log analyst, I'm just looking from what I...

Q. But you have a relatively low porosity, do you not?

A. That's measured by this tool.

Q. Okay. And if we -- Do you work with mud logs regularly?

A. I have in the past. I'm not an expert, but it's a tool that we use.

Q. Would you -- Would it be customary to recommend that a zone be perforated from just the mud log?

A. I'll use it in conjunction with all the available data, geological data.

Q. If you were working with mud logs as you go through the Morrow, when you get a gas show in the well it could be formation gas, could it not? I mean, that's what you're thinking --

A. Yes.

Q. -- this could show?

It also could be drilled-up gas? Do you understand that term?

A. Drilled-up gas?

Q. Gas that is released not because it's coming out of the formation but because it's being broken up by the drill bit. It escapes when the formation is being --

A. Well, you're in a field I'm not really familiar with, so I don't see how I could answer that question.

Q. Do you understand that if you're drilling in a very tight zone, that, in fact, you might be getting drilled-up gas as opposed to formation gas? Or am I getting beyond an area --

A. You're getting beyond...

Q. If we look at the interval on the mud log that is -- that corresponds to the GRE sand, if I'm reading this correctly, when we get into the GRE sand, in fact, we start seeing a fairly substantial amount of shale; is that correct?

A. Well, to me it looked like a majority of that map is sand, not shale.

Q. If we go above that into the middle Morrow "B" sand, we don't have any shale present, do we?

A. No.

Q. And that's the area from which you were talking

about there being substantial volumes produced from the well?

A. Yes.

Q. And now as we get down into this, we do for the first time start seeing shale; isn't that correct?

A. Yeah, it appears if you on the -- maybe shale stringer is separating the two.

Q. And then we also in the center of the log see that we start encountering brown, soft shale and granular mix in the formation as well; isn't that true?

A. Yes, and I addressed that earlier when I said it's probably related to that drilling -- slight -- a little drilling break right below the GRE sand. I mentioned that earlier in my testimony, that that is where it's coming from.

Q. Now, if we would take this interval that you've shown here as -- that you believe, potentially a very productive interval in the GRE; is that correct?

A. Well, it looks very interesting. It's very anomalous, you've got a good drilling break, and you've got visual porosity, increase of gas. It looks favorable.

Q. This log has been available since it was -- I guess June of 1979; isn't that correct?

A. I wouldn't know that because I was -- The date of it? Is that what you're asking --

Q. Yes.
A. -- the date?
Q. Yes.
A. I presume so, because I've only had access of it this year --
Q. Okay.
A. -- so I presume -- whatever the title is, yes.
Q. And what we have here is a log of an interval that, if we relate it back to your isopach maps, you show a zero net sand; isn't that right?
A. Zero, yes.
Q. And if we compare it to the cross-sections of the area where you have mapped it, you show this sand being present right below the lower Morrow "B" that has been perforated and produced for a period of time, correct?
A. Could you repeat that again, please?
Q. The interval we're talking about is on the log of this well. The zone that you've correlated across the log --
A. Is the GRE? GR- --?
Q. Yes, the --
A. Yes --
Q. -- GRE.
A. -- okay. Yes.
Q. And that's what we're talking about with the mud

log?

A. Yes.

Q. And this is the log, the 1979 log?

A. Yes.

Q. And there have been five operators of that well, have there not been?

A. I'm not sure. I'm not -- I've heard that, the other people testify that, but I have not knowledge that --

Q. No one has ever perforated this zone, have they?

A. I don't know, sir.

Q. Do you have any perforations shown on --

A. No, I don't. The date I have, it did not indicate it had been perforated.

Q. It shows that it has not been --

A. -- been perforated, yes.

Q. Let's go to the Exhibit B-2, the structure map.

A. B-2?

Q. Yes. This again is based on well data. I'll give you a minute here.

A. B-2, right?

Q. Uh-huh.

A. Yes.

Q. This is based on subsurface well data?

A. Well, based on -- Yes, it is.

Q. Okay. And on this exhibit you show two faults?

A. Yes.

Q. And this was prepared by you?

A. Yes.

Q. Why did you place the fault crossing Section 34? What information did you have that showed that?

A. Well, the anomalous well, if you look at the well in Section -- the southeast quarter of Section 34, the Llano well --

Q. Uh-huh.

A. -- has a subsea value at top of the middle Morrow of minus 9040. And if you look back to the northeast it shows anti-regional dip. If you had established a normal rate of dip, you would expect that well to have been a couple hundred feet lower than what it is now.

Q. How does it compare to the well in the southwest of this section?

A. Southwest of --

Q. -- of Section 34.

A. Oh, it's approximately -- what is it, 59 feet higher to that.

Q. Would the structural difference of 59 feet suggest to you that there should be a fault there?

A. Yes.

Q. If we look at this map, if you go down to Section 9, down in the southwest quarter --

A. Section 9.

Q. -- and we look at the well in the -- it looks like the southwest of the southwest at a minus 9324?

A. Yes.

Q. We go up to a well in the northeast at 9126 feet?

A. Yes.

Q. With that kind of a difference, would that suggest there's some faulting in there to you?

A. No, the base -- This doesn't show anti-regional dip.

Q. Okay, so it's not just the distance, it's the actual dip --

A. Dip --

Q. -- you see?

A. -- yes.

Q. Now, you've mapped -- Well, as to the placement of this fault, what information was available to you to locate this where you did?

A. Based on my interpretation.

Q. It's almost exactly where Mr. Gawloski had placed it some time ago; is that right? On some earlier exhibits?

A. I don't know, I don't have access to Mr. Gawloski's --

Q. The exhibits that you discussed that were shown today in this hearing were not available to you when you

placed the fault --

A. That's right.

Q. -- in Section 34?

A. That's correct.

Q. If we look at the way this is currently mapped, this is very different from how it was mapped in 1979, or do you know?

A. I don't know how it was mapped in 1979, I couldn't comment on that.

Q. How much of a throw do you anticipate you have on this fault?

A. Which fault, sir?

Q. The one -- the smaller fault --

A. -- the smaller fault --

Q. -- the one across 34.

A. You could anticipate anywhere from 50 to 100 feet, 125 feet.

Q. In your experience as a geologist, does a throw of 50 to 100 feet give you enough throw to create the sort of structural feature that you have shown on the eastern side of that fault?

A. Yes.

Q. Then you have contoured the reservoir on both sides of this fault, have you not?

A. Contoured, yes, I have.

Q. And if we go to the western side of the fault, you've got 50-foot contours; is that correct?

A. Yes.

Q. And so we come -- our minus subsea depth is -- starting over in 33 you've shown it at a minus 9300 feet, correct?

A. I have minus 9263.

Q. But if we look at the contours, you start with --

A. Okay.

Q. -- 9300 --

A. Yes, okay.

Q. -- and as we move toward the fault we come to 9200, then 9100. If we get over to the fault, is it fair to say we're at approximately a minus 9050 feet?

A. I don't know. I didn't interpret that.

Q. But you've got a general trend here, do you not? We've got a contour that's 9100 feet.

A. Yes.

Q. Wouldn't you expect that trend to continue, so it would continue to move to a shallower depth as it goes that direction?

A. My interpretation doesn't indicate that.

Q. But we do have 9100 feet to the west of the well in the southwest quarter?

A. Yes.

Q. And if the trend that you've mapped continues, that well is above 9100? In fact, you've shown it as above 9100?

A. By one foot.

Q. And as we continue toward the fault, is it unreasonable to think that it would continue to be shallower?

A. I don't have that data. My interpretation -- the way I've got it mapped, this is the way I've got it mapped.

Q. But I'm asking as you've mapped it, you have no -- you think it flattens out after it goes through the well in the southwest quarter?

A. At the time, that was the interpretation I made.

Q. And so you think it comes up and then flattens out, right at the well in the southwest? I'm just trying to get your interpretation.

A. Well, I've got a value of a minus 900, and I was just trying to make an interpretation at the time when I made this map --

Q. Okay.

A. -- of what I think it was.

Q. And that's several hundred feet west of where you've placed the fault?

A. Several hundred feet?

Q. That well is several hundred feet west of where

you've placed this fault?

A. Excuse me, I've lost your questioning, your train of thought.

Q. We're talking about the well in the southwest of Section 34.

A. Southwest of 34, yes.

Q. And you have placed a fault through 34?

A. Yes.

Q. And the well is west of that?

A. The well west -- Yes.

Q. And it's -- I'm asking, how many feet west of where you placed the fault is that well?

A. I don't have a scale, I don't --

Q. You can't look at this map, you're not able to do that?

A. Well, it's one inch to 2000 feet, so, you know, what is that? A quarter of an inch or a third or an inch or -- so that's -- so if it's a quarter of an inch, one inch is 1000 feet, so several hundred feet.

Q. Okay. Now, if we go -- and at that point you're adding minus 9099?

A. At that well point.

Q. If we go the other side of the fault, I'd like you to look at the contours, and we come in with a 9100-foot contour. Do you see that looping around?

A. Yes.

Q. The next contour toward the top of the structural feature would be at 9050; is that right?

A. In between, yes.

Q. And if you take that contour and you bring it around to the fault, you're at about 9050 at that point; isn't that right?

A. Yes.

Q. And unless -- if this well and the formation flattens out at the location of the well in the southwest of the quarter, you would then have a difference of about 40 feet; isn't that right?

A. Forty feet, where did you get that?

Q. At the fault, due east of the fault -- due east of the well in the southwest quarter.

A. Due east -- You lost me. Could you repeat that again, please?

Q. At the fault on the east side where the contour at 9050 feet intersects the fault as you've placed it --

A. Yes.

Q. -- that would be at a minus 9050, correct?

A. Yes, correct.

Q. On the other side of that fault line, you have mapped this so there is a subsea depth of something between a minus 9100 and whatever the formation continues to go to

as it moved toward that fault?

A. Yes.

Q. It's possible that due west -- I'm sorry, due east of the well in the southwest quarter, based on your mapping alone, you have virtually no throw where you have placed the fault; isn't that true?

A. Well, you've got 9050. It looks like you may have 50 feet of throw.

Q. But if the formation continues to rise as you've mapped it west of the fault, you could have no throw; isn't that right?

A. That's right, you could, possibly.

Q. And you just don't know, unless you drilled a well right on that fault, correct? Right at that point? You wouldn't really know --

A. Well, my interpretation is that it goes this far north. But unless you have seismic or drilled a well, you wouldn't know that.

Q. Do you have seismic?

A. No.

Q. Have you drilled a well?

A. (Shakes head)

Q. You're showing a fault here, and you might not have any throw at that point?

A. I based it -- If you look up there a little

further north in Section 27, you've got a minus 9155, and if you go to the northeast quarter of Section 34, 9086, that's a little bit more than 50 feet between those two wells, so you could still have a significant fault there.

Q. You could, but if you honor the contours as you've shown them, you might not; isn't that just fair to say? It's a possible interpretation?

A. Well, it's based on some of the well data. The other one is a minus 9150. That shows, you know, 60-some-odd feet. It's 14 -- 69 feet, in that area.

Q. Do you have any evidence that this is a sealing fault?

A. No, I don't.

Q. If it's a sealing fault, in fact, you would have two separate accumulations in the gas storage project, wouldn't you?

A. Yes.

Q. And if it isn't, then you could have communication across that fault?

A. But it appears from -- you know, when we discuss the pressure data again, two different interpretations, and that -- well, I think some of the pressure data in any case, that is a sealing fault, that you have two distinct reservoirs.

