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 SAMSON RESOURCES COMPANY, KAISER-FRANCIS OIL COMPANY, AND MEWBOURNE OIL COMPANY FOR CANCELLATION OF TWO DRILLING PERMITS AND APPROVAL OF A DRILLING PERMIT, LEA COUNTY, NEW MEXICO	)	CASE NOS. 13,492
APPLICATION OF CHESAPEAKE PERMIAN, L.P., FOR COMPULSORY POOLING, LEA COUNTY, NEW MEXICO	)	and 13,493
	)	(Consolidated)

REPORTER'S TRANSCRIPT OF PROCEEDINGS

COMMISSION HEARING

BEFORE: MARK E. FESMIRE, CHAIRMAN
JAMI BAILEY, COMMISSIONER
WILLIAM C. OLSON, COMMISSIONER

Volume II - December 14th, 2006

Santa Fe, New Mexico

This matter came on for hearing before the Oil Conservation Commission, MARK E. FESMIRE, Chairman, on August 10th and December 14th, 2006, 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.

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C U M U L A T I V E I N D E X

August 10th and December 14th, 2006
Commission Hearing
CASE NOS. 13,492 and 13,493 (Consolidated)

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(Continued...)

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A P P E A R A N C E S

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(Continued...)

A P P E A R A N C E S (Continued)

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EARL E. DEBRINE, JR.

and

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Santa Fe, New Mexico 87504-2265
By: W. THOMAS KELLAHIN

* * *

ALSO PRESENT:

Volume II: Thursday, December 14th, 2006:

BOB COLPITTS
Finley Resources

RONALD JOHNSON
Samson

KEN KRAWIETZ
Samson

MARK M. LAUER
Senior House Counsel
Samson Resources Company

LEZLYE RICKEY
Samson

* * *

WHEREUPON, the following proceedings were had at 9:02 a.m.:

CHAIRMAN FESMIRE: While he's doing that, let's go ahead and get the formalities out of the way.

This is the Thursday, December 14th, 2006 meeting of the New Mexico Oil Conservation Commission. Let the record reflect that Commissioner Olson, Commissioner Bailey and Chairman Fesmire are all present; we therefore have a quorum.

This is a special setting to addresses Cases Number 13,492 and 13,493, which have been consolidated for the hearing before the Commission.

Also present today is the Commission secretary Florene Davidson, Commission counsel Cheryl Bada, and the court reporter Steve Brenner.

At this time we will ask for the appearances of counsel in Causes Number 13,492 and 13,493.

MR. GALLEGOS: Mr. Chairman, appearing for Samson Resources and Mewbourne Oil Company, Gene Gallegos and Mickey Olmstead.

MR. HALL: Mr. Chairman, Scott Hall from Miller Stratvert law firm, Santa Fe, appearing on behalf of Kaiser-Francis Oil Company, and I'll have one witness in this proceeding.

MR. KELLAHIN: Mr. Chairman, I'm Tom Kellahin of

the Santa Fe law firm of Kellahin and Kellahin. I'm in association this morning with Mr. Earl DeBrine, Mr. John Cooney of the Modrall law firm in Albuquerque. Collectively we represent Chesapeake.

CHAIRMAN FESMIRE: Procedurally, according to the scheduling order, I guess it's been determined that the Chesapeake Operating Company, Inc., shall present its testimony in evidence first. And with that, I will ask Mr. Kellahin to call his first witness -- or ask his witnesses to stand to be sworn today, I'm sorry.

MR. KELLAHIN: Thank you, Mr. Chairman.

Mr. Godsey, would you please stand, and Mr. Finnell, would you please stand? I have two witnesses here.

(Thereupon, the witnesses were sworn.)

CHAIRMAN FESMIRE: Mr. Kellahin, go ahead and call your first witness.

(Off the record)

MR. KELLAHIN: Mr. Chairman, at the conclusion of the last hearing we had completed the land presentation for both the pooling cases and for the permit-dispute cases, and all that is now in the record. And the objective today was for us to forward with the technical evidence from both competing sides of the case, starting with Chesapeake, talking about the geologic information and then the

engineering analysis for the area.

And to start off that process, I'd like to call Mr. David Godsey.

CHAIRMAN FESMIRE: Okay. Mr. Gallegos, that is my understanding. Is that your understanding of the way we're going to proceed today?

MR. GALLEGOS: Yes, it is --

CHAIRMAN FESMIRE: Okay.

MR. GALLEGOS: -- Mr. Chair.

CHAIRMAN FESMIRE: Mr. Godsey, you've been previously sworn?

MR. GODSEY: Yes, I have.

CHAIRMAN FESMIRE: Mr. Kellahin, you may begin.

MR. KELLAHIN: Thank you, Mr. Chairman.

DAVID A. GODSEY,

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. Godsey, for the record, sir, would you please state your name and occupation?

A. David A. Godsey, I'm a petroleum geologist with Chesapeake Engineer- -- Chesapeake Oil and Gas.

Q. And where do you reside, sir?

A. Edmond, Oklahoma.

Q. When and where did you obtain your degree in geology?

A. Stephen F. Austin State University, in 1977.

Q. How many years of experience do you have as a petroleum geologist?

A. 27 years, almost 28.

Q. Can you give us a short summary of your work experience?

A. Yes, I can. When I came out of college in 1977 I went to work for Core Laboratories in Midland, Texas. I was a core analyst there, I worked up to lab supervisor. My responsibilities there were doing core analysis, doing lithologic description, porosity, permeability measurements, helping coordinate with our clients to understand that data and relate it to their logs. While I was there I did establish and maintain the first quality control for the Laboratory that they had had on their equipment for their existence.

After that I went to work for Threshold Development Company as a development geologist there. I was working northern Midland Basin and southeast New Mexico as a development geologist. We were drilling about 100 wells a year, so I spent a lot of time analyzing logs, doing log analysis and doing well site supervision.

After that I went to work for Texas Oil and Gas,

TXO Production Corp., still in Midland, Texas, as a prospect-generating geologist. Again, I was working southeast New Mexico, I was working the Texas panhandle and the northern Midland Basin.

In 1984, January of 1984, I was moved to Corpus Christi by TXO as district geologist. Two years later I was made exploration manager down there, which gave me responsibility for all of the Texas Gulf Coast. I was there a total of four years, came back to Midland, Texas, for TXO, still as exploration manager there. Our entire area that I supervised -- oh, a staff of about 20 geologists working all of the Permian Basin, southeast New Mexico, Texas panhandle.

We were merged into Marathon in 1990, I went independent. I was independent for about eight years, still in Midland, Texas, working all of southeast New Mexico and the Permian Basin. And while I was doing that, I was a -- I helped form a company called EnerQuest, which has now evolved into CrownQuest. You may have seen them in some of your hearings here.

I went to work for EOG -- oh, wait a minute, I skipped a company. Gee whiz.

I went to work for Matador Petroleum in there, immediately after Texas Oil and Gas, as chief geologist, still working the Permian Basin, still in Midland, Texas.

While I was with Matador, I did expert geologic testimony on a case involving Morrow sands and damage to clay mineralogy. I had also done similar work like that when I was in Corpus Christi for TXO, where I presented a paper to the Society of Professional Well Log Analysts that dealt with the log analysis and core analysis, identifying lithology and sand content in the Yegua sandstones in the Gulf Coast.

Anyway, back on track here, I went to work for EOG here, in Midland, Texas, still, working exclusively southeast New Mexico, targeting primarily the Morrow as one of our primary objectives.

Q. How many years have you had experience in the Morrow formation?

A. I'd say, all told, over 20 years.

Q. What are your current responsibilities for Chesapeake?

A. For Chesapeake, again I'm working southeast New Mexico, specifically Lea County, Chaves County and Roosevelt. I'm in charge of exploration and exploitation for that area. The Morrow is one of our primary objectives.

Q. When we look at the section in discussion here, it's this irregular Section 4. Is this in an area that you're familiar with?

A. Yes, it is.

Q. Were you the geologist for Chesapeake that was responsible for picking the location in the southeast quarter for the KF State Number 4 well?

A. Yes, I was.

Q. At the time that you picked that location, had you completed any geologic studies of the area?

A. Yes, I had.

Q. Have you continued with your geologic study of this area?

A. Yes, I have.

Q. And as wells have been drilled, have you continued to acquire information and analyze that information?

A. Yes, I have.

Q. Did you testify before Examiner Jones at the Examiner Hearing in this case?

A. Yes, I did.

Q. Are all the exhibits that we're about to see that are geologic in nature represent your work product?

A. Yes, they do.

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

CHAIRMAN FESMIRE: Is there any objection?

MR. OLMSTEAD: No objection.

MR. GALLEGOS: No, no objection.

CHAIRMAN FESMIRE: Mr. Godsey is so accepted.

Q. (By Mr. Kellahin) Mr. Godsey, let's turn to the locator map and use this to refresh our memories about the specifics of the technical case that we're involved in today. If you'll turn to what is marked as Chesapeake -- All the geologic exhibits are marked GO -- GRO?

A. GEO and then a number --

Q. GEO.

A. -- so this is GEO 1. You can see it in the top right-hand corner of the slide.

Q. Let's start with that slide then, Mr. Godsey, and as you use the pointer and direct our attention to some portion of the display, make sure you verbalize where you're taking us so the court reporter will be able to write down what you're illustrating for us.

A. Okay.

Q. First of all, would you highlight the location of the KF State 4-1 well in Section 4?

A. The KF State is located in Section 4 in this laydown 320 unit which lies in the extreme southern third of that section. It's a long section. It's located what would be -- P, Q, R, S, T, U, V -- I guess in W right there, as I'm pointing in Section 4. It's highlighted on your maps and labeled as KF 4 State Number 1.

MR. KELLAHIN: The Exhibit books, I believe, Mr. Chairman, members of the Commission, have hard copies of each of these displays if you care to look at those later. They should correspond with the visuals on PowerPoint.

Q. (By Mr. Kellahin) Identify for us the type of information you've shown on this locator map, Mr. Godsey.

A. This is a map showing all of the well control at the time of generation of this map in the area. It shows -- the TD is shown below each wellbore, right there. The Morrow producers are highlighted in red. Chesapeake acreage is highlighted with the yellow outlines that you see on the map. The well control that is 11,000 feet or deeper, we have put the operator, well name and number beside the well.

And then, on many of the pertinent locations that will be talked about quite often in this hearing, we've put the section and unit designation for help -- to help us locating that.

Now we've put an index of how that works down here at the very bottom left of the map, and you can see, to refresh your memory. On a standard 640, approximate, section, the numbering -- lettering system that starts in the upper right-hand corner would be A, B, C, D, drops down, comes back, E, F, G, H, I, J, K, L, then M, N, O, P. But -- We have these long sections in here, and that just

then continues, it would be -- after P it would be Q, R, S, T, U, V, W and X, and that's what's indicated right here to keep you straight on that, because it gets very confusing.

Q. There are wells indicated on here that have the red dots on the location. What does that mean?

A. The red dots are Morrow producers, and beside that, that shows in red the cumulative gas production and then in green the cumulative oil production. And I think that is as of -- the production is as of the -- December of 2005. We didn't update it because this was -- you know, exactly how much a specific well had made at a given time at this point is not pertinent; this is really an index map to help you find yourself.