Q. And so it's your interpretation that there are

two separate storage reservoirs here?

A. Two separate pools, east half and a west half.

Q. What about north and south of that fault in the storage project? You have two separate reservoirs, would you not, based on your interpretation?

A. North of the fault?

Q. North of the fault, the minor fault, the one that traverses 34. If that's a sealing fault, you have one storage project north of that, would you not?

A. You have a pool there, yes.

Q. And then you'd have south of that fault a second storage project; is that right?

A. Yes.

Q. And again, the exact placement of this fault, is it your interpretation, you don't have any well that ever cut this fault?

A. Yes.

Q. But you believe there's a fault, not something -- the formation falling over a structural nose?

A. Yes.

Q. Let's take a look at B-6. It's the isopach map on the upper Morrow "A" sand. This is your interpretation of the net sands in the "A"; is that correct?

A. Yes.

Q. You don't show the "A" being present in the well

in the southeast quarter of Section 34?

A. Yes.

Q. You do, however, show the "A" sands running north-south, over and through the center of Section 34, correct?

A. Yes.

Q. And this is your interpretation of how they are located?

A. Yes.

Q. And you have -- You know, Dr. Lee yesterday was concerned about how we were able to map pods with one or two well spots. If we look at the reservoir in the section of 34, you only have one well control point; that's the Nearburg well; isn't that right?

A. Yes.

Q. And from that you've interpreted this to extend north-south throughout Section 34?

A. Yes.

Q. All right. Now, from that I'd like to go to the new exhibit you've presented today, the two-well cross-section that you used to explain the possible drainage of the GRE sand in the well in the southeast of Section 34.

A. Not the GRE sand.

Q. The injection sand, I'm sorry, the "B" sand.

CHAIRMAN WROTENBERY: Are we talking about E-8

or --

MR. CARR: I guess E-8, it's the one Mr. Kellahin offered today, a two-well cross-section with, it looks like, an isopach on the --

CHAIRMAN WROTENBERY: That is E-8.

MR. CARR: Oh, I had it EA.

CHAIRMAN WROTENBERY: Eight.

MR. CARR: That might be the new trace. I have it EA and EA'.

Q. (By Mr. Carr) Mr. Brezina, if we look at the isopach part of this map and we look at Section 34, you have interpreted the reservoir available to the well in the southwest quarter of that section to extend in a north-south direction over the western part of the section; is that correct?

A. Are you talking about the well in the southwest quarter?

Q. Yes, sir.

A. Yes, sir.

Q. And you have interpreted that reservoir to run that direction based on, again, one data point, have you not? That well?

A. Yes.

Q. And yet you have also a data point in the southeast quarter of that section, do you not?

A. Yes, I do.

Q. And you decided your interpretation is not to connect those points, but to connect the well in the southeast with a well two miles away south and southwest; is that how your interpret it?

A. Yes.

Q. And so it's just again -- This is how you, when you analyze these well points, would interpret the reservoir to be located?

A. Yes.

Q. And you believe that it is appropriate to connect the wells north-south on a two-mile axis and not connect the wells in the same section?

A. Yes.

MR. CARR: That's all I have, thank you.

MR. KELLAHIN: Ma'am --

CHAIRMAN WROTENBERY: Let me ask, Mr. Hall, did you have anything?

MR. HALL: No questions.

CHAIRMAN WROTENBERY: Commissioner Bailey?

COMMISSIONER BAILEY: I have a few questions.

EXAMINATION

BY COMMISSIONER BAILEY:

Q. I've heard very little testimony about the well that is in your cross-section that's in the southwest of

Section 27, just to the north.

A. Excuse me, could I get a map right here?

Q. Yes. B-1.

A. B-1?

Q. Yes. And also B-5.

A. Which is smaller, B-5?

Q. B-5 is the smaller.

A. Okay, if you don't mind -- Okay.

Q. Ready? According to B-1, the GRE sand is mapped into that well, which is the BTA Grama "B" well?

A. Yes.

Q. Which is on the downthrown side of the postulated fault there. Can you explain to me the depositional environment that would cause such an odd lobe that you had to map onto that pod in order to take into account the GRE sand in the well?

A. I just honored the points, you know. There in that particular well I had 2 feet out of 3 feet. And if you notice around there, you've got very little -- most wells have zero feet. I was just honoring all the data points, all the geological points, and tying it together.

Q. Yes, I'm just trying to get to the depositional environment that would cause such a --

A. Well, you could have another meander in the channel, so the thing could be bending back over and

heading more -- it was northwest and now it would be going north. A fluvial system, a channel.

Have no other control in 27, so I don't know where to go with it. So I just closed it off.

Q. Here on B-6 --

A. B-6?

Q. Yes.

Q. -- indicates north-south orientation --

A. Excuse me, I -- Could you give me a minute, please? Okay.

Q. -- indicates north-south orientation for the upper Morrow "A" sand, which is the blue sand that is up there on the cross-section; is that --

A. The -- No, it's the yellow sand, above the blue. The blue is just the top of the middle Morrow section, actually a limestone. What we're mapping here is in yellow, above the blue marker.

Q. Okay, and that sand, you say, is fluvial deltaic.

A. Yes.

Q. And the blue sand that's mapped below that --

A. Blue sand, ma'am?

Q. The blue that is indicated for the base of the upper Morrow.

A. Oh, that's not a sand, that's just -- it's a limestone. It's just -- We colored that up so it's easier

to see where that stratigraphic marker is, top of the middle Morrow, which is -- some people call the top of the clastics, which is the base of this limestone. It's not a sand.

Q. Okay. Yesterday we heard testimony about barrier sandbars that are showing up as upper coarsening of the gamma-ray log. Could you point those out to me and explain the depositional history of what we're going through in this area, as far as fluvial deltaic --

A. Based on the gamma-ray?

Q. Yes.

A. I didn't make that determination. That was Nearburg's geologist. I think it's very difficult, based on a gamma-ray, to determine what the environments are. You have so many other things to consider. You have radioactive minerals that could cause you problems with the gamma ray, and so I didn't use that. And I wouldn't use that interpretation. So I didn't present that sort of analysis to determine the depositional environments.

Q. So looking at the well logs that are on your exhibit, you're not going to tell me the depositional environments, other than just fluvial deltaic for the GRE?

A. Yeah, see, what I've done is, this map -- as you indicated right here, and honored all the geological points, and they came in a kind of north-south orientation.

Q. That's not what I'm asking.

A. Excuse me, then.

Q. I'm asking for the depositional environment for the different sands that you're showing on your well logs.

A. Yeah, I don't think you can determine it from the gamma-ray itself by determining -- or the coarsening -- or the fining of the sands based on the gamma-ray itself. I can't tell you, if you look based on this sand, if it's going to be fluvial deltaic, which a better way of determining -- that will help you is an SP curve, and that generally helps determine -- But you just can't use one bit of information, you have to gather all the geological data together to determine the environmental deposition.

COMMISSIONER BAILEY: I have no further questions.

THE WITNESS: Thank you.

CHAIRMAN WROTENBERY: Commissioner Lee?

COMMISSIONER LEE: (Shakes head)

EXAMINATION

BY CHAIRMAN WROTENBERY:

Q. Mr. Brezina, I did have a question for you about whether you reviewed the record in the case that resulted in Order Number R-5995. I think that's Exhibit A-5 in Redrock's exhibits, and that is the order in which several of the parties have noted that the Division made a finding

about a fault in Section 34. At least they allude to a fault in the area. It's kind of hard to tell from the finding exactly where the fault is.

Have you reviewed that --

A. No, I haven't.

Q. -- evidence in that case?

A. No, I haven't, other than what was presented here at the hearing. Nearburg presented that earlier yesterday.

Q. So you don't know what kind of data or other information the Division might have considered in making that finding?

A. No, I haven't.

CHAIRMAN WROTENBERY: Mr. Kellahin?

MR. KELLAHIN: A couple of follow-up questions on Mr. Carr's cross-examination.

REDIRECT EXAMINATION

BY MR. KELLAHIN.

Q. I want to focus on the -- I want to focus on your -- Let me go back to your Exhibit B-4, Mr. Brezina. It's the gross map of the GRE sand. Do you have that in front of you?

A. Yes, sir.

Q. Here you're mapping the gross interval of the GRE sand?

A. Yes, I am.

Q. And you've picked up the well that Commissioner Bailey was talking bout in Section 34 -- I'm sorry --

A. It says 27.

Q. -- 27. 27, do you see that one?

A. Yes, I have.

Q. And you've put it on the western edge of the pod as you've oriented it?

A. Yes, I have.

Q. Okay. Let's turn to your net map. Let's see if I have it.

CHAIRMAN WROTENBERY: Which exhibit is --

MR. KELLAHIN: That's going to be B-5.

CHAIRMAN WROTENBERY: B-5, okay.

Q. (By Mr. Kellahin) Describe for me what causes you to change the shape in the gross pod when we get to the net pod.

A. Oh, excuse me, I've got -- I pulled out the same map. I had it misfiled. What was that one again, number --

Q. B-4 and B-5.

A. Yes.

Q. B-5 would be your net map.

A. Okay.

Q. All right.

A. Could you repeat the question, please, sir?

Q. Yeah. Follow me through or tell me the analysis you take to take the gross map and refine it to the net map, paying attention to the south half of 27.

A. Well, I use the gross map as a model. I mean, that's the maximum width of the channel, maximum size of the channel itself. And what I did was, I used that as an outline showing where the direction was going. And then from there I came down and zeroed in and was trying to fit this porosity map within this model that I had established earlier.

Q. All right. Now, when you build backwards and go to the gross map, the depositional orientation of the whole package is this north-south orientation?

A. Yes, it is.

Q. And when we're mapping on this kind of data, we're mapping porosity, are we not?

A. On the porosity map?

Q. Yeah.

A. Yes.

Q. And when we're looking at whether the southeast quarter of Section 34 has hydrocarbons in the GRE sand that would be drained by the Nearburg well, you have to take into consideration not only the permeability -- the porosity, but the permeability as well?

A. Yes.

Q. What determines the productivity? Is it going to be porosity or permeability?

A. Usually they work together, porosity and permeability.

Q. Has Nearburg's exhibit worked into the analysis of the permeability identified on the mud log?

A. No.

Q. Have you integrated the permeability on the mud log into your conclusion?

A. Yes, I have.

Q. And is the permeability in the southeast quarter in association with the porosity connected to the Nearburg well?

A. It appears. If it's not, it's real close. I think you're on the edge.

Q. When we talked about the Llano well in the southeast of 34, Mr. Carr asked you about multiple operators over the course of time.

A. Yes.

Q. Are you aware that there was mechanical difficulty in that well, there's junk in the wellbore that precludes access below the top of the Morrow "A"?

A. No.

MR. KELLAHIN: That concludes my examination.

MR. CARR: Nothing further.

CHAIRMAN WROTENBERY: Okay, thank you Mr. Brezina.

THE WITNESS: Thank you very much.

MR. KELLAHIN: We're ready to call our engineering expert, Mr. John Wells. Mr. Wells's exhibits will be found in the exhibit book starting behind Exhibit Tab D.

The first exhibit book that was presented had the D exhibits, and they haven't been collated into this.

CHAIRMAN WROTENBERY: Then I'm in trouble.

MR. KELLAHIN: We'll fix it. Let me take a look here, and we'll see if I can figure this out. C now becomes D.

CHAIRMAN WROTENBERY: Ah, okay.

COMMISSIONER LEE: Then up to D, right?

MR. KELLAHIN: All of the C's are now D. His C replaces this. That's what was supposed to happen.

What we're going to do is, we're going to go through the package, the engineering things, and we won't necessarily take them in sequence, but I will tell you where we are.

CHAIRMAN WROTENBERY: Do you by any chance have an extra set?

We can share it. That's okay, we'll share, that's fine.

JOHN A. WELLS,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Wells, would you please state your name and occupation?

A. My name is John Allen Wells. I am a principal in the firm of Wells Chappell and Company in Sugar Land, Texas, reservoir engineering consultants.

Q. Were you retained by Redrock as a petroleum engineer after the Examiner Hearing to investigate the engineering values being derived from the Nearburg well?

A. Yes.

Q. As part of that study, did you examine the --

(Off the record)

CHAIRMAN WROTENBERY: Go ahead, please.

Q. (By Mr. Kellahin) -- did you examine the data available from Nearburg on the production?

A. Yes.

Q. Did you look at the pressure test information supplied?

A. Yes.

Q. You heard Mr. Friesen's testimony yesterday on behalf of Nearburg on his engineering work with material

balance and volumetrics to try to validate at least the size of the Nearburg's geologic interpretation for the GRE sand?

A. I did.

Q. Have you gone through a similar methodology for the GRE sand pod that Mr. Brezina has prepared on behalf of Redrock?

A. I have.

Q. Have you utilized the same kinds of data that Mr. Friesen utilized for his work?

A. I believe that I have. In fact, I would agree with Mr. Friesen's characterization yesterday that our methodologies are very similar.

Q. And we've got a series of displays that in September were packaged together as your engineering exhibits, and they were marked C-1 through C-9?

A. Yes.

Q. When we supplemented the exhibit book, those exhibits were changed, and the C exhibits were supposed to have been re-numbered C-1 through C-9?

A. Yes.

CHAIRMAN WROTENBERY: D-1 through D-9?

MR. KELLAHIN: I can't talk.

THE WITNESS: Actually, it looks like T now that we've --

MR. CARR: Mine looks like O.

CHAIRMAN WROTENBERY: We will mark them now as --

MR. KELLAHIN: Pick a letter you like.

CHAIRMAN WROTENBERY: -- D-1 through D-9.

MR. KELLAHIN: D.

Q. (By Mr. Kellahin) Are you okay with that?

A. Sure.

Q. And we've re-organized them a little bit, so they're not quite the way they were in the book?

A. Right.

Q. Is this the kind of activity that you have performed repeatedly over the years in the course of exercising your profession as a petroleum engineer?

A. That's well within the scope of the services that I perform routinely, right.

MR. KELLAHIN: We tender Mr. Wells as an expert petroleum engineer.

MR. CARR: No objection.

COMMISSIONER LEE: What's the educational background?

MR. KELLAHIN: Okay, I'm sorry.

THE WITNESS: Education?

Q. (By Mr. Kellahin) Yeah, where did you get your degree?

A. I hold a bachelor of science in mathematics and

chemistry from Delta State University in Mississippi in 1971 and a master of science in physics at Mississippi State University in 1973.

COMMISSIONER LEE: Thank you.

Q. (By Mr. Kellahin) Summarize for us your employment experience.

CHAIRMAN WROTENBERY: I'll just note that we accept his qualifications.

Q. (By Mr. Kellahin) Do you know Dr. Katz?

A. I studied under Dr. Katz, yes.

After graduate school I worked for Texaco Production Research and in 1978 I was employed at Intercomp, an international gas and oil consulting company specializing in numerical reservoir simulation.

And then in 1987 I became a principal in the firm of Fairchild and Wells, which is predecessor company to my current Wells Chappell circumstance.

MR. KELLAHIN: We tender Mr. Wells as an expert witness.

CHAIRMAN WROTENBERY: He is accepted.

Q. (By Mr. Kellahin) Mr. Wells, let's start at the logical starting point for you as an engineer, when you're given the task of examining a well such as the Nearburg well and making engineering calculations so that you can determine the volume of original gas in place within a

given area. Can you look at what was marked Exhibit D-9 and D-8?

A. Yes.

A. Is this the starting point?

A. Yes, I was retained to perform certain computations as relates to the volume of gas that might reside in an underground reservoir, specifically the GRE reservoir. So in order to do those computations, I need certain physical properties that are characteristic of the gas.

And so what I was provided was these two component analyses of the gas that was produced from the Nearburg well. You can see that on these sheets that they're dated June of 2000, which was in and about the original completion date. So what I have here is a compositional analysis of the gas, and then I have such things as the gross heating value and the specific gravity.

So what I did was, I took these low fractions, componentwise, and input those into a correlation program, PVT program for gas, in order to generate the formation volume factor and the gas deviation Z factor which are necessary to do the subsurface volume calculations.

It's a little more rigorous approach than just taking specific gravity of the gas and the reservoir temperature. This just gives me a little more rigorous

computation.

Q. What then did you do?

A. So then I generated Exhibits D-5 and D-6, and these are the gas formation volume factor as a function of pressure, displayed on D-6. The gas formation volume factor is essentially a parameter that allows us to do a single-stage flash of gas that's held under pressure and at temperature in the reservoir and bring that to surface or sales gas conditions when we talk about standard cubic feet of gas. This is the parameter that allows me to convert reservoir cubic feet of gas to surface standard cubic feet.

And D-5, that's the so-called Z factor, the deviation factor that relates gas and how it deviates from the ideal gas law.

COMMISSIONER LEE: Why do you want to show this?

THE WITNESS: I'm just showing these to establish that when I do my eventual calculation on reservoir volume of gas and how many standard cubic feet of gas that represents initially in place, or at any other pressure, that I need to have this as the background to do those computations.

COMMISSIONER LEE: Is there any physical meaning of that equation?

THE WITNESS: No, there's no physical meaning to it. That's just the relationship as a function of pressure

for those two parameters.

COMMISSIONER LEE: Thank you.

Q. (By Mr. Kellahin) What happens next?

A. So then, armed with that information --

Q. What information? You have at this point now satisfied yourself about the correct B over G?

A. B_g, formation volume factor --

Q. And what do you --

A. -- and the gas deviation factor, Z factor, right.

Q. You've gotten that far.

A. I've got those now.

Q. Okay.

A. So then Mr. Brezina, Redrock's geological consultant, provided me with his net sand map, which is shown in my Exhibit D-1.

Q. Okay.

A. So now it's a straightforward exercise. I have on here a contour display of net sand thickness, and of course it's set on a scale, an areal scale. So what I did here was, I overlaid a finely-meshed computation grid system and digitized all of those contours. Then I initialized a reservoir simulation program, essentially planimetered this volume.

Q. So your program will allow you to planimeter --

A. Right, planimeter.

Q. -- gas volumes --

A. Right.

Q. -- within these contours?

A. Right. It's just a more straightforward approach to determining the bulk volume initially, and then you assign the porosity, which is the percent of the bulk volume that represents pore space.

And then we assign, as noted on here, the Sw_c. That's the irreducible connate water saturation. And then I have to know the initial pressure at which I'm initializing this system. And then the B_g, that's the volume factor at that pressure and at the reservoir temperature.

So I fill into this equation, essentially -- the model really does it for me -- and the net result is, based upon Mr. Brezina's distribution and areal changes in thickness, and utilizing a constant 9.25-percent porosity and a constant water-saturation of 27 percent, an initial pressure of 6937 pounds -- and we can talk about that pressure, but associated with that pressure we have this formation volume factor. And so then it's a straightforward exercise to just determine the amount of gas that would be stored in this pod.

And at the last part of this exhibit my overall gas-in-place calculation, as you can see, comes out to be

1.983 billion standard cubic feet.

And then based upon Mr. Brezina's location of the fault, I divided this -- or computed the amount of gas that would reside north of the fault and south of the fault. And you can see that's broken out there. South of the fault is 1.845 BCF. And then I also was able to determine the number of acres south of the fault. It came out about 262 acres.

Q. Let me ask you some questions about the shape. I'm going to give you Mr. Brezina's Exhibit B-9. Is that Exhibit B-9 his net map on the GRE sand?

A. Yes.

Q. And that's the map that's reproduced on your Exhibit D-1?

A. Exactly, right.

Q. When you look at that map, are you calculating the gas in place using the zero contour line?

A. I'm calculating the gas in place inside of the zero contour line.

Q. When we get to the edges of that contour line, we are in areas of the pod that are having lower porosity values calculated with those sands, right?

A. Right.

Q. There is gas located in those lower porosity portions of the pod, are there not?

A. Anything inside of the zero contour line. What I actually did was, I assigned just a constant 9.25-percent porosity to it. Now, Mr. Brezina told me that the porosity in the thicker part of this GRE pod was something higher than 9.25 percent, and I'm sure there's some gradation as you get towards the thinner parts of that channel. But he said to use an average of 9.25-percent for the porosity.

Q. Well, what I'm looking for is the Llano well in the southeast quarter of Section 34.

A. Right.

Q. That's in a portion of the pod that's got low porosity values, but it does contain hydrocarbons --

A. Well, yes, I mean --

Q. -- the way you've mapped this?

A. Certainly. Yeah, I mean, there's hydrocarbon inside of this zero net thickness contour everywhere.

Q. Are there going to be hydrocarbons outside of that zero line?

A. Not according to this interpretation. Outside of that zero line there would be no GRE sand, and therefore I would not compute any gas in place, unless I was to do these other pods here, which I didn't do.

Q. Do you agree with Mr. Brezina's interpretation that it's appropriate to include the Llano well within the GRE well for purposes of determining gas in place that

would be produced by the Nearburg well?

A. Well, certainly throughout my career I've worked closely with geologists and petrophysicists, and it's always an interpretive exercise between geologists and those kinds of disciplines. But typically, if you have a gross sand pick, then you don't just ignore that. You know, there could be some interpretation as to whether there's one foot of net in there or zero feet of net, but you typically don't just ignore the fact that the sand exists there.

So I think it's reasonable for him to recognize that the GRE sand exists at that point. However, you can see he's not allowed it to extend, you know, past that point on a net basis, and he's -- I think he's done a conservative approach by assigning actually a zero net there.

Q. Are you satisfied that the southeast quarter of Section 34 contains recoverable gas in the GRE sand that will be produced by the Nearburg well?

A. Well, I'm satisfied that based on this orientation and distribution of the GRE sand, as provided to me, that there is gas in that southeast quarter section.

Q. When we look on your display, the D-1, on how you've handled the fault, when we get on the west side of that fault line --

A. Uh-huh.

Q. -- am I correct in understanding that you've excluded that from the calculations?

A. Well, actually I've done a total calculation. You can see GIP on that Exhibit D-1. That's 1.983 billion standard cubic feet. That's how much I compute is inside the complete pod.

And then I have divided that into two separate computations. North of the fault is 0.138 billion standard cubic feet, and south of the fault is 1.845 billion standard cubic feet.