CHAIRMAN FESMIRE: And that's in BCF, or -- I mean in --

THE WITNESS: That's in --

CHAIRMAN FESMIRE: -- MMCF?

THE WITNESS: -- MMCF.

CHAIRMAN FESMIRE: Okay.

THE WITNESS: So for instance, this well up here in Section 5, which would be in 5F, right there, that has made 28,766 MM, so basically 28.8 BCF of gas, if you will. Okay? Pretty big well.

Q. (By Mr. Kellahin) Of the key well -- the well population of wells, the last well drilled in this area is

the KF State Number 4; is that correct?

A. On the map area, no, there have two or three wells in the southern part of the map area drilled since the last hearing. But as far as immediately around the KF area, yes, the KF 4 State Number 1 was.

Q. Can you show us the location of the Osudo 9 well?

A. The Osudo 9 well is here in Section 9. It's in Unit H of Section 9, right there. It's operated by Mewbourne. Chesapeake has the largest working interest in that well, so we're very familiar with it.

Q. In your thought process and in your exploration geology thinking, what is the relationship with the Osudo 9 and the KF State Number 4?

A. Well, the Osudo 9 was drilled -- we drilled that well -- Mewbourne was the operator. We drilled that well prior to the drilling of the KF 4 State Number 1. It found a very nice, thick, very productive sand that reached rates of upwards of 20 million a day, and we moved quickly to protect our leasehold up here in Section 4 to the northwest and north to drill the KF 4 State Number 1. We found the same sands in it, and they appeared to be in the same reservoir.

Q. What was your reason for moving quickly?

A. Well, when you have a well that is that good in the Morrow and that kind of flow rate, you need to do that

to protect yourself from drainage.

Q. So the location of the KF State Number 4 well was your recommended location to your company?

A. Yes, it was.

Q. Let's turn to Exhibit Number 2. The topic here, Mr. Godsey, is to define the log intervals that -- associated with the two wells we just described.

A. Okay.

Q. If you'll look at Exhibit Number 2, identify for us what we are seeing.

A. This is the log section of the Morrow sands producing in the KF 4 State Number 1. On the left side, this is the neutron density log, this is the gamma ray in this first track, this is the neutron density, cross-plot porosity, this would be the PE curve, and this is the correction curve for the density.

On the right side is the mud log for that interval, so this would be the drill time, lithology sample for us and some cut, et cetera, and then gas shows over in the far right.

Now in yellow, highlighted across the log interval, is the Morrow sand that's present and producing in the KF 4 State Number 1. And you can see here very clearly with the neutron density crossover giving the lithology effect for sandstone -- I'm identifying this

sandbody here in the upper part -- we have a sandbody right here in the middle, another sandbody there, and then a basal sandbody right here. So all this is identified clearly by the neutron density response on the wireline log.

Now what I recognize in here has been outlined for you at the bottom of the exhibit. Basically you see that we have multiple sands in here, they're easily identified by the neutron density log, they are separated by sequences of shale and silty shales, and they are distinctly different sands.

If you look in here, the upper sand, this -- the uppermost sand on the exhibit, it's coarser-grained, it's unconsolidated, angular and lighter-colored. You will see that it correlates to the upper sand unit in the Osudo 9 State Number 1.

The middle sands, these two sands right in here in the middle part of the log interval, are more finer grain, more consolidated and cemented, they're darker in color, and they correlate to a lower sand that's producing in the Osudo 9 State Number 1.

And then this lowest sand we have, the basal one that we have perforated -- and you can see the sand again on the neutron density log -- that is a finer-grained, consolidated, cemented and browner-colored sand again, and

it correlates below the producing sands in the Osudo 9 State Number 1. So -- But what you can see clearly, these are distinctly different sand packages.

Q. Are there different methods a geologist can use for determining the sand content of a formation?

A. Well, yes, there are.

Q. What did you use?

A. I'm using the neutron density response of the tool to the lithology, because that is the standard for the industry, it is the best and most accurate technique to use. Now after that, after looking at the neutron density response, I will look at the PE curve, which is an indicator of lithology also.

Q. Come back. See the area that's outlined in red on the log that identifies --

A. Yes.

Q. -- that interval?

A. Oh, I'm sorry, this --

Q. Now stay there. Now go to the right. Show us what you're seeing on that portion that shows you the crossover on the density neutron --

A. Sure, let me --

Q. -- log.

A. -- let me identify these curves a little more accurately.

On the far right, this curve right here is kind of a longish, dashed curve. That's the neutron curve. Next to it, to the left on the log, a finer dash is the cross-plot porosity. And then this solid curve to the left of that would be the density curve.

So this cross-plot porosity that's plotting between the two is no lithology indication. All it is is cross-plotting the density and the neutron to determine the best look of what the actual porosity of the rock is, more or less regardless of the lithology. It's a -- Usually, they'll use a sum-of-the-squares average to get that.

Now next to that --

Q. At that point in the illustration, then, do you take that crossover height --

A. I take the --

Q. -- and reverse it to a value in terms of net clean sand?

A. Yes, I do, I count up the net feet of sand that has this lithologic effect of crossing over.

Now keep in mind, these logs are run on a limestone matrix. Regardless of what the various matrixes are that we'll see in a wellbore, the standard is -- for the entire mid-continent -- is to run these logs on a limestone matrix. We do that so that when we are varying our lithology we know that these different tools respond

differently to different lithologies. So if we know we're running them on a limestone matrix, we look at the relative response of the density and the neutron log to determine what that lithologic response is.

So for instance, if we're truly in a limestone the two curves should stack on top of each other, because we're telling the limestone -- or the neutron log, You're on a limestone matrix; we're telling the density curve, Hey, you're a limestone. And if it really is, they should both be reading about the same.

When we are varying from that limestone rock, then the density curve reacts one way to, say a sand, driving -- it goes higher, whereas the neutron log, if you're really in a sand, it'll go low. So that tells me by the relative response of this what my lithology is.

Now --

CHAIRMAN FESMIRE: So you've got a 17-percent porosity -- cross-plot porosity --

THE WITNESS: Well --

CHAIRMAN FESMIRE: -- on the upper section?

THE WITNESS: -- actually, no, the standard Permian Basin format is, porosity scale -- this is minus 10, so this is zero, and that's 10, 20, 30. Two porosity units per division. So this is cross-plotting right around 8 percent, that's correct.

Now after that, I will look at the PE curve, which is this curve right here. The PE is a lithology indicator also. Limestones should appear as a value of about 5, dolomites would be about 3, sandstones would be about 2. Except drilling additives to the mud can have a serious effect on the response of the PE curve. So it's a secondary look at your lithology because of that. Particularly in this area, we do sometimes take kicks, particularly barite in the mud, will have an adverse effect on the PE curve.

After the PE curve I will look at the gamma-ray curve. Now the gamma-ray, this is zero to 100, so zero on the left, 100 API units on the right. Look at -- This happens to be a spectral gamma-ray log, so it's breaking it into various components, but the total gamma-ray curve is this furthest one out here, and we can talk about that at first right now.

The gamma-ray curve is kind of my third source of looking at the log to define what my lithology is. Shales have high gamma-ray, sands can have a relatively clean gamma-ray, limestones will be relatively clean, and dolomites will be not quite as clean. But those are only generalities. You actually can have some very radioactive sands, giving you high gamma-ray response. So if you go strictly by gamma-ray, you can be fooled significantly by

that.

Actually, the gamma-ray curve is not a lithology indicator, it's a shaliness indicator. And so it is used as a subordinate curve to help analyze your lithology.

Q. (By Mr. Kellahin) Did you consistently apply your methodology of this neutron density log, curve analysis and the cross-plot to the analysis of all the logs that you've examined?

A. Yes, I did. Now -- and most of the logs in the area run -- we have this -- neutron-density logs that you see here are something very similar to that. There are a few older logs where we have just a gamma-ray and a sonic or just a gamma-ray and a density.

Basically, if you have a single porosity tool, then you make do with what you have. In an instance like that, you have to rely very heavily upon your gamma-ray curve, you have to go look at it, because I don't have my cross-plot technique to rely upon to identify the lithology. There I would look at the gamma-ray curve and look at the tool response of whatever porosity curve I have, and then make the experienced decision of how much sand do I have, based on applying a gamma-ray cutoff to the log.

But better than 90 percent of the -- I don't know if that's an exact number, but the vast majority of the

well control in this area does have a neutron density log, so that's the best technique to use, and that's the first one I go to.

Q. Can you use this methodology by which to determine the net thickness of the interval to be examined in each of the wellbores?

A. Exactly, and that's exactly what I have done.

Q. And once you had that information, are you then able to construct an isopach of that particular sand member?

A. Yes, I do.

Q. Please continue. What's your next slide?

CHAIRMAN FESMIRE: Mr. Godsey --

THE WITNESS: Go back?

CHAIRMAN FESMIRE: -- when was that log run? What date? Do you remember?

THE WITNESS: This hearing has drug out a long time.

CHAIRMAN FESMIRE: Right.

THE WITNESS: Let's see, it had to -- somewhere in my pile of stuff I have a date. If anyone has a date on that exact time --

MR. WAKEFIELD: KF 4 State?

THE WITNESS: Yes.

CHAIRMAN FESMIRE: Yes.

MR. WAKEFIELD: It was logging either late June or early July of '05.

THE WITNESS: Yeah, June or July of 2005. I've slept a few times since then, so I don't remember the exact date.

CHAIRMAN FESMIRE: Okay, thank you.

THE WITNESS: I'll accept that if you recall it. Okay, so going to the next slide, this is GEO 3. This is a similar presentation, but this is of the Osudo 9 State Number 1. So once again I have the gamma-ray/neutron density log on the left side and then the mud log on the right. Again, this would be drill time here, lithology identification, you know, sample show, gas shows. Again, we have the gamma-ray curve. Now here, they did not run the spectral gamma-ray, they only ran a total gamma-ray log, so we only have one curve for the gamma-ray.

We have the neutron curve on the far right, the cross-plot is in between, and then the density is this solid curve that you see. Again, we see colored in yellow on this slide the neutron density lithology effect on the log, crossing over the density higher than the neutron. That is telling me in here that this is a sandstone.

Q. (By Mr. Kellahin) Just then, Mr. Godsey, on the log for the Osudo 9, can you identify on this log the corresponding or the correlative interval that you just

examined for us and showed on the KF State 4 well?

A. Yes, that's where I was going to go next. The -- so you can see here, we have two distinct and packages in this well, separated by about a three-foot shale bed. The top unit, right here in the upper part of the yellow-colored interval, that upper sand is -- it's coarser-grained, unconsolidated, angular, lighter-colored and is higher in porosity. That's the one that correlates to the top one in the KF 4 State Number 1. And you'll note that the lithologic description is very, very similar.

The lower unit in the Osudo 9 State Number 1, it's finer-grained, it's more consolidated and cemented, and it's darker colored. That correlates to those middle sands in the KF 4 State Number 1.

And you can also see the differences in the two packages in and of themselves on this log. You'll note there's some difference in the gamma-ray character from the top unit to the bottom unit, and you'll notice the porosity overall is higher in the upper unit than in the lower unit.

So these are, again, two stacked sands sitting right on top of each other, separated by about a three-foot shale.

The perforated interval, just like in the other slide, is shown in red. The green on both slides would indicate the producing interval, what's being produced

together. So again, it correlates very well to the KF 4 State Number 1.