Q. So south of the fault line do you calculate enough gas in place, original gas in place, to fit the size of the reservoir that Mr. Brezina has drawn south of the fault?

A. Well, the reservoir -- the size is what it is. He provided that to me with a certain porosity, and that establishes the pore space. So then it's just up to me to assign the pressure, the temperature, the formation volume factor, the connate water saturation, and that's just a straightforward calculation as to how much gas is in that pore space.

Q. Well, I guess I didn't ask you that right. Using the P/Z analysis, you have come up with a number associated which would be the estimated ultimate recovery from the

Nearburg well?

A. Well, why don't we do this --

Q. Isn't that what you do?

A. -- go to this exhibit then?

Q. Yeah, not just yet.

A. Okay.

Q. But that's what you do?

A. That can be done, yes.

Q. Is that what you did?

A. I really didn't determine an estimated ultimate recoverable. I really wasn't asked to determine recoverable gas.

Q. I'm talking about gas in place.

A. Yeah, gas in place, I've determined that.

Q. Can you use the table consistently with what it shows you and show that that gas can be put in the pod that Mr. Brezina drew for you south of the fault?

A. Right. Well, this was step one to establish, based on this sand distribution, this volume of pore space, how much gas would reside there at the designated pressure and temperature.

Then what I did was, I looked to see how much gas had been produced from this pod. The only production that I really know about was the Nearburg well, and so that well has produced -- it's documented 1 billion cubic feet of

gas. So in a qualitative sense you can say, just knowing that, that I'm calculating 1.8 billion standard cubic feet residing south of the fault. So if the well has produced 1 billion cubic feet, then everything is consistent so far. I understand the well has additional reserves, capability to produce additional gas.

Q. Well, what I'm trying to understand, Mr. Wells, is, at the Examiner Hearing Nearburg presented an engineering conclusion that apparently resulted in the fact that Mr. Gawloski's pod was too big at the Examiner Hearing, and when we saw the pod again yesterday, they had to shrink the pod to make it fit the engineering data.

A. Uh-huh.

Q. Do you have to alter and change your pod?

A. No, I was provided this one depiction of this GRE pod, and I have not changed the contours or changed the physical properties, the porosity or anything to it. I've just had one computation --

Q. Do you have to do that to make the gas fit?

A. No.

Q. Okay.

A. No.

Q. Show me the P/Z.

A. So Exhibit D-2 is a -- what we call a graphical solution to the material balance equation. It just

demonstrates the relationship between the equilibrated reservoir pressure, divided by the appropriate gas deviation Z factor. And then at points where you know how much gas has been produced from the reservoir, if you have a pressure measurement at that distinct point, then you can plot these points on the curve.

So what I've done here is relate it back to my D-1 exhibit. I elected to assign a pressure of 6937 p.s.i. as the discovery pressure of the GRE sand. And so if you take that and divide it by the appropriate Z factor that I get off of this relationship here as a function of pressure, then that results in the distinct point that's plotted on the X axis of gas production of zero, and is plotted at around 6000 P/Z. So that's the first point.

The next distinct point that's plotted here, and the next one -- there's only two more -- those are the identical points that Mr. Friesen used in his analysis. I believe, that to be true. The second point there is at a gas production volume of 555 million cubic feet, and Nearburg reported a pressure, a stabilized reservoir pressure at that point, of 3057 pounds.

So all I've done is taken the same pressure that they report and divided that pressure by the Z factor, and then I plotted it at the cumulative production volume noted on that date, which is 555 million cubic feet. So that

results in that second point moving from left to right.

The third point, correspondingly, occurs essentially now. It's the cumulative produced volume out of the well, which is slightly over 1 billion standard cubic feet, and Nearburg reported a pressure, equilibrated reservoir pressure, of 1562 pounds.

So all I've done is to take the reported pressures as best as I am able to determine what they are, the reported public record volumes, and I've created this three-point P/Z graphical material balance equation and solution.

Then what I've done is just -- I've essentially taken the slope on the -- that's established from the last two points and just extrapolated that down to zero pressure, and that generally gives you an idea of what the total gas in place in this reservoir was at the beginning.

So you can see that based on that extrapolation, I would say that the reservoir should have somewhere around 1.6 billion cubic feet of gas in place.

If you reference back to the Exhibit D-1, which is my volumetric calculation, you see that I came up with south of the fault -- and let's assume that the -- If we assume that the fault is sealing, then the pressures on this well would represent only the influence see in the south of the fault volume. So the south of the fault

volume calculated volumetrically as 1.8 BCF.

The P/Z, if you do this straight extrapolation, comes to 1.6. So they're in the ballpark. I didn't try to -- I mean, I could have taken this -- and you can see that the slope on the P/Z curve seems to be changing. There's no reason it can't keep changing as time goes forward. In fact, in some of these reservoirs where you have kind of a heartland, hinterland kind of configuration, you have high permeability, gas that will come to the reservoir -- come to the wellbore initially, and that will demonstrate one slope or relationship between pressure and produced volume.

And then later you have the low-permeability hinterland-area gas that slowly begins to bleed in. So you can get some reservoirs that have production profiles that drop off dramatically and then begin to level off for quite a period of time.

So I don't know what this one is going to do, but what I've done is, I've just taken the conservative approach and run it straight down to zero. I suspect that it could -- as the well is back on production, it could turn and start to flatten, and it could very well go and point to my 1.8 BCF calculation and be in perfect agreement.

Q. Mr. Wells, does your assumptions about the initial pressure in the well suffer from the same

limitations as Mr. Friesen's calculation does?

A. Well, I think Mr. Friesen -- from what I've seen and from what I understand, there is some uncertainty associated -- What was that true initial discovery stabilized reservoir pressure? I understand that he's looked at numbers that range between 7100 pounds and something in excess of 7500 pounds.

You know, if you take the depth to the midpoint of these perforations, as indicated on Nearburg's exhibit and you take the pressure, divide it by the depth, you can come up with what we call an initial static pressure gradient. And so if you use that 79 -- I believe it was 7900 pounds that Mr. Friesen said maybe that's a possible initial pressure, that --

Q. Do you have those numbers?

A. I don't have that in front of me.

Q. All right.

A. Yeah, on Nearburg's Exhibit Number 20, Mr. Friesen provided the tabular information that went into his volumetric calculation. And as I understand it, he's saying here that maybe we had 7100 pounds, or maybe we had 7922 pounds. No, wait, maybe I remember. The 7900, maybe that came from the RFT test at the Llano well. Maybe that's what it was.

But in any case, I don't know the original

pressure either. But if you take these two pressures and divide them by the midpoint perforation depth of 13,145 feet, you end up with pressure gradients in excess of what we would expect for normal hydrostatic pressure, and that's usually around .44 p.s.i. per foot.

If you use 7900 pounds and divide that by 13,145 feet, the depth that's attributed to that pressure, you get a pressure gradient of more like .6 p.s.i. per foot. Now, that can happen, but it certainly indicates significantly overpressure reservoirs, and there's reasons why reservoirs can be overpressured or underpressured with respect to normal hydrostatic.

But what I elected to do was to take a pressure that was more close to the normal hydrostatic, but it's still in excess about a .5 gradient.

Q. Let me ask you ways that would change the P/Z profile of this slope.

A. Right.

Q. If your starting point is one where you're dealing with an overpressured --

A. Uh-huh.

Q. -- above-normal --

A. Uh-huh.

Q. -- gradient --

A. Right.

Q. -- what happens to the slope?

A. That would just move this point up slightly right here, this first point.

So in other words, if I took 7900 pounds and divided it by the appropriate Z factor, then that starting point would be a little higher here. But --

Q. The slope of the curve would change?

A. The initial slope down to the first point would be different than shown right here. The second slope wouldn't be affected.

Q. Let's look at the second slope. If you're dealing with a low-porosity sand that contains gas, will that change the P/Z slope at the lower end of the slope?

A. Yeah, I wouldn't characterize low porosity, more low permeability, yeah, uh-huh, or compartmentalized gas or something like that. It's not unusual to see these P/Zs as they're plotted out and the well is finally depleted, to see a slope change throughout the history.

Q. We're not going to see just a straight line, necessarily?

A. No, not -- You typically don't see that. There are very few reservoirs that are truly 100-percent volumetric.

MR. KELLAHIN: That concludes my examination of Mr. Wells. We move the introduction of his exhibits D-1

through D-9.

MR. CARR: No objection.

CHAIRMAN WROTENBERY: Exhibits D-1 through D-9 are admitted into evidence.

Mr. Carr?

CROSS-EXAMINATION

BY MR. CARR:

Q. Mr. Wells, you were an engineering witness, testified for either LG&E or Raptor concerning the special project rules for the gas storage project that's involved in this Application; is that correct?

A. That's correct.

Q. How long had you worked for LG&E or Raptor prior to starting to work for Redrock?

A. Well, actually, I'm retained by both simultaneously.

Q. Are you currently employed, then, by Raptor in terms of engineering services for that gas storage unit?

A. I'm doing some things for them, yes.

Q. In your work do you treat the gas storage unit as two separate reservoirs or do you treat it as one project?

A. I'm not sure that -- I'm here in a capacity to testify for Redrock on what I've done for them. I'm not sure I'm at liberty to discuss my other client's findings and conclusions.

Q. So you don't have an opinion on whether or not you've got one or two pools?

A. Oh, I definitely have an opinion. I'm just saying that I don't have a release from Conoco to discuss that.

Q. You understand that's an issue in this case?

A. If you say it is, certainly.

Q. You've been here for the testimony, have you not?

A. Uh-huh.

Q. And you understand we're talking about a fault through the reservoir?

A. Uh-huh.

Q. And that there's a question of whether that's a sealing fault that runs through the storage project?

A. Right.

Q. And you will tell the Commission that you have an opinion on that?

A. I don't think I have an opinion on the fault so much as I have an opinion on the way that the individual gas storage wells perform with respect to whether it's one continuous communicating pool or not.

Q. But you're not able to share that with us?

A. I guess I could ask --

MR. HALL: Madame Chairman, let me state an objection to the extent that Mr. Carr's question calls for

any sort of proprietary business information derived in his capacity as a consultant for Conoco or Raptor. It is also beyond the scope of his retention by Redrock in this case. We would object on that basis.

MR. CARR: I would submit it's not beyond the scope of this case, and if this witness can't be cross-examined on what he knows about the area, then I think you should strike his testimony.

I don't think we should be subjected to "I'll tell you some things and I won't tell you others."

CHAIRMAN WROTENBERY: Mr. Wells, I'd request that you answer the question, please.

Q. (By Mr. Carr) Do you operate that storage unit as if it is two separate storage units?

A. May I ask you a question or a -- first?

CHAIRMAN WROTENBERY: Yes, sir.

THE WITNESS: Are you telling me to disregard Mr. Hall's objection?

CHAIRMAN WROTENBERY: Mr. Hall has objected, and I've overruled his objection, so --

THE WITNESS: Okay, okay, sorry. Go ahead.

Q. (By Mr. Carr) Does LG&E and Raptor operate that storage unit as if it were two separate storage units?

A. Do they operate the storage facility, the Grama Ridge storage facility, as if it were two different

something?