Q. Mr. Chairman, I apologize, we're going to skip a couple of exhibits and pull them up now into the sequence, and Mr. Godsey's fourth display, I think is your GEO --

A. GEO 18.

Q. GEO 18. Give us a moment to find that, Mr. Godsey.

Mr. Godsey, I'd like you to continue now with --

A. Okay.

Q. -- your discussion about the determination of the sand thicknesses using your methodology. Could you identify for the record, what are we looking at when we see Exhibit 18?

A. Exhibit 18 is a diagram out of a basic well log analysis book by George Asquith and Krygowski. The purpose of this slide is to more clearly illustrate for you, without all the other curves and confusion in there, diagrammatically what Asquith has shown there is a hypothetical diagram of a neutron density log with a PE curve and a gamma-ray. So the gamma-ray will be on the left, zero to -- I believe he has 100 on the right, is the scale, so -- less gamma-ray, higher gamma-ray response to the right.

The curves that we see here, the -- again, the

convention is, the neutron is the long dash, the density curve would be the solid curve, and then this shorter dashed curve is the PE curve that I said is also a lithology indicator.

So what we're indicating here is, again, these logs are run on a limestone matrix, so when you're truly in a limestone, as he's indicated here with his lithology indication in the middle, the curves will stack on top of each other, because we're truly in the lithology that we're telling the computer that we're in, because this -- keep in mind, the neutron log is really reading the hydrogen ion concentration of the formation, basically.

The density log is really seeing the electron density, and they're relating this to things to try to get a value. Well, for it to calculate -- for either curve to calculate a porosity value, you have to tell it what the lithology is. So if we tell it that we're in a limestone and we truly are, then they're going to read about the same. When we're not, then they have differing responses, and that is what this is showing.

Highlighted here in yellow -- there are one, two, three, four areas that are highlighted in yellow on the log -- on this slide, where sandstone occurs. And you'll see in every instance, we have the lithology effect of the density going high, the neutron dropping low, giving that

crossover, is what we call it, giving crossover in the sandstones. Even when you're in a sandy limestone or a dolomitic sand, you can get a small amount of crossover in there. So the neutron density is the primary thing to look at for your lithology indication.

Secondarily, you'll look at the PE curve. You'll note in these clean sands the PE curve is down here close to 2. As we get into other lithologies the PE will change. For instance, in a limestone the PE will be up close to about a 5, and so on and so forth.

Now when you look at the gamma-ray, generally you'll see the gamma-ray gets relatively clean when we're in a sandstone. But it's also clean when we're in numerous other lithologies in here. The gamma-ray curve is a secondary -- and I -- to my mind, really the third-order curve to use in identifying your lithology. Now when you don't have the neutron density curves to work with, yes, you have to work with what you have.

Q. What's the source of this display?

A. This is out of the Asquith and Krygowski *Basic Well Log Analysis* manual. George Asquith is kind of one of the gurus of the petroleum industry for log analysis. He's been around for a hundred years.

Q. In your geologic opinion, is this authoritative on this subject?

A. Yes, it is.

Q. All right, let's go to your next display.

A. Now --

Q. Describe first of all what we're seeing.

A. Okay, this is the neutron density cross-plot response chart for the neutron density logs, and this is straight out of the Halliburton log analysis manual. This is GEO 19. In your books it would be right behind wherever Number 18 was.

CHAIRMAN FESMIRE: Mr. Kellahin, I don't have 18, 19 --

MR. KELLAHIN: In your book?

CHAIRMAN FESMIRE: -- or -- I don't have 18 or 19. Is there a -- And my 20 is different --

MR. KELLAHIN: Well, let's fix your book.

CHAIRMAN FESMIRE: Okay.

MR. KELLAHIN: Mr. Chairman, you may have the original exhibit book, and not the substitute one.

CHAIRMAN FESMIRE: Okay.

MR. DEBRINE: Yes, Mr. Chairman, the exhibit books that we submitted a couple weeks ago, there's a separate exhibit book for the geological exhibits and a separate one for the petroleum engineering exhibits --

CHAIRMAN FESMIRE: Okay.

MR. DEBRINE: -- and so if you don't have those,

you're probably working off the original.

CHAIRMAN FESMIRE: I'm working off the original.

MR. KELLAHIN: Let's give you another book.

CHAIRMAN FESMIRE: Is that fair?

MR. KELLAHIN: Sure.

CHAIRMAN FESMIRE: It's been accurate up to this point.

CHAIRMAN FESMIRE: Okay?

THE WITNESS: Okay.

Q. (By Mr. Kellahin) Mr. Godsey, identify the source of this display.

A. Yes, this is straight out of the Halliburton logging manual, their chartbook manual for the analysis of their logs. I used the Halliburton one rather than Schlumberger or Baker-Atlas, because most of the logs immediately around the KF are Halliburton logs.

The way this chart works is --

Q. Excuse me, what information do you then put on this display?

A. Well, we take -- Did I add to the display?

Q. Yes.

A. I'm sorry. In this boxed-in yellow area that is centered around this curve that is called sandstone curves here on the chart, I've added that in to identify the -- kind of the sandstone region of where points would plot on

this curve. I also added in several points that you see in various colors with the dotted lines, and I've identified which wells they came from on the right side of the exhibit.

Q. That's your work, then?

A. That is my work.

Now what this chart is showing is -- and the way you utilize this, you come into the chart from the bottom with your neutron porosity log reading. And say, for instance, at this point right here, you would come in with a reading of -- I believe that's about 4.

You would come up until you meet the density reading, you come into the -- with the density reading, whatever it was. In this instance it was about 14, and you see where that point falls. And if you're in a sandstone it will fall in this sandstone region. If you're actually in a limestone, you'll fall around the limestone region. If you're in a dolomite, or a dolo-stone as they call it here, then you'll fall in the dolomite region.

There are exceptions to this. When you have complex lithologies where you have a combination of sand and shale and lime and stuff, it can get very complex. And that's why you see kind of a region around this where I'm saying this is clean sand. You can have sandy stuff that falls right towards the edge of it in either direction.

Also, gas effect will tend to drive the points up this direction. So if you want to, you see this gas-correction curve up in the upper northwest quadrant of the slide. Gas will drive the density curve way up, erroneously high, and the neutron erroneously low, and it will plot something up in this gas region, and then you correct it by -- if you want to, calculate your actual porosity of the rock. You would then just slide that back to your porosity -- to your lithology line, and read your porosity value. So --

Q. What then do you do with this?

A. Well, by looking at this and seeing where these points plot, I can determine what my lithology is from the neutron density log. And then I take that analysis and count up the net feet of clean sand that I have in my logs, and that's how this technique works. And this is a standard for the industry.

CHAIRMAN FESMIRE: Does this calculation result in that cross-plot there?

THE WITNESS: Yes, it does. Now -- You know, and there are -- there are, as you can imagine with these logging companies, there's probably half a dozen actual formulas that they may, you know, have developed through the years to calculate the cross-plot. But generally, this is what they do. They -- Graphically, the cross-plot

porosity curve is done by plotting the neutron versus the density and then reading what the value is on your lithology line. Okay?

Q. (By Mr. Kellahin) Yes, sir.

A. Now, if I go to GEO 27 -- again, we're jumping around and I apologize for that --

Q. Give us a moment, let's find 27.

Where is this well located?

A. Okay, this well is located in the very southern part of the mapping area. It's in Section 33, in the same township, but in the southern part of the map. It's in 33A, is the unit designation.

Now the purpose of showing you this is to illustrate the importance of using the neutron density log to determine your lithology content. We've already seen in the slides -- the log sections of the Osudo 9 and the KF 4 State Number 1, picking that lithology and seeing the clean gamma-ray, it's very straightforward. You know, I could teach my daughter to do it in really a few minutes when it's very, very simple. But it can be very complex, and that's what we are seeing here.

If you use something like a gamma-ray cutoff to -- and/or some type of cross-plot porosity cutoff to determine your sand content in this well, you would determine that there's no sand. By neutron density cross-

plot analysis you can see there's sand.

Now I'm going to go to a zoom -- I'm just going to zoom -- the next slide zooms in on that where you can see it a little bit better. Now let me identify the curves for you.

Now you can see I have two sections that are colored in yellow. That's my sandy content, based upon the neutron density curve. Again, the density is the solid curve, the neutron is the long dash, cross-plot of those two would be in between. This would be the PE curve, which is the longer, more solid dash over in the left third or middle part of this slide, and then your gamma-ray is over here to the left. Again, the gamma-ray scale is zero to 100; 50, then, would be right in between.

If you look in here, I have neutron density crossover right there giving me a little lithology effect of a sandstone. Also my PE curve is trying to drop down a little bit, towards the sandy interval.

And then in this part, the thicker part of the yellow in there, here's the neutron curve. That's the furthest one to the right. The density curve has gone much further to the left, giving me again my lithology effect, indicating this is actually sandstone.

If I looked at the gamma-ray and assigned something like a 50 API, even a 55 or a 40 API, cutoff,

ignoring the neutron density and use the gamma-ray cutoff to determine net feet of clean sand, everything would fall -- in this lower, thicker yellow interval, would fall greater than that. The gamma-ray curve would tell me it's shale, not sand, and I wouldn't count that as sand.

Also if I was using the gamma-ray cutoff, quite often you will then use some type of a porosity cutoff. If you used what Samson has used, which is a 6-percent porosity cutoff, showing you the scale here, again, this is minus 10, so that's -- there's zero, 2, 4 -- here's 6-percent porosity, right where my pointer is right now. The cross-plot porosity in that upper lobe is less than 6. Even though the gamma-ray, some of it, is clean, or less than 50 API, you would count that as no sand again, using those cutoffs.

But by using the proper technique of using the neutron density lithology effect, looking at how they respond to each other, understanding how that cross-plot works, I can identify this as sand, and this is, in fact, a Morrow producer and it's made over a BCF of gas.

That's how important it is to use the proper technique to determine your sand content in these wellbores.

Q. Have you taken your methodology and constructed isopach maps?

A. Yes, I have.

Q. Let's turn to Exhibit 4. We're going to come back to Exhibit 4 now, right?

A. Now we're back in the sequence of your books, more than likely.

Q. Mr. Godsey, for the record please identify the display.

A. This is Exhibit GEO 4. It is the net middle Morrow clean sand isopach for this area. So this is an isopach contour map. It's color-filled in green on here. Superimposed with that is the structure on top of the Morrow. The structure has been drawn by computer. The isopaching that you see with the green color-fill is hand-drawn by me.

The relevant aspects of the map, you can see once again highlighted in red the Morrow producers. This also shows the cumulative production in red and the -- for gas and green for oil. Chesapeake leasehold is indicated in the yellowish blobs -- blocks, that you see outlined on the map. The proration unit, the 320-acre laydown unit for the KF State, is indicated in the red box in here, and the KF 4 State Number 1 is identified on your map.

Now over on the right side of the map, if you will, you'll see there are no contours. The first thing you see is a bold, black line traversing the entire

distance from the north end to the southeastern part of the map, and that is the Morrow subcrop map. What that means is, there is no Morrow to the east of this, it doesn't exist, and Morrow exists to the west of that. The reason it does not exist to the east is, this is the Central Basin Platform to the east of the area. The Delaware Basin -- we're on the edge -- we're on the eastern flank of the Delaware Basin -- Delaware Basin is thickening to the west.