Q. Yes.

A. No, no.

Q. You testified in the earlier hearing about a project area for the Grama Ridge Storage Unit, did you not?

A. A project area, okay.

Q. Do you recall that?

A. Vaguely.

Q. And the project area for the storage unit included all of Section 34, did it not?

A. Well, I think maybe you're talking about the testimony with regard to the unit boundary and such as that?

Q. Well, there rules for a Grama Ridge gas storage project area --

A. Uh-huh, okay.

Q. -- and you were an expert engineering witness who testified for either LG&E or Raptor --

A. Right.

Q. -- oh, probably over a year ago, about what was needed to protect the gas storage unit?

A. Uh-huh.

Q. Do you recall that testimony?

A. Yes.

Q. And there was a project area for which these

rules you were supporting were going to apply; is that right?

A. Uh-huh, okay.

Q. Is that right?

A. Yes, I believe so.

Q. And that project area included all of Section 34, did it not?

A. Right, right.

Q. And you testified that you considered the project area one common source of supply, did you not?

A. I don't recall that. One common source --

Q. Let me hand you the transcript of your testimony --

A. Okay.

Q. -- from that time.

A. Uh-huh.

Q. This was the hearing held May 21st, 2001?

A. Okay.

Q. And I've given you the testimony of John A. Wells?

A. Yes, you have.

Q. That's you, is it not?

A. Yes, yes, uh-huh.

Q. And you were under oath, were you not?

A. Yes.

Q. And you told the truth at that time?

A. Yes, I did.

Q. And you were sharing with the Division your understanding of the project area for this gas storage unit, were you not?

A. Yes, I was, yes.

Q. Would you turn to page 72?

A. Seventy-two.

MR. KELLAHIN: Mr. Carr, do you have a copy for me, please?

MR. CARR: No, I don't.

MR. KELLAHIN: No? That's all right. Hang on just a minute, let me see if I can find -- Do you have a copy of that transcript, Scott?

MR. HALL: Probably.

CHAIRMAN WROTENBERY: Yeah, we can share.

MR. KELLAHIN: Scott, why don't you sit over here?

Q. (By Mr. Carr) Mr. Wells --

A. Yes.

Q. -- I would direct your attention to line 16 of this transcript on page 72.

A. Yes.

Q. There's a question there by Mr. Hall to you?

A. Uh-huh.

Q. And the question is, "All right. Now, do you understand the injection, storage and withdrawal of gas within the project area to constitute what is known as a common source of supply?"

Do you see that question?

A. Yes, I do.

Q. Would you read your answer, please?

A. "Yes, I do recognize that it is a common source of supply, with the caveat, however, that this...gas belongs to Raptor, it's non-indigenous gas, it was injected and belongs to them."

Q. And that was your answer?

A. Right.

Q. And you did testify that Section 34 was included within the project area, that at that time you considered to be a common source of supply?

A. Well, I think what you're suggesting is that the term "common source of supply" means something to do with the reservoir, as opposed to what I would interpret that. A common source of supply means the gas comes in to the main header system of the storage facility and it goes out to the wells. It's a common source of supply. It's gas that Raptor buys, and it's their gas, it's their gas that is injected into the reservoir.

Q. But this was the question and this was the answer

you gave on that date?

A. Yes, it was, certainly was.

Q. And the project area does include all of Section 34?

A. Yes.

Q. Did you also testify at that time that the lateral extent of the Morrow formation was not precisely known in this area?

A. Yes, and I still believe that.

Q. You're aware that there was a case some time ago involving an L&B well drilled west of the gas storage project?

A. I --

Q. You're not familiar with that?

A. No, I'm not familiar -- L&B, no.

Q. Are you familiar with RFT logs?

A. A little bit.

Q. Are you familiar with the fact that Llano has required those in the past to confirm that people are not in communication with the storage project?

A. I do recall seeing something about some requirements that were in place early on.

Q. Let's go to Exhibit -- and I don't know what the number of that is. It's the -- It's Exhibit 1, it's C or D --

CHAIRMAN WROTENBERY: D-1.

Q. (By Mr. Carr) D-1.

A. My Exhibit D-1?

Q. Yes, sir.

A. Okay. And I'm just going to ask you to help me understand here what you've done --

A. Okay.

Q. -- with this. D-1 is based on the geological interpretation; is that fair to say?

A. Mr. Brezina's interpretation, certainly.

Q. And when Mr. Kellahin asked you if you had an opinion as to whether or not this reservoir extended into the southeast quarter of Section 34, to make that interpretation you have to accept the geology; isn't that right?

A. Yes.

Q. You're fitting engineering information within the geological interpretation?

A. Exactly.

Q. And if it went some other direction --

A. Right.

Q. -- you're still working with what you get --

A. Right.

Q. -- what you get from the geology?

A. The only additional thing I added to that is that

in my experience in working with petrophysicists and geologists, I do normally see that they honor the gross picks on the sand, and so I don't find it inconsistent that with 6 feet of gross sand that you would have the sandbody extend in that direction.

Q. Would you agree with Mr. Friesen's testimony yesterday that you have a difference in opinion on the volume that we're dealing with in this case?

A. Well, that has to be the case, he's analyzing a totally different pod than I am, yeah.

Q. If you had been given a different size or shape pod, then your engineering work would be different? You're basing this part of the work on the geology, correct?

A. Certainly.

Q. And you are also able to come back from a straight engineering point of view and determine the gas in place; isn't that right?

A. That's the P/Z curves.

Q. And that's what you did with the P/Z?

A. Right.

Q. Now, in your experience have you encountered situations where after you did your P/Z work it didn't fit comfortably within the geological interpretation?

A. Oh, sure.

Q. And then what do you do? Do you have the

geologist rework his map?

A. Well, it depends on what the goal is. I mean, if the well has been produced, the gas is sold, you know, why go back and do a bunch of engineering? You're done.

Q. But normally if you're trying to get the date to mesh, to get a real handle on the gas in place --

A. Uh-huh.

Q. -- you'd then have to take another look at the geology if it didn't fit the P/Z?

A. Yeah, well, you're right. I mean, companies that have producing reserves, they have annual reserve estimates done by independent agents, and they come in and they are continuously updating and revising those reserve estimates. That's very common in the industry, yes.

Q. And if -- as you go through that process, interpretations change; that's fair to say?

A. Certainly. However, I don't think that -- Let me just make sure that I'm clear on this. The well has produced 1 billion cubic feet, so there would be no estimate going forward that would make that number smaller than it is today.

Q. Right, I'm talking about -- you commented on Mr. Gawloski's map being larger and now being reduced in size. That could be because they're trying to match the geology with the engineering; isn't that right?

A. Sure.

Q. Now, if you were asked to pick a gas-in-place number based on a geological interpretation or a P/Z curve, which would you consider to be more reliable?

A. Typically, the P/Z, I guess, if I had enough points I would probably rely on that more than geological. On the other hand, if I only had a few points P/Z but I had, you know, a dense amount of wells there and lots of data that allowed me to consider the geology to be fairly definitive, I might defer to that.

Q. So there are cases where you could adjust the P/Z to match the geology?

A. Yeah, true.

Q. As well as matching the geology to the P/Z?

A. Vice versa, right.

Q. In this case, do you believe your P/Z work or the geological interpretation are more reliable?

A. I don't know that I would characterize in this case either one to be more or less reliable than the other. I think that -- My conclusion here is that if I'm given this pod and with this pressure and these reservoir characteristics, it calculates this much volume in place, then if I look at this performance information from that pod, it looks like it points to the same order of magnitude of gas in place. So...

Q. When I heard your testimony about the P/Z, the initial point of the 6000-pound --

A. 6937, right.

Q. Okay, but we've plotted that on the --

A. Right.

Q. -- on the --

A. Uh-huh.

Q. -- left? How did you get that number?

A. How did I get the 6937?

Q. Yeah.

A. Actually, that was a number that I extracted from a Nearburg reported pressure. I don't really have the source for that specifically right now, but...

Q. And you plotted that and then have two additional pressure points, is all --

A. Right, that's all I have --

Q. -- to your P/Z curve?

A. -- two additional.

Q. You have projected the gas in place using only two points, not honoring all the points; is that correct?

A. Right, the second slope is what I've extrapolated.

Q. Now, if you had honored all the points on the P/Z, in fact, you would have come out with a substantially smaller gas-in-place number, would you not?

A. If I had honored all three of them and tried to do a best fit --

Q. Yes.

A. -- between the three points, it looks like it might have resulted in maybe 1.5 or something like that.

Q. Do you ordinarily, in doing P/Z work, just use the later points to project your curve, or do you honor all points?

A. Well, most P/Z work that I do is -- reservoir is where we have more than one well. So we'll have different pressures from different wells, and as they all accumulate on a single chart then, yeah, we might do some averaging or something to do that.

Q. It is fair to say that if we had honored all points on your P/Z curve, we would have gotten a smaller gas in place?

A. That's fair to say, yes.

Q. And it would be smaller than what is mapped on the first exhibit?

A. Somebody who wants to put a -- They could use the first and second point only and come straight down to 1.2 BCF. That's certainly something somebody could do, you know. It's in interpretation.

MR. CARR: Thank you, that's all I have.

THE WITNESS: Yes, sir.

CHAIRMAN WROTENBERY: Commissioner Lee?

MR. HALL: Madame Chairman, if I might briefly?

CHAIRMAN WROTENBERY: Oh, I'm sorry, Mr. Hall?

EXAMINATION

BY MR. HALL:

Q. Mr. Wells, I want to clarify one thing with you in response to a question of Mr. Carr's with respect to your prior testimony in Case Number 12,588, which led to the adoption of special project rules for the gas storage project.

He asked you about the common source of supply, and do you understand Mr. Carr's question to be directed the common source of supply within the gas storage interval within the project area?

A. Yes.

Q. And at the time we weren't concerned with gas in the GRE sand --

A. No --

Q. -- in our proceeding?

A. -- absolutely not, no.

Q. Completely different intervals?

A. Right.

Q. And isn't it also accurate to say that the concerns LG&E and Raptor had that led to the implementation of the special project rules for the unit was limited to

more than what's -- extended beyond just Section 34? In other words, wasn't Raptor concerned that there was a possibility of additional Morrow penetrations in the additional sections that comprise this storage unit?

A. That's certainly correct. We felt like that the lateral extent of the gas storage interval was indeterminate, and we wanted to be protected from wells being drilled into that storage gas.

MR. HALL: Thank you, Mr. Wells.

CHAIRMAN WROTENBERY: Thank you, Mr. Hall.

Commissioner Lee?

EXAMINATION

BY COMMISSIONER LEE:

Q. Well, how can you operate the gas storage without knowing your boundary?

A. Well, it's essentially a two-well storage facility. They have four wells there. Only two do the injection and withdrawal. And what we try to do is keep an ongoing hysteresis curve for their fall-spring inventories, and we're doing periodic -- you know, semi-annual, fall-spring shut-in pressure surveys. We try to make sure that we've got all of the metered volumes correlated with the main --

Q. How can you correlate without a boundary?

A. Well, we do a -- We essentially don't have a

geological interpretation that we're modeling this on. We're just really doing it --

Q. Did you propose --

A. -- on performance.

Q. -- to do anything?

A. I'm sorry?

Q. Did you suggest to your boss to do anything about your boundary?

A. Well, I haven't -- At this point I haven't been asked to do anything with respect to --

Q. Where is the gas coming from?

A. Where does the gas come from? Off of the pipeline to be injected.

Q. So it's a different gas from native gas?

A. Certainly, right.

Q. Then why don't you do something about it to your company?

A. The fall-spring inventory pressures indicate that the gas is being contained.

Q. I don't think so.

A. There's no -- There's no shifting --

Q. If you don't know the boundary, how can you know where it's coming from?

A. Well, I mean, if a boundary exists, even though I don't know physically where it is, the performance

information indicates that we have no lost or migrated gas.