The isopach map is drawn here on a 10-foot contour interval, and what you can see out of this mapping in here is the sand distribution for the area.

Now I've determined my sand content in each wellbore by the method that I indicated earlier with the neutron density cross-plot technique. And what this --

Q. Mr. Godsey, are you aware that the engineer has calculated a volumetrics for portions of Section 4?

A. Yes, I -- Yes, I am.

Q. Did you supply him the map by which he was able to make his volumetric calculation?

A. Yes, I have.

Q. What map did you supply?

A. I supplied him this map, which is all of the middle Morrow sands. I've also supplied him three sand maps of individual sand lobes, those individual sand lobes that we could identify in the KF 4 State 1. I've mapped

those individually also for the engineers.

Now what you really see out of this is, you get a very strong sense of the east-west trending of sandbodies in the map area. You can see that very clearly through here.

For instance, if you start at the southern end of the map, down here at the very bottom, that last log section I've showed you that I said was in Section 33 is right down here at the very southern end of the map, Section 33, Unit K. You can see that's part of a whole series of Morrow producers trending uninterrupted from east to west across the map.

I see this same type of orientation of sandbodies coming from east to west, coming off of the Central Basin Platform area, they're trending east to west all the way through here, and then they're coalescing with more sands that are deeper in the Basin, that have been coming from the northwest off of the Pedernales Uplift.

So the whole purpose of mapping this this way is to determine the net clean sand, and then mapping all of them together, lumped together, to develop the sand trends for the area.

Now --

Q. Before we leave this display, Mr. Godsey, give us a general summary of why you believe these sands are

oriented in a generally east-west direction.

A. Well, several things are telling me that. First of all, if I knew nothing else about the regional geology, if you just start looking at where are the red dots, which are Morrow producers, you can see continuous strings of Morrow producers lining up in an east-west orientation. When I correlate the individual logs to each other, I see these sand packages falling in similar positions, saying that these are related genetically.

I know the -- But I do know something about the regional geology. The Central Basin Platform is to the east. It was emergent and exposed at time of deposition of the Morrow, so it was a local sedimentary source for sediments deposited in the Morrow time.

Now overall, in the broad scheme of things for the entire Delaware Basin, the Pedernales Uplift, which is to the northwest about 100 miles away from this KF area -- it was probably the greatest sediment source for the Morrow for the entire Delaware Basin.

But we have structural elements at the time that were local sediment supplies. For instance, in this area you have the Central Basin Platform. To the west side and the southern part of the Delaware Basin you had the Diablo Platform. In the very southern part of the Delaware Basin, you had the Ouachita Uplift. So they were supplying

sediments locally, but the Pedernales from the northwest was giving, in the gross sense of the entire Basin, a very significant source. Local structure also had a significant control in here, and that's what I'm relying upon, is some of the regional knowledge that I have, as well as the literature.

And when I start mapping these things in here and start seeing how they correlate and how they compare to each other, and then give some of that data to the reservoir engineering group, they analyze the pressure data and other things that confirm my mapping of this area.

Q. Can you zoom in on this map?

A. Yes, I can. Now this is zooming in just on the area in question. Right here in the middle of the map is the KF 4 State Number 1, located in Section 4. The 320-acre proration unit is outlined in red. And you can see the net sand isopach going from zero to a thickness of 10, 20, 30, 40, 50 feet or so, a little over 50 feet in this area. The KF 4 State has 17 net feet of sand, the Osudo 9 has 54 net feet of sand. I think that those wells are correlative, they are connected.

And they connect also to the WEL Com State Number 1 in Section 10 and gives us an east-westerly orientation, just like we see to the south in Sections 15, 16, and so on.

And once again, you'll see by the testimony that Jeff Finnell presents in the reservoir engineering aspects, his work has confirmed this mapping.

Q. Let's go back to the spacing units in Section 4.

A. Okay.

Q. What orientation of a spacing unit for the KF State 4 well has the greatest maximum reservoir volume potential associated with it?

A. Well, obviously the laydown 320 that we have for the KF 4 State Number 1 will maximize the amount of sand available to produce there in that part of the section. So I believe that the laydown 320 is appropriate, because that is how the sand lies.

Q. Let's look at your next display.

A. Now, this is a cross-section that we thought we would put up, and you can see it better in paper if we put it up on this poster board. Let's do that.

(Off the record)

Q. (By Mr. Kellahin) Is there a locator line for this line of cross-section, Mr. Godsey?

A. Yes, there is. There's an index map on the far right side of the display that you can see over here, and this is a snapshot of my map. This cross-section runs from the left end -- that's the blue line of cross-section you see on the index map, starting on the southwesterly end.

It runs from west to east. It will turn north and then turn from east to west. So on the left end we're starting on the west side of the map, we're running east, we'll turn north and then we'll turn east [*sic*] again.

Now this is a stratigraphic cross-section --

Q. What was it that you wanted to learn?

A. The purpose of this is to illustrate the presence and then absence of sands as you go in different directions. So as we go from west to east you can see highlighted in the bolder yellowing in here on the cross-section the sand presence in each of the wellbores. So if I go from west to east I'm going up the sand trend, if you will. When I get to --

Q. Hold it a minute now. On the far left side of the log --

A. On the far left side --

Q. -- the first log is of what well?

A. That's the Pure Oil Company Wilson Deep Unit Number 1 in Section 13.

Q. And as you move, then, easterly through the thickness of the trend, the fifth well over is what?

A. The fifth well over is the Amerada WEL Com -- I'm sorry, wrong well. That's the Santa Fe Energy PQ Osudo State Number 1.

Q. As you continue to the right, then, are you

changing direction?

A. Yes, I am. So basically as I go from left to right -- you'll notice that at the top of the cross-section we have these numbered, 1, 2, 3, 4, et cetera. As we go from left to right, wells 1 through 6, essentially I'm going from west to east, and I'm moving along the sand trend, so I'm continuously in sandbodies in these wells.

Now --

Q. Let's talk about that portion of the analysis. Among that population of wells, what is the sand continuity as you move east to west, or west to east?

A. Well, it's actually very good, and this ties in with my map we saw on the previous slide. Almost all of these are Morrow producers in here to some degree or another, and the sand continuity is there throughout the Morrow -- middle Morrow section. But you do see the multiplicity of sands that we have in here, so you have a lot of different sand units.

And you also notice on the west end of this how much thicker that section that is. That's because, as you see on my map, we've moved further out into the Delaware Basin, the entire section is thickened, and we have more sands developed out there. But we have continuously sands falling in the same general region as we move from west to east because we're moving along the sand trend.

Q. Starting, then, with the sixth well, are you changing direction?

A. Starting with well 6, I turn and start traversing north, and I will traverse north until I get to well 10. And what I see is, as I'm going from south to north I go in and out of sand in these wellbores. You can see --

Q. What does that mean to you?

A. Well, that means I must now be crossing sand trends, because I'll go into a sand trend; I'll go a little further north, I have no sand. Then I go back in -- a little further north I get back into a sand again, I'm a sand trend. I go north again, I get out of sand. So if you're going along one, you're going to stay in it. As you're crossing them, you'll be going in and out of sand thicknesses.

Q. What does that tell you about the possibility that the sands are oriented north-south?

A. It actually would tell me that they're not. It tells me that they should be oriented in an east-west section.

Now once I get to well 10, which is the CC 3 State Number 1, then I turn and I begin to go back west again, following the sand trends. And you'll note how the entire interval is thickening, and I'm continuously in the sand all the way to the right end of the cross-section.

So again, I have started off following a sand trend from west to east, I'm in it all the way. As soon as I deviate and start going to the north, I'm going in and out of sands. And then when I stop and turn west again, I'm staying continuously in sandbodies. Again, that is something that helps me with mapping this and determining where do these sandbodies go?

Q. What's your next display there, Mr. Godsey?

A. The next display would be GEO 6, and it's the cross-section just under that.

Q. Again, Mr. Godsey, orient us. Where is the line of cross-section?

A. This cross-section runs -- oh, it kind of actually runs several different directions, but it starts on the southerly end in Section 15. The index map is there in the upper right-hand corner of the exhibit. The line of section is shown there in that bluish-purple. The right end of the cross-section is the well in Section 15. It traverses to the north, turns west into Section 9, through the Osudo, up to the KF State, and then culminates on the left side with well number 1, in the CC 3 State Number 1.

Now this is a much more detailed cross-section in here. The purpose of this exhibit is to show you the next step I take in mapping this area. I started off by determining my net clean sand in each wellbore, and then I

mapped all that sand together to see where the sand trends go. Now I want to see if -- can I differentiate the individual sandbodies and map them individually?

It's important to do that more or less in this sequence. If you just start off and say, Hey, I'm going to separate all these sands out first thing, you can get very confused as to where do the sandbodies go and how your correlations are, because these correlations can be a little bit confusing.

Now this cross-section, then, is a stratigraphic cross-section. It's hung on this marker here that you see is very flat, filled in in gray. The entire middle Morrow section is this very light yellow section. I've filled in in gray some of the thicker shale units within there.

But then I have been able to differentiate three of the sands that are present in this area. They're the three that are most important to this immediate vicinity around the KF State, and you'll see I have an interval that's filled in in blue, I have one that's in orange in the middle there, and then I have one that's in a light green. I have done that for all the wells in the area, so that I can differentiate the different genetic sand units and try to map them individually, to help with the problem that we have at hand. So I've done that, and then I have net isopachs for each of those units.

So what I'm calling the green sand here -- and I'll probably refer to it as green -- you'll see it labeled also as the Osudo Upper New. The orange is the Osudo Upper, and the blue is the Osudo Lower. I'll probably just say green, orange and blue from here on out for ease. Okay?

Q. The top one again is --

A. The top one -- the green one --

Q. Green.

A. -- is green, and it is the Osudo Upper New.

Q. And the orange is the one in the middle?

A. The orange is the one in the middle, and that's the Osudo Upper. And then the blue one I have called Osudo lower.

CHAIRMAN FESMIRE: Before we get into that, real quick, Mr. Godsey, in the two Chesapeake wells I'm assuming that you had a significant part to play in the preparations; is that --

THE WITNESS: Yes, I did.

CHAIRMAN FESMIRE: You appropriated a lot larger interval in both of those wells that you counted as net pay. Why is that?

THE WITNESS: Well, the individual perforations are the red boxes on here. The green box is -- that indicates what zone is producing together. So the actual

perforations are the red boxes, and that matches the actual sand content very closely.

CHAIRMAN FESMIRE: Okay, so I had that backwards then?

THE WITNESS: Right, and I probably didn't explain it very well. I'm sorry.

So with our perforations -- That's a very good point. With our perforations, we are targeting the specific sandbody, and if the wells need it we treat that. Now in the case of the KF State Number 1, no treatment was necessary; it was a natural completion. Also, the Osudo 9 State Number 1, which is well 3 on the cross-section, that was a natural completion as well.

The CC 3 State Number 1, the first one on here, was a natural completion. It came in at over 3 million a day. I thought we had something great, and it depleted in less than a month. You'd have sworn I had a working interest in that one.

But so on and so forth, all the way through here where I have the data, the red boxes will show the exact perforated interval, and then the green box would show, okay, of that perforated interval what's producing together? All that was put together. Okay? So from this work then, I differentiated out three of the sands.