Q. How do you know we don't have --

A. From the repeatable -- Whenever we come to the same inventory two years after -- two years later, we have the same metered inventory, storage gas, gas accounting volume, and we reach the same pressure.

Q. I don't know what kind of operation this is, but it's not -- certainly it's not an engineering-sound operation, and I think you need to know the boundary to operate the storage field. And you have a way to find it out. You can test with isotope to find it out.

A. Yeah.

Q. Then why do you guys refuse to do that?

A. Well, first of all, Raptor just came into possession of this facility. They are in process right now of trying to put some procedures in place. Maybe we will do some hexafluoride tracing or maybe we will do some pressure transient --

Q. You don't need to have a tracing --

A. Yeah?

Q. -- because your gas is different from your native gas.

Well, I'm very --

A. But we --

Q. -- disappointed by the operation.

Another thing is, the P/Z, I heard you say you have a multi well.

A. A what?

Q. You have a multi well to do that P/Z. What kind of engineering is that?

A. I'm sorry, a what well?

Q. You have two wells --

A. Two wells.

Q. -- you say you're using the P/Z curve. What's the slope of this P/Z?

A. Are you talking about for the gas storage now?

Q. Yeah.

A. For the gas storage?

Q. No, no, no. I'm asking you, you made a statement, this P/Z can be used for the two wells simultaneously.

A. This P/Z?

Q. Yeah.

A. No, this has nothing to do with the gas storage. This is the Nearburg well.

Q. You just made a statement, this P/Z, whenever you have a multi-well you can use the average pressure for them.

A. P/Z methodology --

Q. Yes.

A. -- can use for -- If the wells are in a common reservoir and they appear to be, you know, performing as a common reservoir --

Q. What's the slope of this P/Z?

A. What is the slope?

Q. Physical meaning?

A. I'm not sure what you mean.

Q. The slope of this should be reflecting the volume of your reservoir.

A. Uh-huh.

Q. So the multi-well doesn't fit into the P/Z. One P/Z is only for one well.

A. Take for example the BAML storage field outside of Houston. It has 100 billion cubic feet of gas stored in there. And in October they shut the reservoir in, and they've just gotten through injecting. They've got 35 wells spread out over, you know, 50 acres. And so when you shut that reservoir in, the pressure on this well in the far east and the pressure on this well equilibrate within two pounds, you know, in three hours.

So high-permeability reservoir -- all of those wells -- You know, if you measure the pressure on this well or this well or this well, they're all about the same pressure. So I'm not sure I follow what you're saying, why you would pick each individual well --

Q. Well, you make a statement --

A. -- and do a P/Z.

Q. -- you make a statement, you use the average pressure for those two wells, which is not true.

A. In the gas storage reservoir?

Q. No, in the -- You just made a statement for this particular well.

A. There aren't two wells, there's only one well.

Q. Yeah, I know, but you made a -- you can see from the transcript. You say, Well, if you have two wells you use the average pressure, which is a no-no.

A. Well --

Q. Well, anyway --

A. -- that was a question from Mr. Carr. He said, if you had a bunch of points could you use an average? Sure, some people run a best-fit line through there.

Q. Well, you can --

A. But if I have reason to believe that these individual wells are not in a common reservoir and don't reflect, you know, common pressure, I wouldn't do that, no.

Q. Okay.

A. Yeah.

COMMISSIONER LEE: All right, thank you.

THE WITNESS: Uh-huh.

CHAIRMAN WROTENBERY: Commissioner Lee.

EXAMINATION

BY CHAIRMAN WROTENBERY:

Q. Which two wells is the storage unit operating?

A. It's this -- what's noted Unit Well Number 2 and 1. Number 2 is in the west half of Section 34, and Number 1 is in the west half of Section 3. Those are the two primary injection withdrawal wells.

Q. Okay. And I had one question about your GRE sand volumetrics, and I'm sorry, I think I just missed part of the discussion. What value did you use for acre-feet?

A. Well, the acre-feet -- essentially you could take the acres that I've calculated here, and it's about an average of, say, 8 or 9 or 10 feet. If it was 10 feet, just multiply 10 times those acres, and it would be --

Q. And what is the value for the acres? I'm just missing the --

A. It's the last entry on that exhibit. Acres south of the fault, 262. So you multiply that by 10 feet, it would be about 2600 acres -- acre-feet, sorry.

Q. Okay.

A. But I don't really need that number specifically.

Q. And then how many north of the fault?

A. I didn't compute that.

Q. So is the gas-in-place figure you have here just south of the fault?

A. The gas-in-place entry that's labeled GIP --

Q. Uh-huh.

A. -- okay, that's the total gas in place inside of the complete pod.

Q. And that would include the acres north of the fault?

A. That's the complete pod, north and south of the fault, right. And then I've just broken that out into volume north of the fault and south of the fault. So those two numbers sum back up to the 1.983.

Q. Okay.

A. Do they? I hope they do.

CHAIRMAN WROTENBERY: Yeah, they do. Okay, thank you.

Did you have some more, Mr. Kellahin?

MR. KELLAHIN: I have a couple of follow-up questions.

EXAMINATION

BY MR. KELLAHIN:

Q. Let's talk about Exhibit D-1.

A. Yes.

Q. Chairman Wrotenbery is talking about whether she can look at this and see acre-feet. You have not posted acre-feet on here?

A. I have not posted it, no.

Q. Yeah. You have --

A. I've just posted acres.

Q. -- a program that calculates it and takes it into consideration?

A. Oh, certainly. It calculates the thickness and the areal extent of the reservoir, so by definition that's acre-feet.

MR. KELLAHIN: May we supply that to you?

Q. (By Mr. Kellahin) You do have that on your program, you can print that out and show us what it is --

A. Uh-huh.

Q. -- and she can compare it --

A. Uh-huh, right.

Q. -- to the other map? You could do that, could you not?

A. Sure, I could do that. Uh-huh.

CHAIRMAN WROTENBERY: Thank you.

THE WITNESS: But I can tell you about what it is. You could just --

MR. KELLAHIN: Well, let's not guess.

THE WITNESS: Yeah, okay.

Q. (By Mr. Kellahin) Now, let's go back to Dr. Lee's question. I want to make sure that both of you are talking about the same thing.

A. Yes.

Q. When you look at your P/Z plot, D-1 --
A. Uh-huh.
CHAIRMAN WROTENBERY: D-2?
Q. (By Mr. Kellahin) D-2 --
A. D-2, yeah.
Q. -- D-2, you're doing the same thing Mr. Friesen is doing with taking a single well and plotting P/Z using the three pressure data points for that well?
A. I believe I'm doing the same thing. I didn't actually see his P/Z plot, but I saw his -- the points that he references, and I believe we're doing the same thing, yes.
Q. All right. You've not attempted to add the Nearburg well with any other well and average or simulate pressures to come up with some generalized P/Z plot?
A. Absolutely not.
Q. So that's not what you --
A. No.
Q. -- did?
A. No.
Q. Have you done that for any wellbore?
A. No.
MR. KELLAHIN: No further questions.
CHAIRMAN WROTENBERY: Anything else?
MR. CARR: One bit follow-up.

RECROSS-EXAMINATION

BY MR. CARR:

Q. Mr. Wells, do you have the P/Z curve prepared by Mr. Friesen? It's Exhibit Number 21?

A. I really never saw that here.

Q. May I show that to you?

A. Sure, uh-huh.

Q. Isn't it true that one of the differences between your P/Z and Mr. Friesen's is that -- Just wait a minute here. Nearburg 21. -- is that Mr. Friesen, when he plotted the P/Z curve, did a best match of all three points?

A. His dotted red line appears to be some sort of a best-fit extrapolation, yes.

Q. And what you did was, you plotted the P/Z curve based on the last two points?

A. Yes, and I gave him my reason for doing that.

MR. CARR: Yes, that's right. Thank you very much.

THE WITNESS: Okay.

CHAIRMAN WROTENBERY: Mr. Kellahin?

MR. KELLAHIN: I'm well past done, madame Chairman.

CHAIRMAN WROTENBERY: You're well past done?

MR. CARR: May it please the Commission, I'm

sorry to do this to you, but when Mr. Kellahin -- if he really is well past done, I do need to recall Mr. Cox for very brief testimony.

CHAIRMAN WROTENBERY: Okay. Thank you, Mr. Wells.

Please come on up, Mr. Cox.

RICKY COX (Recalled),

the witness herein, having been previously duly sworn upon his oath, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. CARR:

Q. Mr. Cox, could you turn to your isopach map of the "B" 2 sand, which was admitted yesterday as Great Western Drilling Company and Nearburg Exhibit 16?

A. Okay, I'm with you.

Q. Now, which sand are we talking about when you talk about the "B" 2 sand?

A. The "B" 2 sand is the second sand in the Minerals, Inc., Llano "34", the second yellow sand from the top.

Q. Is that the gas storage sand?

A. It is the gas storage sand. It's unperforated in this well.

Q. And you have mapped it extending across the south half of Section 34; is that correct?

A. Yes, sir.

Q. You don't show that well, that sand, the injection sand, extending down into Section 3, into the well in the northwest quarter, do you?

A. That's correct.

Q. Have you been able to, during the night, locate the log for the well in Section 3?

A. Yes, I did.

Q. And do you have a copy of that with you?

A. Yes, sir, I do.

Q. I'd like to mark this as Nearburg Exhibit Number 25. Do you have a copy?

A. I have a copy.

Q. On the easel I have placed Nearburg Exhibit Number 5, which is our cross-section GRE-GRE'. Does this cross-section show both of the wells in the south half of Section 34?

A. Yes, sir, it does.

Q. And they are the two wells on the right-hand side of the cross-section?

A. Left.

Q. On the left-hand side of the cross-section?

A. Yes, sir.

Q. Would you take the log for the well in Number 3, go to the easel and show whether or not the sand that is

present in the gas storage interval is also present and producible in the well in Section 3.

A. Sure. I'm left-handed, so Mr. Kellahin, I'm going to stand in your way.

What I've done on this log, I've colored all of yours the same. The blue limestone at the top corresponds to the same blue limestone you see colored on the cross-section.

Sandstones are colored yellow on your log sections, just like they are here on the easel.

And this is a stratigraphic cross-section, so we'll hang this log in the same position stratigraphically, which would be the base of this thick blue limestone.

And if we look first to a correlation with the Llano "34" well in the southeast of 34, we see we have a sand in exactly the same position as the first sand in the Llano "34" well, and it is indeed perforated in that interval.

If we look at the second sand, the "B" 2 sand, in the Llano "34" well, and then we look into the log of the well in the northwest of Section 3, there is no sand that corresponds to that sand, the "B" 2 sand.

And then if we look at the lowest sand, the lower Morrow "B" main pay, the thick yellow one at the bottom, we again have sand in the northwest of Section 3 that

correlates very well with the sand in the south half of Section 34.

So I believe we have a very good correlation between all the stratigraphic markers present, between the well in the northwest of 3 and the south half of Section 34. And there in fact is no "B" 2 sand in the northwest quarter of Section 3.

Q. In your opinion, could the well in the northwest quarter of Section 3 have contributed in any way to the pressure depletion discovered in 1979 in the well in the southeast quarter of Section 34?

A. That would be impossible since it doesn't have a reservoir in it.

Q. I would like you to refer to what was marked and admitted today as Redrock Exhibit E-8. Have you had an opportunity to review that?

A. Yes, sir.

Q. And you have seen how the isopach map has been drawn to contour a reservoir from the well in the southwest of Section 34 to the well in the north half of Section 10, two miles away?

A. Yes, sir.

Q. And then to the left of that on the exhibit is a copy of the log in Section 10?

A. Yes.

Q. Do you have an opinion as to whether or not this well could be contributing to the pressure depletion that was experienced in 1979 in the well in the southeast of Section 34?

A. Well, again, I go back to my isopach map because it reflects my interpretation of the petrophysical characteristics in that well, based on the logs available in that well, and I gave that well one foot of net sand. Again, my net sand was based on a combination of a gamma-ray less than or equal to 50 API units, plus a density of greater than or equal to 8 percent, a porosity density log greater than 8 percent.

So there's one foot of net sand in that well, based on my mapping.

Q. And is it --

A. There's just -- There's no way. You can't drain a mile and a half with one foot of that sand. And if you look at the log, in Section 10 it has gas effect, a crossover, but if you measure the porosity there it's very low.

Q. Do you have an opinion as to whether or not the well in Section 10 could have contributed in a pressure drawdown of the well in the southeast of 34?

A. I don't believe it could have any significant impact whatsoever.

Q. When you look at the isopach map and you see the contours being pulled from the well in the southeast of 34 down to the well in the north half of 10, does that contour interval go between two wells in which there is neither gross nor net pay?

A. Yes, sir, it does.

MR. CARR: That's all I have. I'd move the admission of Exhibit 25.

CHAIRMAN WROTENBERY: Any objection?

MR. KELLAHIN: No objection.

CHAIRMAN WROTENBERY: Exhibit Number 25 is admitted into evidence.

And while I'm thinking about it, I think we need to clean up our numbering on the exhibit that you introduced earlier today, the copy of the records from the State Land Office. I think we called that Exhibit Number 23, and we should have called it Exhibit Number 24.

MR. CARR: Twenty-four, and then our log would be 25.

CHAIRMAN WROTENBERY: And the log would be 25. So just let the record reflect that what we had introduced earlier today as Exhibit Number 24 is actually Exhibit Number 24.

Mr. Kellahin?

MR. KELLAHIN: Thank you.

CROSS-EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Cox, would you turn to Exhibit 16?

A. My Exhibit 16? Yes, sir.

Q. Yes, sir, the Great Western 16. This has got the Morrow "B" 2 sand in it?

A. Yes, sir.

Q. Your interpretation is that the well in 10 can be connected to the well in the southeast of 34; isn't that what you just told me?

A. No, I didn't say that.

Q. Were you not commenting on Mr. Brezina's display where he had contoured a portion of the zone to connect the Llano "34" well to this well down in the northwest of 10

A. I thought Mr. Carr asked me if I saw that on the map, and I said yes, sir, I see that.

Q. Yeah, and you don't believe it?

A. No, sir.

Q. Okay. When you look at your map, Exhibit 16, are we looking at the same interval that you've just described with Mr. Brezina's?

A. Yes, sir, based on his correlations on these wells.

Q. So we're looking at the same thing.

Look in Section 3 on your map. On the west side

of 3 you've got a zero line in the Shell well?

A. Yes, sir, a zero data point.

Q. And then in the east side of 3 you've got a zero point on the Llano "3" State Com 1. Do you see that?

A. Yes, sir.

Q. How far is it between those two data points?

A. Approximately 4500 feet.

Q. Okay. Is that enough distance where we can contour from the Llano well in the southeast of 34 and give us a shape, a long, elliptical shape, that will go through those two control points east west and pick up the well in 10?

A. It's physically possible, if you ignore the data.

Q. Well, let's look at your data, let's look at your data in Exhibit 15.

A. Fifteen?

Q. Here it is. You've got them all connected.

A. Well, the difference is, you're looking at a gross sand map over about 600 feet of combined sands, individual sandbodies, and what we're talking about is one sand. On both of our isopachs, we're contouring one single sand. And this map represents a compilation of sands over 600 feet.

Q. Look in Section 3 on the gross map.

A. Yes, sir.

Q. What do you have deposited between the two control points? Morrow "B" sand, right?

A. Somewhere in there, there's Morrow "B" sand.

MR. KELLAHIN: Okay, no further questions.

CHAIRMAN WROTENBERY: Commissioner Bailey, do you have --

COMMISSIONER BAILEY: (Shakes head)

CHAIRMAN WROTENBERY: Commissioner Lee?

COMMISSIONER LEE: (Shakes head)

CHAIRMAN WROTENBERY: I just want to make sure I'm following this well that was logged in Exhibit Number 25. This well is in Section 3. Is this the Gas Storage Unit Well Number 1? Is this the same well as the Gas Storage Unit Well Number 1?

MR. HALL: It is.

CHAIRMAN WROTENBERY: Okay, so -- And I think this is the well that Mr. Wells had testified is one of the wells being used actively in the gas storage unit today?

MR. HALL: Correct.

CHAIRMAN WROTENBERY: Okay.

EXAMINATION

BY CHAIRMAN WROTENBERY:

Q. This well is also to the southeast of the fault that has been projected by Raptor --

A. Yes, ma'am.

Q. -- in its testimony here today?

A. That's correct.

Q. The other well that is being used principally in the storage unit is the Well Number 2, and we've talked extensively about that. It's in the southwest corner of Section 34?

A. Right.

Q. And it appears on the --

A. -- northwest.

Q. -- north or west side of the fault that is --

A. That's correct.

Q. -- projected in Raptor's exhibit?

Okay, thanks. I just wanted to make sure I was putting it all together.

Did you have anything else, Mr. Kellahin?

MR. KELLAHIN: No, ma'am, I do not.

CHAIRMAN WROTENBERY: Mr. Carr?

MR. CARR: (Shakes head)

CHAIRMAN WROTENBERY: Okay, so does that --

MR. CARR: That concludes --

CHAIRMAN WROTENBERY: -- the testimony?

MR. CARR: -- our presentation.

CHAIRMAN WROTENBERY: Okay.

MR. KELLAHIN: That concludes ours.

CHAIRMAN WROTENBERY: Do you wish to give a

closing statement, either verbally or in writing?

MR. CARR: I could give it either way. I would prefer to do it in writing, but I am prepared to talk to you --

CHAIRMAN WROTENBERY: I think we would be happy to receive those statements in writing.

COMMISSIONER LEE: Before --

CHAIRMAN WROTENBERY: Oh, did you have something else?

COMMISSIONER LEE: Before the witnesses go, can I recap what I learned from an engineering point of view?

Both of them, you calculated volumetrics based on your geological interpretations; is that true?

MR. WELLS: Yes.

COMMISSIONER LEE: Okay. And then your point is -- one of the important things you point out is the pressure communication between those zones. And from your point of view it's depleted from the south?

MR. WELLS: Commissioner Lee, my testimony had to do with the GRE pod; it's not in --

COMMISSIONER LEE: Well, the --

MR. WELLS: -- communication with anything.

COMMISSIONER LEE: No, no, no. I'm talking about that -- they found the second well, line of wells, and they found out they have a pressure depletion, and that's their

proof from an engineering point of view. They connect it to -- that well is actually connected to the storage site.

MR. KELLAHIN: Yeah, now, here's the other side of the --

COMMISSIONER LEE: The other side of the story is, drainage from the south.

MR. KELLAHIN: No, the other side of the story is, if you believe the fault where we find it, no one has examined the rest of the gas storage wells to see if some gas storage well, other than the well in the southwest quarter, is responsible for the depletion.

COMMISSIONER LEE: That's if --

MR. KELLAHIN: As a hypothetical, you could go down and pick up the well in 10 to see if that's an answer.

COMMISSIONER LEE: Okay. So you're saying that two miles long, that strip to deplete that gas, that's one possibility?

MR. KELLAHIN: Well, I say it's one among several, and it's one. It could be any of the other wells that are on the same side of the fault as the Nearburg wells.

COMMISSIONER LEE: Any further engineering significance of this case?

MR. CARR: Not on the engineering. Geologically --

COMMISSIONER LEE: Yeah, I know. So thank you.

MR. CARR: May it please the Commission, present through the hearing has been James Brown, one of the overriding royalty owners. He just came up and asked if he could make a brief statement.

CHAIRMAN WROTENBERY: Certainly.

MR. BROWN: Madame Chairman, I'd like to make a statement as one of the --

CHAIRMAN WROTENBERY: You did stand up yesterday and --

MR. BROWN: Yes, I did.

CHAIRMAN WROTENBERY: -- be sworn, didn't you?

MR. BROWN: Yes, I did. I was confused, but I thought I would just in case.

CHAIRMAN WROTENBERY: I did notice that there were --

MR. BROWN: The numbers were there.

CHAIRMAN WROTENBERY: That's right.

JAMES E. BROWN,

the witness herein, after having been first duly sworn upon his oath, testified as follows:

DIRECT TESTIMONY

BY MR. BROWN:

MR. BROWN: Ladies and gentlemen, my name is James E. Brown. I go by Jim, and I reside in Midland,

Texas. I'm the owner of a 3/10-of-1-percent overriding royalty interest in the State of New Mexico Oil and Gas Lease Number V-5683, which covers the north half of Section 34.

I'm an independent petroleum geologist by profession, having bachelor's and master's degrees in geology and over 33 years experience in the industry. My current income is primarily derived from oil and gas royalty payments. I speak to you today as one of five royalty owners that were involved as a team in generating the prospect that caused Great Western Drilling Company to acquire an oil and gas lease in the north half of Section 34. This was in the December, 1999, lease sale conducted by the New Mexico State Land Office.

Nearburg subsequently acquired an interest in that lease and drilled the Grama Ridge "34" State 1 during the year 2000. It was my understanding that the Oil Conservation Division approved a north-half unit for that well. During the 13 months that that well was on production, I received about $18,700 in royalty income and paid the State about $2500 in production taxes and income taxes.

I generate prospects in the Permian Basin of Texas and southeast New Mexico for a living. Royalty payments, such as those from the State "34" well, are

extremely important to me as a source of income. I really can't express to you just how distraught all five royalty owners are that we spent time and money developing a prospect and selling it and having clients invest over a million dollars drilling and completing that well, to only have apparently the State change its mind about the ownership.

Not only has our income been stopped for the past 14 months, but also I'm told that our interests could be diluted by a party that has an interest in a nearby well that according to public records has not produced economic quantities of oil and gas for over ten years. I really don't understand how the State can let this happen.

However, my greatest concern is that the act of shutting in our well over a year ago has likely reduced the ultimate reserves that that well will recover. My experience tells me that that well has likely been damaged by this long impasse.

Commissioners, I respectfully ask that you allow the subject well to be turned back on immediately, so that no further reservoir damage will occur. I also ask that the State of New Mexico honor the lease and unit that you granted as a result of the December, 1999, lease sale. I and the other royalty owners feel that the State of New Mexico should not dilute our interest and should not

continue to prevent us from receiving our income.