There are more sands than this, if you start

looking at all of the wells in here, there are more sands than just these three. For instance, the uppermost sand we perforated in the CC 3 State Number 1, the first well on the cross-section, on the left end, that's a different sand entirely. And if we go far enough in different directions, we'll find other sands coming in and out, just as we saw on the previous cross-section. Okay?

Q. (By Mr. Kellahin) Let's look at the isopach of the upper zone. That's the orange zone.

A. I hope that's next. Ah. So this is the net clean sand isopach of that unit I call Osudo Upper. It was colored in, filled in in orange on the cross-section, and I pretty much have used orange color fill on the isopach. Contour intervals are the same as in previous maps, most of the relative elements of red dots being Morrow producers and so on and so forth, are the same. The cross-section we just looked at is indicated on there as well.

I need to make a correction to this map. The datum points that you see for the wells are incorrect. I'd blame my geotech if she had been the one that did it, but I did it. My mistake.

Q. Let me understand the nature of the mistake. The contouring and the values actually used by you in the computer are correct --

A. Are correct.

Q. -- but the posted number is wrong?

A. That's correct. The posted number is a -- I had the wrong layer turned on when I told the computer to generate the map, didn't realize it. The map is contoured with the correct datums, and the contours are correct for this unit. The datums that I show beside the well are not the correct datums to post. I can give you all those one by one, it will take about five minutes. Or we can -- if you care, we can resub- -- we can send these to you at a later date with the correct datums on them.

Q. Let's just try to do it at the break.

A. Okay.

Q. You discovered this yesterday afternoon, didn't you?

A. I discovered it late yesterday afternoon.

CHAIRMAN FESMIRE: Okay, I'm a little confused. When you say "datum", which --

THE WITNESS: Okay, if you look at, say for instance, the KF 4 State Number 1 there in Section 4 --

Q. (By Mr. Kellahin) Instead of a 10, what's that supposed to be?

A. Instead of 10 feet that should be 2 feet. It's the number inside the little whited box there. That number, in most cases on this map, is wrong. It's not the number I used, it's not the number that pertains to this.

That actually, you'll see, pertains to the green map.

Q. Based upon this analysis, Mr. Godsey, do you have an opinion about the orientation of the sand that you've mapped as this upper portion of the middle Morrow, this orange sand?

A. Yes, I do. The orange sand clearly shows an east-west-trending orientation of the Morrow -- of this specific Morrow sand in this area. I can see that going from Section 10, 10 to 9, in Section 4, and that sand is trending off to the west in Sections 8 and 7, so on and so forth. I see that equivalent sandbody in another little fluvial system coming down here in the south, in Sections 15, going into 16 and feeding off that direction, and then I see a paralleling unit down here.

I believe this to be a river system, a fluvial system, if you will, coming off of the Central Basin Platform to the east and feeding into the Delaware Basin to the west.

Q. Show us the orientation of the structure as we move through the southern portion of Section 4.

A. Ah, structurally we're in a relatively low area in Section 4 down at the area of the KF 4 State Number 1. We're moving updip as we go to the north or northwest or northeast, so basically in any northerly direction we're moving in an updip direction to the north.

As we saw on Exhibit GEO 4, the net middle Morrow sand for the entire area with the structure map superimposed on it, there is a high present up there to the north that had little no effect on deposition in the area, but --

Q. Do you see a closure to that structural high to the north?

A. No, we do not. I see a strong nose coming across there, and I really don't see any structural closure to it.

Q. In your geologic opinion, has that structural high to the north influenced the sand deposition to the channel that you're accessing in Section 4?

A. No, the structural high we see to the north, which is really centered up in, say, the northern part of Section 5, on up into 31, 32 and a little bit north of there, that is a high, there's no doubt about that, but it did not have any control on sediment deposition in this area.

Conversely, the much -- In the scheme of things, that was a very small, little high.

The high that had control and affected sedimentation in this area will be off to the east, which is the Central Basin Platform that was emergent at the time.

Q. Let's go to the next slide.

CHAIRMAN FESMIRE: Mr. Kellahin --

MR. KELLAHIN: Yes, sir.

CHAIRMAN FESMIRE: -- would this be a good be a good place to take a 10-minute break?

MR. KELLAHIN: Sure.

THE WITNESS: Okay.

CHAIRMAN FESMIRE: At this time we'll take a break until 10:30 and reconvene at 10:30.

(Thereupon, a recess was taken at 10:19 a.m.)

(The following proceedings had at 10:32 a.m.)

CHAIRMAN FESMIRE: At this time we'll go back on the record. Sorry for the interruption, Mr. Kellahin. Your witness, I guess.

Q. (By Mr. Kellahin) Mr. Godsey, would you turn to the next of the individual sand maps that you prepared? I think we're ready to look at the middle portion, which was the green map?

A. Yes, and that's what I have up on the slide right now. This is GEO 8. That's the one I called the Osudo Upper New. We're going to call it green; this is the green sand.

This one is correct. In fact, if you start looking, you'll see that these data points, that -- for instance, the 10 feet here at the KF 4 State Number 1, has the same number that's on the other two maps. We'll see if

we can get those corrected to you just shortly here.

Q. The numbers, then, in the blocks on the green map --

A. The numbers in the blocks on this map is the net feet of clean sand of that stratigraphic sand unit that pertained to that well and this map.

Q. And these numbers in the blocks, then, are the right numbers?

A. And these numbers in the blocks on this map, GEO 8, for the green sand, are the correct numbers.

CHAIRMAN FESMIRE: Okay, Mr. Godsey, if I've got -- understand what you're doing, the two that would have been the right point on the previous map, this 10 and then the next map ought to show 5 at the KF State 4?

THE WITNESS: Yeah, but you'll see -- if you look at these numbers on this map, compare them to the previous one and the next one, you're going to see these are the exact same numbers on those two maps.

CHAIRMAN FESMIRE: Okay.

THE WITNESS: I just -- I both love and hate computers.

CHAIRMAN FESMIRE: But if we sum them all together, the sum of the three will give us what was in the net pay isopach that you showed us --

THE WITNESS: Almost.

CHAIRMAN FESMIRE: Almost.

THE WITNESS: Remember, there's more than just these three sands.

CHAIRMAN FESMIRE: Okay.

THE WITNESS: So there -- so it will be less than or the same, depending on if there are more sands in any given wellbore.

CHAIRMAN FESMIRE: Okay.

THE WITNESS: Okay?

CHAIRMAN FESMIRE: I'm sorry, Mr. Kellahin.

THE WITNESS: So --

Q. (By Mr. Kellahin) In terms of calculating volumetrics, then, you gave the engineer that total sand package from Exhibit 4 --

A. Yes, I did.

Q. -- which may be slightly more or equal to the sum of these three maps?

A. Yes, that would be correct.

Q. Let's go to the green map now. Your conclusion about the orientation of this particular sand member?

A. Well once again, I'm seeing that same east-west orientation of sands that I was seeing in the previous maps. You can see I have this sand present and productive off to the east in Section 10 at the WEL Com State Number 1. It's present in the Hunger Buster State Number 3 to the

west in Section 9, it's present and one of the main sands in the Osudo 9, it's present in the KF 4 State Number 1.

It's not present to the north in the Apache well with zero net feet of sand, it's not present to the south in Sections 15, 16, so on and so forth.

I see this sand trending in a general east-to-west direction, it's a fluvial sand trending out towards the Delaware Basin, into the Delaware Basin. I also see this equivalent sandbody, probably a contemporaneous little fluvial system, turning east to west across the northern part of Section 4, into Section 5, and off to the west.

Q. Which orientation of the spacing unit for the KF State 4 well gives you the greatest reservoir potential volume for this sand member?

A. The laydown 320 unit that we have established for the KF 4 State Number 1 is the appropriate unit for this map.

Q. Do you see any indication that this sand package ought to be oriented north-south?

A. None at all.

Q. Let's go to the last of the series. We're now down on the blue map, is it?

A. Yes, this will be the blue map. It's identified as Exhibit GEO 9, and again, those data points within the white box is incorrect, and we'll have the corrected ones

to you soon.

CHAIRMAN FESMIRE: Beginning to look familiar, huh?

THE WITNESS: Right, those numbers start looking the same, don't they?

Q. (By Mr. Kellahin) Apart from the error in the number in the blocks, does the underlying contouring and value actually use the correct value for the display?

A. Yes, it is.

Q. What's your conclusion about this map?

A. Well, once again I see clearly east-west orientation of this sandbody. I see it present through Section 15, trending to the west, going up -- I believe it trends across into Section 17, so on and so forth. I see a little bit of it is present, obviously, in the KF 4 State 1, it's not present in the wells immediately south of it. I believe it's -- while I lack well control for about a mile across there, I think that's the same sand unit I'm seeing off here to the west.

So once again, this is confirming the geological picture I have, the depositional pattern of sands that are coming off of the Central Basin Platform, feeding into the Delaware Basin from an east-to-west -- general east-west direction.

And once again, when you look at the orientation

of the 320-acre unit being a laydown 320 in the most southerly one-third of Section 4, that's the appropriate unit for this sand map.

Q. Let's go to your next display, Mr. Godsey. Your Exhibit Number 10 is what, sir?

A. Exhibit Number 10 is what I'll call a regional gross Morrow isopach for this area.

Q. Now distinguish that from what we saw earlier, which is identified as Exhibit Number 4.

A. Exhibit Number 4 was an isopach of the net clean sand of the middle Morrow. This is actually an isopach of the -- it's actually of the upper and middle Morrow units, the entire interval from top to bottom, not picking any clean sand, just the gross interval of that middle and upper Morrow section.

Q. Why would you want to have a map like this?

A. Well again, we need to put things into a regional context whenever we're evaluating an area. This covers over 700 square miles. You can see the absence to the east of the Morrow sediments, because the Central Basin Platform is over there. You can see that the sediment is thickening as we move west into the thicker parts, deeper parts of the Delaware Basin. This allows me to identify in the gross sense, where does the Morrow exist and where does it not?

You can see that the zero line that you can see

running through the map area is not a straight line. It is convoluted, running around through there, and that --

Q. You're looking at the far right side?

A. I'm looking at the far right, the dark black zero line over there. And you can see, then, that I have some thicks and thins running in here, indicating I probably have some sedimentation coming off of the Central Basin Platform, feeding into the Delaware Basin.

Also, as you can see, the map, if I extended it far enough to the northwest or west, I'll continue to have Morrowan sediments. As I feed up to the northwest I would have continuous Morrow sediments moving up the northwest shelf towards the Pedernales a hundred miles away.

Q. What does the color code tell you?

A. Well, the color code is really just filling in. The thinner areas are in red. As I move to the cooler colors, i.e., from red to green to blue, then I'm getting thicker and thicker sediment.

So this helps see the outline of this portion of the Delaware Basin. It shows where the Central Basin Platform exists to the east and gives me a sense of the general idea of where the Morrow sediments exist. And this agrees very well with what we see in the literature.

Q. Exhibit Number 11, Mr. Godsey?

A. Back to the cross-section. All right, Exhibit

GEO 11, which I think shows up just fine on the slide, Tom, if you want to --

Q. Let's --

A. -- show that...

To help illustrate what we're seeing in the previous slide of the gross Morrow, as well as what we're seeing in the net middle Morrow sand isopaching, this is a structural cross-section on the east end -- It actually goes off of the mapped area, moving up towards the Central Basin Platform. So the first well on the east is a point of control about five miles to the east.