Thank you.

CHAIRMAN WROTENBERY: Thank you, Mr. Brown.

Any questions --

MR. KELLAHIN: Questions for Mr. Brown.

CHAIRMAN WROTENBERY: -- for Mr. Brown?

EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Brown, where do you reside, sir?

A. Midland, Texas.

Q. How long have you practiced as a geologist?

A. I've practiced since 1969.

Q. Does any of that work include New Mexico?

A. Yes, sir. If I may refer --

Q. Well, I don't want you to describe it for me. I just want to know, have you practiced in New Mexico?

A. I have worked on prospects as an employee of a corporation in New Mexico, and I have worked as an independent geologist for the past three years.

Q. Have you ever testified before the Division before?

A. No, I have not.

Q. Are you knowledgeable about their rules and regulations?

A. Yes.

Q. Do you believe it's the Commission's or the Division's responsibility, or it's their fault for what happened to this well?

A. I feel that since the State of New Mexico put that lease up in the December, 1999, lease sale, that yes, there is a responsibility there.

Q. Don't you think the ultimate responsibility lies with your operator, Nearburg, to become aware of the rules and regulations by which he is allowed to operate in this state?

A. Yes, sir.

Q. Is he in compliance with all those rules?

A. I think so.

Q. He is? What acreage dedication does he have for the well?

A. Well, I'm aware that they now have the south half and the north half of Section 34.

Q. Are you aware that a standard spacing unit is 320 acres?

A. I'm aware also that in the Morrow the State of New Mexico allows 160s.

Q. And how do they do that?

A. I could not tell you right now, adequately in this forum --

Q. Under Rule 101 --

A. -- how that happens.
Q. -- have we downspaced the Morrow to 160 acres?
A. They are applying for that, as far as I know.
Q. That would be an exception, right?
A. I assume so. I don't know.
Q. You've been paid all of your entire overriding royalty interest you have, three --
A. Three-tenths of one percent.
Q. -- three-tenths of one percent?
A. That's correct.
Q. And Nearburg has paid you on total production, and you've derived about $18,000 worth of income from that?
A. That's correct.
Q. And then the well was shut in and they stopped paying you?
A. That's correct.
Q. Did you ask them to petition the Commission to allow that well to be turned on?
A. My group had asked -- not specifically, no --
Q. Okay, did you --
A. -- but they suspended continue -- If I may say --
Q. All right.
A. -- this has been a continuing process where it was understood that soon that well would be turned back on and allowed to produce.

Q. Well, I'm trying to understand what action you took directly with the Division, or indirectly, to force this issue to a hearing so this body could make decisions on whether that well is turned in.

A. Mr. Kellahin, I think you can see that with my small interest individually, it is difficult to justify hiring an attorney to represent us.

Q. Have you figured out what overriding royalty percentage Redrock would have if the spacing unit is the east half of the section?

A. It would essentially cut my override in half.

Q. What would their share be? They would have a 5-percent override, would they not?

A. That's correct.

Q. As an overriding royalty owner, are you in a position where you can cause your operator to drill a well?

A. No, sir.

Q. And Redrock in its position as an overriding royalty owner in the southeast quarter of the section now force Nearburg to drill a protection well?

A. Not to my knowledge.

MR. KELLAHIN: No further questions.

CHAIRMAN WROTENBERY: Any questions?

MR. HALL: No.

COMMISSIONER BAILEY: I strongly encourage you to

come over to the Land Office and talk to our people about some of the clear misconceptions you have over leasing in the State of New Mexico and the relationships between the lease configurations and the spacing units as determined by the OCD.

THE WITNESS: All right.

COMMISSIONER BAILEY: I think it's important for you to come over so that you can understand those relationships and the very clear misconceptions that you have.

THE WITNESS: All right.

CHAIRMAN WROTENBERY: Thank you for your testimony, Mr. Brown. And likewise, we'd be happy at the Oil Conservation Division to talk to you a little bit about how our spacing requirements work. I can say, we're chagrined that we didn't catch the problem earlier in the process when we were issuing the drilling permit.

THE WITNESS: Was that a 320 lease that was granted?

CHAIRMAN WROTENBERY: It was a 320 lease, but the leasing and the designation of a spacing unit are separate matters, and separate rules apply.

THE WITNESS: All right.

CHAIRMAN WROTENBERY: The State Land Office administers the leasing. The lease does not necessarily

have any relationship to the designation of the spacing unit.

COMMISSIONER BAILEY: Not in any way.

CHAIRMAN WROTENBERY: And so --

THE WITNESS: And a nonproducing well can hold that east-half unit? Is that what I will learn when I come to visit you?

CHAIRMAN WROTENBERY: No, I think we'll just talk about the process -- or the staff will talk with you about the process --

THE WITNESS: All right.

CHAIRMAN WROTENBERY: -- of designating a spacing unit. But you're right, we should have caught the problem when we issued the application for permit to drill. We didn't do that, and so we did contribute to the difficulty here a little bit.

THE WITNESS: All right. Well, I appreciate your offer --

CHAIRMAN WROTENBERY: I'll say, though, it is the operator's ultimate responsibility to --

THE WITNESS: Right.

CHAIRMAN WROTENBERY: -- work through those issues, but --

THE WITNESS: And it is a little difficult for an overriding royalty interest to have an influence without a

working interest.

CHAIRMAN WROTENBERY: I understand that as well. What we will do is, as a Commission, work hard on this matter to get this thing resolved and issue an order at our November meeting, which is scheduled for November 22nd. So you'll have our decision on the matter at that point.

THE WITNESS: I appreciate that.

CHAIRMAN WROTENBERY: Thank you very much for appearing, and --

THE WITNESS: Thank you, I'll contact --

CHAIRMAN WROTENBERY: -- making your statement.

THE WITNESS: Thank you.

CHAIRMAN WROTENBERY: And we need to set a date for the receipt of the closing statements.

How much time do you need? A couple of weeks or --

MR. KELLAHIN: Yes.

CHAIRMAN WROTENBERY: -- ten days?

MR. KELLAHIN: That would be helpful. I have Commission Hearings next week --

CHAIRMAN WROTENBERY: Yes.

MR. KELLAHIN: -- where we're going to learn about coal gas.

CHAIRMAN WROTENBERY: So two weeks, would that --

MR. KELLAHIN: That would help.

MR. CARR: What about two weeks from Friday?

MR. KELLAHIN: Two weeks from Friday.

CHAIRMAN WROTENBERY: I just want to make sure our counsel has enough time to review it and draft an order for the Commission's consideration by the --

MR. KELLAHIN: Would you want us to --

CHAIRMAN WROTENBERY: -- 22nd. That would be November 8th.

MR. KELLAHIN: Would you want us to try to submit draft orders or not?

MR. ROSS: Always helps, but I don't know. It's up to you whether you want to take the time to do that.

MR. KELLAHIN: Well, I will tell you, Steve writes very good orders.

CHAIRMAN WROTENBERY: He does, we agree with that.

MR. KELLAHIN: I'm happy to --

CHAIRMAN WROTENBERY: So I think if you'll just send the closing statements, then we can work from that. If you have any -- What you might do is, if you have any particular findings or ordering provisions that you feel strongly about, you might include those in your closing statements.

MR. CARR: And yesterday morning I advised you that I would like an opportunity to respond to material

submitted by Mr. Hall, and I'll do it by that date or before so that you have that. That's --

CHAIRMAN WROTENBERY: Okay. Actually, if you could do that within a week so that if the other parties need to respond to that information --

MR. CARR: It's probably going to be midweek next week, but that's still a week in advance. All right?

CHAIRMAN WROTENBERY: Okay, that sounds good. That sounds good. Actually, if you could get those to us by the 1st --

MR. CARR: We can do that.

CHAIRMAN WROTENBERY: -- and then that would give Mr. Hall and Mr. Kellahin an opportunity to respond --

MR. CARR: Okay.

CHAIRMAN WROTENBERY: -- with their closing statements on the 8th.

And then Mr. Hall, you also were going to put together some information on the storage unit wells? Do you already have that?

MR. HALL: I have ready for the record what we've marked as Raptor's Exhibit 16. It's a compilation of the C-105 data.

CHAIRMAN WROTENBERY: Okay. Is there any objection to the admission of Raptor Exhibit Number 16 into the record? Have you had a chance to look at it?

MR. KELLAHIN: Not by me, I have no objection.

MR. CARR: Not by me, no objection.

CHAIRMAN WROTENBERY: Okay, then Raptor Exhibit Number 16 is admitted into evidence. Thank you, Mr. Hall, for providing that information.

Is there anything else that we need to take care of today?

Okay, then we'll take this case under advisement.

Thank you all very much.

MR. CARR: Thank you.

CHAIRMAN WROTENBERY: Appreciate the testimony of all the witnesses.

MR. KELLAHIN: Would you like us to vacate the room so that you can --

CHAIRMAN WROTENBERY: Yes, I will entertain a motion at this point from --

MR. KELLAHIN: We'll come back and get our stuff later.

CHAIRMAN WROTENBERY: Okay. Well, actually, we'll give you a few minutes to go ahead and move your stuff out.

Let me just ask for a motion from one of the Commissioners to go into closed session to deliberate on the matter before us.

COMMISSIONER BAILEY: I so move.

COMMISSIONER LEE: Second.

CHAIRMAN WROTENBERY: All in favor say "aye".

COMMISSIONER BAILEY: Aye.

COMMISSIONER LEE: Aye.

CHAIRMAN WROTENBERY: Aye.

(Off the record at 12:46 p.m.)

(The following proceedings had at 1:20 p.m.)

CHAIRMAN WROTENBERY: Okay, I'll entertain a motion that we go back into open meeting.

COMMISSIONER BAILEY: I so move.

COMMISSIONER LEE: Second.

CHAIRMAN WROTENBERY: All in favor say "aye".

COMMISSIONER BAILEY: Aye.

COMMISSIONER LEE: Aye.

CHAIRMAN WROTENBERY: Aye. And I'll just note for the record that while we were in closed executive session the only matters that we discussed were the consolidated Cases 12,622 and 12,908-A. We deliberated on the evidence that we have heard in those cases over the last two days.

And with that, I don't think there's any further business for this special meeting of the Commission, so I think -- Let's just call it adjourned.

COMMISSIONER BAILEY: I move we adjourn.

COMMISSIONER LEE: Second.

CHAIRMAN WROTENBERY: All in favor say "aye".

COMMISSIONER BAILEY: Aye.

COMMISSIONER LEE: Aye.

CHAIRMAN WROTENBERY: Aye. We're done then, thanks.

(Thereupon, these proceedings were concluded at 1:21 p.m.)

* * *

CERTIFICATE OF REPORTER

STATE OF NEW MEXICO)
) ss.
COUNTY OF SANTA FE)

I, Steven T. Brenner, Certified Court Reporter and Notary Public, HEREBY CERTIFY that the foregoing transcript of proceedings before the Oil Conservation Commission was reported by me; that I transcribed my notes; and that the foregoing is a true and accurate record of the proceedings.

I FURTHER CERTIFY that I am not a relative or employee of any of the parties or attorneys involved in this matter and that I have no personal interest in the final disposition of this matter.

WITNESS MY HAND AND SEAL November 3rd, 2002.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 16th, 2006