You can see structurally it has moved way up. This dark brown interval in the upper portion of that log, that's the Woodford. This is the Devonian, and all the lower Paleozoics below that, that would come in way below this stuff in the next well to the west of that, well 7 on the cross-section.

So we've had -- There's over 3800 feet of relief in this area in a five-mile distance, so there's a whole lot of relief moving up towards the Central Basin Platform.

Now the middle Morrow section would be the lowermost of this yellow colored-in, yellow filled-in area, in all the logs. So you can see as I start from well 1 on the west end, I'm nice and thick in the Morrow, I'm continuously in Morrow sediments, moving updip,

continuously having Morrow sedimentation until well number 7, which is my last point of control. I know I'm coming screaming updip --

Q. What is that well number 7?

A. Well number 7 is the WEL Com State Number 1. It's in Section 10, in Unit K. The index map that you have there has indicated the line of cross-section running from west to east in here.

So the whole point of this is to illustrate for you the significance of the Central Basin Platform, how close we are to that, literally within walking distance of it, and you can see that the -- most of the Mississippian sediments are gone. You have a thin Mississippian section left. All of the Morrow and Atoka section is gone. You may have a little bit of a Strawn section in that well in the far east, but all these others are gone, mostly due to nondeposition, but below the Morrow it's due to erosion.

Q. What does the proximity to the Central Basin Platform have on your opinions with regards to the orientation of the sand deposition?

A. Well, again, as I stated earlier, in the broad sense of the Delaware Basin in general for the entire Basin, the Pedernales Uplift, which is about 100 miles to the northwest, that was the predominant sediment source for the entire Basin.

However, when you're in proximity to structures like this, say the Central Basin Platform, that is a local sediment source also. This was essentially a chain of islands, a platform chain of islands, that existed during the entire Pennsylvanian time.

So, you know, there would be periods of low sea-level stand and higher sea-level stand moving back and forth, but basically we're sitting there within walking distance of what has been described by some workers as the Pennsylvanian mountain chain. So locally that had to be a significant sediment source for this area.

Q. Within this area, what's the depositional environment? Are we dealing with a beach front, or is this a drift-channel system? What's going on here?

A. Well, in the Morrow it's really all of the above. The Morrow is a whole series -- and I'm talking primarily about the lower and middle Morrow, it's a clastic -- predominantly a clastic wedge of sediment that was deposited by fluvial, which is river systems, fluvial-deltaic, so the river system feeding down into deltas, into the shoreline, which will be the shore-face-type sediments, and then the mixing of shoreline continental-type deposits with marine deposits.

So that we really have the entire thing. We have -- you can have some strand-plain-type, beach-type

deposits, you can have shore-face deposits, but you have -- particularly in the portions where you're closer to your source, you have a lot of fluvial systems feeding in through here that then, as I'll explain later, can get worked back and forth by the sea level moving up and down.

Q. Have you attempted to do a literature search, the topics involved in this hearing?

A. Yes, I have.

Q. As a result of that hearing, do you have some authoritative papers to cite, to support your position and interpretation?

A. Yes, I do.

Q. Let's turn to that.

A. So we're now on Exhibit GEO 12.

Q. Identify this for us.

A. This is a -- Well, all right, this is from a paper called Paleogeography of the Pennsylvanian time showing approximate location of the land masses and submerged areas at time of deposition of the Morrow. This is out of a paper by Hill and others called the Geology of the Delaware Basin, Guadalupe, Apache, blah, blah, blah... It's a Permian Basin Section, Society of Economic Paleontologists and Mineralogists publication.

The entire reason for showing this is to show you the outline of the Delaware Basin and what the literary

sources say are sediment sources for the Delaware Basin and specifically for the KF area. So you can see outlined in here the Delaware Basin, labeled in there. We have the Pedernales Uplift far to the northwest. And red -- the red dot here is the KF 4 State area.

So yes, we have sediments feeding in from the Pedernales Uplift across a low relief, you know, coastal plain. Local to the KF area, the Central Basin Platform had begun to emerge and was exposed at the time of deposition and is a local sediment source. And that's what these little arrows you see on here is the indication by the author.

You'll also see, as I mentioned earlier, on the -- in the southern part of the Delaware Basin, on the west side, you see the Diablo Platform as a sediment source at the time of deposition. And then in the very southern part of the Delaware Basin you see the Marathon Uplift down here, which is a sediment source also.

Now, while the Pedernales was a predominant one across the entire northwestern shelf of the Delaware Basin and feeding into the Basin, the Diablo Platform, the Marathon Belt and the Central Basin Platform were local sediment sources feeding into the Basin at the same time.

CHAIRMAN FESMIRE: Can I ask a quick question? Is it just a function of scale? Why is that -- the area

that we're looking at, the KF well location up on the Platform?

THE WITNESS: It's a function of scale. I mean, gee, we're showing probably a third of Texas and the biggest part of southeast New Mexico, and if I made it much smaller I was afraid we wouldn't be able to see the dot.

CHAIRMAN FESMIRE: Okay, but it is supposed to be --

THE WITNESS: Well, we're actually -- we're right on the very -- we're on the flanks of the Central Basin Platform.

CHAIRMAN FESMIRE: But your argument is, it's down -- it's in the Basin?

THE WITNESS: It is in the Basin, it's not up on the Platform, that's correct.

Q. (By Mr. Kellahin) Let's go to your next literature source, Mr. Godsey.

A. GEO 13, the source of this is a book by McGooky from 2004. It's titled *Geologic Wonders of West Texas*. It's a very good little treatise on the geology of the Permian Basin specifically, as well as a large part of west Texas. But it's really showing just another example of the same thing.

Again, we see the Delaware Basin in here, and what he's showing is in this darker area, what would be

pink on your colored exhibit that you have in your hands, this is exposed area. And then in these darker little channels with the arrows on them, that's where, diagrammatically, sediments are being shed into the Delaware Basin.

And again, you can see the KF 4 State Number 1. I've indicated with an arrow approximately where it lies, which is right up here on the flanks of this, just into the Basin. And we have sediment source, according to this author and many others, coming off of the Central Basin Platform into the Delaware Basin, and that's what deposited the sand in the KF area.

Q. Your next source of literature, Mr. Godsey?

A. Excuse me?

Q. Your next exhibit?

A. Ah, Exhibit 14, this is from Hill and others, again on the geology of the Delaware Basin. This is an east-to-west diagrammatic cross-section that more or less shows the evolution of -- going from the Toboso Basin in the earlier Precambrian -- lower Paleozoic times, into the formation of the Delaware Basin and the sediment wedge that was deposited as the Morrow and Pennsylvanian-type sediment.

So starting at the top here, say at time A, if you will, in the Ordovician, before the -- before we had

the Delaware Basin and the Central Basin Platform and the Midland Basin and all that, we had just one very large basin called the Toboso [*sic*] Basin, and that was in the lower Paleozoic time, so we had the earlier sediments deposited in just a very large basin.

By the time we get into the late Mississippian, the Central Basin Platform has started to be pushed up. It's no longer in the middle of the Basin, it's being pushed up. And that Central Basin Platform is what has divided the Toboso Basin basically into the Delaware Basin on the west and the Midland Basin on the east, and gives us the current configuration, paleogeographic configuration, of the entire Permian Basin now.

So what we're seeing here at time C, which would be the third diagram in -- third from the top, third from the bottom, it's the middle one in here -- where the KF State would fall is indicated in the red line, and you see highlighted in yellow there this wedge of Morrowan rocks that this author said existed. You can see, again, it's right on the flanks of the Central Basin Platform that had already started emerging towards the end of the Mississippian time and was exposed as a land mass and shedding sediment into the Basin.

Another example out of the literature is Exhibit GEO 15. This is a paper by Darrell James from Midland in

1984 on the Pennsylvanian reservoirs. Specifically -- He was talking about a specific field in the Basin, but he talked generally about the regional aspects of deposition for the Morrow in this area. So here is his map showing depositionally what was happening at the time of deposition of the Morrow.

He sees the Central Basin Platform to the east. You can see the red dot that approximately identifies where the KF area is. He calls these the ancient Pennsylvanian mountains, which you see across there, and you see these open arrows are his sediment direction arrows for sediment feeding off of the Central Basin Platform and towards the deeper part of the Delaware Basin.

And you also see up to the northwest this very large area of the -- up towards what we would call the northwest shelf, the Pedernales Uplift would be up here more towards the -- in the middle part of -- middle of New Mexico, central New Mexico, and we have a lot of sediment being shed off of the Pedernales to the northwest, feeding to the southeast across this low-relief coastal plain and into the Delaware Basin.

So once again, Mr. James is saying that locally the Central Basin Platform is clearly a source of sediments for the Morrow.

Q. Again, what does that tell you as part of the

orientation of the --

A. That would tell me that I should have an east-west-type trend of the sands in the area, rather than a north-south-type trend.

Now GEO 16 is from a more recent and more detailed study. This is an industry study that was done by Integrated Reservoir Solutions and Core Labs. It was supported by numerous companies within the industry. They did a -- just a regional Morrow study for southeast New Mexico.

Now the purpose of this map is to show you in a very broad sense the paleogeography of the entire southwestern part of the United States during early Pennsylvanian time. The KF State will be down here in the very southeast part of the map, indicated in red. The brownish or earth-tone-type colors would be land masses.

You can see the Central Basin Platform immediately to the east of the KF State dot. You can see the Pedernales highlands indicated up here in central New Mexico, far to the northwest of the KF area. You can see the northern part of the Delaware Basin sitting like this in here on the map in the southern part of New Mexico, southeast New Mexico.

So once again, this industry study, recent one done to study specifically the Morrow of southeast New

Mexico, is once again putting the Central Basin Platform emergent as a sediment source for the Morrow, locally.

Now GEO 17 is out of that same industry study, Morrow study done, and this is kind of an example-type map. This is their paleogeography of the Delaware Basin during a middle middle Morrow lowstand. That means in the middle Morrow -- in the middle part of the middle Morrow, this is at one time during that time -- this is more or less how things would look.

Again, the KF is identified in red, and you can see they're showing these channel systems feeding in an overall east-to-west-type direction and feeding into the Delaware Basin, and you can see coming from the northwest, across the northwest shelf, sediments shed from the Pedernales into the Delaware also.

So you know, once again, they're putting this in the frame of plastic deposition shed in an overall east-to-west direction from the Central Basin Platform into the Delaware Basin, across the KF area.

Q. If you'll take us back to Exhibit 4, then, let's conclude.

A. So now if we take that and tie the regional aspects of what we see in the literature, that gross Morrow isopach that I showed, and tie this into what I'm doing here, you'll find that my mapping here in GEO 4, which is

the net middle Morrow sand isopach, agrees very well with what the literature says and what the regional picture is for the area.

Now -- So to understand the deposition of the Morrow in this area you've got to remember, the Morrow is the earliest Pennsylvanian sediments deposited in the Basin. They're a sequence of fluvial, fluvial-deltaic, shoreline, transitional marine sands and shales and siltstones, with some limestones coming in in the upper part of the Morrow.

The Basin formation began, that formed the Delaware Basin, in late Mississippian time, continuing through the Pennsylvanian time. So the Central Basin Platform was coming up, it was exposed, and it was a local sediment source for the area. That's what the literature says, and that's what my work agrees with, and that's why you see the strong east-west trending of sands in this KF area. They're shed from the Central Basin Platform to the west, and they're feeding out here and coalescing in the deeper part of the Basin with sands that have been coming from the Pedernales uplift.

Now -- So it's clear in the literature that the predominant source of sediment for the entire Basin was the Pedernales, but we have local influence from structures in that area, and they will have an influence on

sedimentation. Now the KF lies immediately adjacent to the CBP, the Central Basin Platform, so therefore that's what's influencing a large part of the deposition in this area.

The other things that are influencing deposition in this area, or entire Basin, was the configuration of the land masses at the time of the Morrow and, in fact, the entire Pennsylvanian. The continents were shoved together, more or less, into one large land mass, and things were kind of rotated around.

You know, in slide 16 the -- I didn't make a point of it, but the paleo-equator line -- if I back up to that very quickly -- Slide 16, you'll notice an equator line, paleo-equator, running from northeast to southwest. Goes almost right through the Four Corners area. So at that time, that's where the continents were shoved together, and that's where the equator was sitting. So actually, this part of New Mexico was sitting south of the equator at the time.

We had these very large land masses -- if I go back to GEO 4 -- we had these very large land masses there that stretched almost from pole to pole, that had the effect of restricting ocean current flow, so you had a cooler climate at that time. Because the land masses were so large, you could have accumulations of very thick glacial ice sheets. Some workers have documented their

estimation of as much as 8000 feet of ice thickness at the south pole, which wasn't -- which would be to the southeast of this area at that time. Okay?

Now the effect of that is to keep sea level relatively very low. So climatically during the deposition of the Morrow and most of the Pennsylvanian time, we're in ice-house conditions. What that means is, you have a relatively cooler global temperature, your global sea level is a little lower, because a lot of that seawater is in ice on the glaciers up on the land masses. All right?

Typically what always happens in ice-house conditions is, it's a very unstable environment. Think of the ice sheets as storage of sea water. You have these thick ice sheets, you'll have -- with sea level very low, which is -- where in that previous slide they were talking about the lowstand in the middle middle Morrow time, well, sea level was very low, at a lowstand, because we had these large ice sheets.

Then you would have a little bit of a meltdown, meltoff of some of the ice, sea level would rise. It's been documented by most of the literature, they're talking about sea level rising the 150-to-200-feet range. Now that's vertical sea water depth.

When you look at that laterally, that can cover a very large area. To the northwest, up towards the

northwest shelf, it's a very gently sloping plain. So if you raise sea level, say, 150 feet, you may move your shore line close to 100 miles. Whereas here on the flanks of the Central Basin Platform it's a much steeper gradient, your sea level will rise as much but laterally your shoreline doesn't move as far.

It's kind of like --

Q. Let me ask you this. Is the beach area the area closer to the Central Basin Platform? That's the edge of your --

A. Well, the beach area is the area of the interface of sea level with the land mass. Okay? And that's moving back and forth through time, but --

Q. Going east and west?

A. Going east and west off of the Central Basin Platform towards the Basin in lowstands. In highstands it moves back up --

Q. Does that --

A. -- higher upflank.

Q. -- dynamic cause the sediments off the Central Basin Platform to be washed east and west?

A. Well, it will actually do both. What you have in the lowstand, you have river systems feeding off the Central Basin Platform into the Basin, because that's all exposed, very high. Sea level is down very low, and you

have river systems feeding off to that.

Then as you start to have a meltoff of the glacial ice, sea level starts rising, you start having transgression of the seas. That starts moving up the flanks of the Central Basin Platform up on the sides, towards the KF area. In the lowstand, the shoreline was probably basinward of the KF area. All right.

So as that sea level transgresses, as it moves up, then you're -- you have some reworking of these river-system sands that have been deposited. Some of them will be preserved, some of them will be re-worked, kind of in a north-south direction. But also, at the same time, your shoreline has moved maybe 100 miles to the northwest, up towards the northwest shelf, because of a very gentle slope.

How far the shoreline may or may not move is kind of like filling up the water in your bathtub. You know, if you think about it, as you're filling water in there the back of your tub where you lean back and it's a nice slope for you, as your water level goes up, that water line moves laterally up the back of that slope, whereas on the sides of your tub, because it's so steep, it's vertical, it doesn't move laterally, you just get deeper. Okay?

Well now, this is kind of like that, but up towards the northwest shelf it was much more gentle,

whereas at the KF it's not truly vertical, but it's very steep. Okay? So --

Q. Well, at the KF site, then, the specifics of that site are locally affected by local events, being the Central Basin Platform?

A. Yes, that's right. So --

Q. Let me -- Let me ask you this.

A. Okay.

Q. In summary, then, what is y our conclusion about the appropriate orientation of the spacing unit?

A. Well in summary, the appropriate orientation of all this is east-west, a laydown 320 is appropriate for the depositional pattern of sands in this area and for the sands that we have found in these specific wellbores. That fits what's going on regionally, it fits what's going on on a semi-regional scale, and very locally to the KF area.

MR. KELLAHIN: Mr. Chairman, that concludes my examination of Mr. Godsey.

We move the introduction of his Exhibits 1 through 19, plus Exhibit 27.

CHAIRMAN FESMIRE: Okay, did we go into Exhibit 5? I didn't get it on my notes.

THE WITNESS: Exhibit 5.

MR. KELLAHIN: I checked it off, but I'm not sure which one it is. It's the dip/strike map of the KF State.

THE WITNESS: You want to go to that -- or, you just need the map, or did you want to go there?

MR. KELLAHIN: He just wants to make sure you talked about this exhibit --

CHAIRMAN FESMIRE: Make sure we introduced it.

THE WITNESS: Right.

CHAIRMAN FESMIRE: But the record will show that it's -- Okay. And so that's 1 through --

MR. KELLAHIN: -- 19, plus Exhibit 27.

CHAIRMAN FESMIRE: 1 through 19, Exhibit 27. And you're going to substitute Exhibits 7 and 9 with the correct numbers; is that correct?

MR. DEBRINE: Yes, Mr. Chairman.

CHAIRMAN FESMIRE: Mr. Gallegos, would you have any objection to that?

MR. GALLEGOS: No objection to substitution. I'm trying to check whether all -- 1 through 19 were actually presented. Let's see, 1 through 10, 13, 15 -- Let me see, let me go back to my notes. We went from -- we went from 3 --

CHAIRMAN FESMIRE: I've got 1, 2, 3, 18, 19 --

MR. GALLEGOS: I don't have -- Were 4 and 5? I don't have a note that 4 and 5 were actually presented. No, 4 was, 4 was. 5 was not.

MR. DEBRINE: It went 3, 18, 19, 27, 4, 5, 6...

CHAIRMAN FESMIRE: I didn't catch 5.

MR. GALLEGOS: I didn't -- I didn't have a note that 5 was discussed either, but we don't have any objection to 1 through 4 and 6 through -- 6 through 17.

MR. DEBRINE: It's the big one on the board.

MR. KELLAHIN: It's the big one on the board.

THE WITNESS: Yes, Exhibit 5 is the --

MR. GALLEGOS: Oh, it's the board?

THE WITNESS: -- is the -- was on the board. That's the one that was on the board going from west to east, staying in the sand, turning north, going in and out of sand, and then turning back to the west again, staying in the sands all the --

CHAIRMAN FESMIRE: Okay, I think the record will reflect that 5 presented, so we will go ahead, and if there is no objection, Mr. Gallegos, we'll --

MR. GALLEGOS: No --

CHAIRMAN FESMIRE: -- allow the introduction of GEO 1 through 19 and 27; is that correct?

MR. KELLAHIN: Yes, sir.

MR. GALLEGOS: Yeah, that's all right, no objection.

CHAIRMAN FESMIRE: Mr. Gallegos, why don't we question this witness for about -- a little over a half an hour and break for lunch?

MR. GALLEGOS: Okay, and Mr. Olmstead is going to conduct the cross-examination.

MR. OLMSTEAD: Thank you, Mr. Chairman, Commissioners. Good afternoon, Mr. Godsey. Mickey Olmstead on behalf of Samson.

CROSS-EXAMINATION

BY MR. OLMSTEAD:

Q. Mr. Godsey, looking at your exhibit -- I'm going to -- if it's all right with you, I'm going to take these in numerical order, if you've got yours roughly in that order --

A. Okay.

Q. -- we'll proceed. Looking at your Exhibit Number 2, is that -- these net sand figures, are they true vertical depths or measured depth?

A. Let me find Exhibit 2, I've got a mess here. Exhibit GEO 2?

Q. Yes, sir, GEO 2.

A. Let me remember on this one. It's actually picked on the computer by measured depth, but we have the directional survey loaded in, and then it gives a true vertical depth conversion to everything I pick.

Q. All right, so that the -- as it's represented here on Exhibits GEO 2 and 3, these are true vertical depths, they've been corrected?

A. GEO 3. There's no correction to make to GEO 3 for vertical depth. That was drilled as a vertical hole, and I don't recall any directional survey that was run on that.

Q. Okay.

A. That's the Osudo 9 State Number 1.

Q. All right, so back to Exhibit Number 2, that's true vertical depth measurement?

A. Oh, the log itself?

Q. Yes.

A. I'm sorry, I thought you were talking about my sand thickness picks.

Q. No, sir, your log.

A. Okay, this log is a measured depth presentation on this. Sorry, I misunderstood you.

Q. Yes, sir, my mistake. All right, look at your Exhibit Number 4, please, your structure isopach, if you would. Has this exhibit changed since the original hearing?

A. Yes, slightly.

Q. Okay, and what changes?

A. Well, let's see, in a few places here -- Ah, Section -- in Section 7, unit K, there's a well there that you see with 24 feet of sand --

Q. Uh-huh.

A. -- designated on that.

MR. OLMSTEAD: May I approach the witness, Mr. Chairman?

CHAIRMAN FESMIRE: You may.

Q. (By Mr. Olmstead) And can you show the Commissioners on this exhibit, your Exhibit Number 4, where the change is?

A. On that?

Q. Yes, sir.

A. Well, this is a new -- for me, it was a new point of well control. That well in Section 7, right here with 24 feet, that's in Unit K. That was the well that I'm going to say you all collectively, the three companies, had drilled and already completed and was producing gas at the time of the original hearing. The log had not been released as of that time. So since that original hearing I now have that log, it is released.

I guess, though, actually my contours didn't really change there very much. I think I predicted between 20 and 25 feet of sand, and I guess that contour really didn't change much, because it really had 24 feet. You all had it mapped as zero, but it was a producing of you all's.

And then -- Let's see, in Section 18, in Unit C, there's a well there with -- shows it's 55 feet. That's another well that was drilled, the log was not released.

It was drilled by -- again, by Mewbourne. It was drilled and completed and flowing gas the day of the original hearing.

Q. Okay.

A. You all's map showed it zero. I had it mapped as about, I want to say -- I was a little bit off on that one, I had it mapped as somewhere around 40-some-odd feet. It came in as 55. Now there are several others. Did you want me to go through them?

Q. No, let me just point you specifically to the WEL Com Number 2 here that's showing zero feet on this map. Did that -- Did you have to change your map in respect to that recent well?

A. Oh, through time as virtually every well was drilled, my map changed some, slightly, yes, and I did change that. I had anticipated that to have some sand in there.

Q. Okay, and which sand did you think that would have in it?

A. I don't remember exactly what I had mapped there, I -- some commercial quantity of sand --

Q. What about --

A. -- not extremely thick, but some commercial quantity of sand.

Q. What about the CC 3 State Number 1, represented

here on your Exhibit GEO 4 as six feet of sand now? Did you have to change your map after that well was drilled?

A. Yes.

Q. Mr. Godsey, looking at your GEO Exhibit Number 4, I see a north-south trend of dark splotches. Would you agree with that?

A. Okay, yes.

Q. Okay. And so --

A. Well, I guess for the record --

CHAIRMAN FESMIRE: Mr. Godsey --

THE WITNESS: -- Where?

CHAIRMAN FESMIRE: -- your attorney will get a chance to bring --

THE WITNESS: Okay, because --

CHAIRMAN FESMIRE: -- answer the question.

THE WITNESS: Okay.

Q. (By Mr. Olmstead) All right. And is it true that immediately following the completion of the Osudo 9 well, represented here with 54 feet, that Samson immediately -- excuse me, Chesapeake immediately staked and permitted two wells to the north? Is that right, the KFOC -- KF 4 Number 4 well, and then the Cattleman 4 well?

A. That's correct.

Q. Okay. And now Chesapeake owns this acreage due west of the KF 4 well and due west of the Osudo well,

correct?

A. That's correct.

Q. Has Chesapeake permitted or staked any well locations there?

A. No.

Q. Okay, now what is the EUR, estimated EUR, of the Osudo 9 well?

A. I do not know, I've not done that work. That doesn't fall under my -- you know, what I do.

Q. Okay, so -- but it's -- do you know how much it's making per day?

A. Which well?

Q. The Osudo 9?

A. No, I have not looked at it --

Q. But it's a --

A. -- the production plot on it.

Q. -- it's a strong well --

A. -- in a while.

Q. -- it's making several million a day, correct?

A. It is a good well, yes.

Q. And you've given it 54 feet.

Up here in Section 29 you've given a well 56 feet. Do you happen to know what that well makes?

A. I don't think that well is active.

Q. Okay, but yet it has the same net pay that you

gave the Osudo 9, correct?

A. If you want to say the same net thickness --

Q. Net sand?

A. Okay, the same amount of net thickness --

Q. Okay.

A. -- of sand, okay.

Q. All right. Now I notice you have strung this 50-foot contour northwest of the Osudo 9. Where's your control point for any of that out there?

A. Off to the west I lack well control for about a mile.

Q. Okay. And in fact, tell me this: How does the sediment come flowing off the Central Basin Platform to the west, stop here, create this pod, and then pick up and continue flowing to the west? How does that work in nature?

A. Well, what's happening depositionally, as you have these fluvial systems coming down through here, these river-type systems, and they're depositing sands all along them. Then as you have this change of sea level, changing from lowstand, transitional, up to a highstand and back, you have some re-working and some actual erosion of the sands that have been deposited.

So what you can have there, specifically in the CC 3 State Number 1, which I believe is where you were

pointing at, at the time --

Q. That's correct.

A. -- what you have there is a very small sand that is deposited. There's actually two sands in that wellbore, each of them being three feet thick, that may have been a thicker sand at some time, and then part of it had been eroded away by a later fluvial system, or one or more of those could have been an overbank-type sand deposit that didn't have much lateral extend to begin with.

Q. Now, let me ask you again about the State WEL Com Number 2 here, it has zero feet. It's only 1320 feet due east of the Osudo 9; is that correct?

A. I'll take your measurement to be probably pretty close, so that's approximately right.

Q. All right, so you go from zero to 54 feet in 1300 feet due west, correct?

A. Correct.

Q. Okay. And the -- I think you testified earlier that the general dip of this area is to the south; is that correct?

A. I don't recall testifying to that.

Q. Is the general dip to the south?

A. Of exactly --

Q. Does your structure map indicate general dip to the south?

A. It depends on which part of the structure map you're pointing to. You've kind of waved your hand over all of it. If you look at the structural contours, you can see that the dip direction is changing through the map here.

Q. Well, right in here, in the area of question --

A. Okay.

Q. -- Osudo 9, I mean we're going from 7600 feet to 7700 feet to 7800 feet, so it's dipping to the south?

A. Present-day dip is doing that, yes.

Q. Okay. And yet, to make your east-west interpretation fit between the zero and the Osudo 9 Number well, you've actually had to bring this sandbody, if you will, up to the northwest, upstream, going against the dip; would that be accurate?

A. Not really. The -- No, that's not really very accurate.

Q. That's not going to the northwest?

A. Oh, I thought you said updip. That's the part I disagreed with. It's going to the west-northwest, that's correct.

Q. Okay. And here you're just mapping net sand, correct? You're not including any carbonates?

A. That's right, net clean sand is what I'm mapping.

Q. Okay, and what's the difference between a sand

and a carbonate?

A. Well, by convention we're calling sand to mean quartz sand. Technically, sand is really a textural term, it deals with a grain size. But by convention -- and I think Mr. Johnson will agree with me -- we generally say sand because we don't want to keep saying quartz sand. You can actually have sand composed of different rock types, but we generally in the industry are dealing with quartz sand as sands, so we're talking sands.

So I'm talking about quartz as one of the primary components of the sand, as opposed to a carbonate which, for instance, would be a limestone which is calcium carbonate, or a dolomite which is calcium magnesium carbonate.

Q. Are carbonates generally deposited in a marine environment, in water, underwater?

A. Yes.

Q. Okay. Mr. Godsey, do you know anybody else who maps the Morrow in an east-west trend?

A. Yes.

Q. Who?

A. Several people on the Chesapeake staff.

Q. Anybody other than the Chesapeake staff, that you know of?

A. Let's see. Well, I've not seen Mewbourne's maps.

I know that -- Darrell James has, we saw that in one of his exhibits. Let's see, when I was working for --

Q. That was a while back, wasn't it? That was a -- His exhibit was from 1984, his paper?

A. I believe that's right. Do you want me to continue with the people I know who have mapped this this way --

Q. No, that's okay.

A. Okay, all right.

Q. Let me ask you, back to Exhibit GEO Number 4, do you agree that there is a paleo-high right here in Section 32? Is that a structural high there?

A. You're going to have to clarify, because you used two different terms that are not the same.

Q. Well, let me go with structural.

A. Okay, do I agree that there's a structure -- a structural high?

Q. Yes.

A. Yes, I do.

Q. And it's closed in Section 32, northwest quarter of Section 32?

A. There's a slight closure there, yes.

Q. All right. So if the Morrow sediments were coming down from the Pedernal high, uplift up to the north, coming down here, they would probably flow between the two

highs here, correct? The structural high in 32 and the Central Basin Platform to the east?

A. Well, actually I have to disagree because the Pedernales high is not to the north of this.

Q. To the north northwest?

A. Let's say west northwest. You're saying it's coming from the north to the south, when the Pedernales is west northwest almost a hundred miles away. It's not north at all.

Q. But it could flow in this direction, correct? And it could flow between that structural high and the Central Basin Platform, correct?

A. Could sand flow in that area?

Q. Yes, sir.

A. Yes, sand could flow in that -- well --

Q. Okay.

A. -- water could flow in that area carrying sand, yes.

Q. All right, Mr. Godsey, let me ask you about your Exhibit GEO Number 5.

A. I wish I hadn't of jumbled this up so much.

Q. Have you got that handy?

A. I've got it here somewheres. Ah, GEO 5.

Q. Okay. Now you've got three gray markers that you've hung the cross-section on, correct? The upper

marker is labeled Morrow clastics, lower gray marker is labeled lower Morrow. What's that middle marker?

A. That's a shale in there that some workers were -- call the top of the Morrow clastics. I chose to call the Morrow clastics where I've got it marked on the cross-section.

Q. Okay. And so you're not -- are you including any carbonates in what you're defining as Morrow clastics between those two --

A. Do carbonates occur within the Morrow clastics interval? Is that your question?

Q. Yes, sir.

A. Yes, they do, throughout the Basin.

Q. Okay, so there are some carbonates included in your Exhibit Number 5?

A. Some carbonates exist within this section, yes.

Q. All right. I notice that if I fold your map like this, now, taking your first and last well on your cross-section, they correlate pretty well, don't they? Wouldn't you agree?

A. If I take -- fold this --

Q. -- to where the first and last wells, well number 1 and 14 on Exhibit Number GEO 5 match up.

A. And when you say correlate, you mean what I've correlated matches up?

Q. Well, certainly your markers match up, and even some of the yellow sands that you've correlated match up, correct?

A. Yes, the shales that I've picked, the Morrow clastics, the one in the middle and then down at the lower Morrow does, the middle Morrow section does. As far as saying that these individual sandbodies are one and the same, you can't make that statement.

Q. No, but these wells are what, two miles apart, roughly, in a north -- due north-south direction?

A. Looks about like that, yes.

Q. Now, I also noticed on Exhibit Number 5, when you picked your north-south wells -- and I think those were wells 6 through 10 -- you essentially cherry-picked the worst wells out in this area, didn't you? You picked the WEL Number 2 and the CC State Number 3?

A. Well, yes, you're limited to the well control you have. I also picked well number 8, which is the WEL Com State Number 1 in Section 10. I wouldn't call that one of the worst wells in the area.

Q. Well, but if you had picked some different wells to go north-south in, say the Hunger Buster and the Osudo 9, the KF 4, those wells would have showed much more of a north-south trend than the wells you picked, correct?

A. You can orient them a lot of different ways,

that's correct.

Q. Your Exhibit Number 6, please, Mr. Godsey, pull that out.

A. Six, what was 6?

Q. Six was your --

A. Here we go, I've got it.

Q. Now, I only ask you about this to ask you about the map legend in the upper right-hand corner. I notice that you didn't show the CC State 3 as a separate pod, so to speak, in this map. So I guess at one time you did show the CC State 3 connected to the KF 4; is that --

A. Yes, as I testified earlier, the map has changed some through time. It was just an index map, I didn't bother to change it.

Q. Okay. Looking at your Exhibits 7, 8 and 9, where you --

A. Let me fold a couple things up here, I'm going to get covered up.

Q. Yes, sir, no hurry.

A. Okay.

Q. Can you isopach these maps in a north-south direction and still honor all of your control points?

A. Yes.

Q. You think you can?

A. It would be more difficult to draw that way, but

yes, they could be drawn that way. You could take virtually any data set and give it to the geologist and ask him, Can you draw it any other way? And almost every time, that would be the case.

Q. Okay. If you would look at Exhibit Number 10, GEO 10 --

A. Okay, are we through with 8 and 9 also?

Q. Yes.

A. Okay, all right. Exhibit 10, okay.

Q. All right now, Exhibit Number 10 just shows the eastern half of the Delaware Basin; is that correct?

A. Actually in probably less than half, but yes, it's the eastern part of the -- middle part of the Delaware Basin, if you will.

Q. Okay.

A. It's a pretty large basin, it extends more to the north, northwest, and a lot further to the south. But yes, that's right, it's just a portion of the Basin, it's on the east side.

Q. Okay. And basins typically thicken in the center of the basin; is that correct?

A. Basins do, in the center of the basin --

Q. Well --

A. -- yes, that's exactly correct.

Q. Sediments flows typically thicken in the middle

of basins. And I guess what I'm getting at -- correct me if I'm wrong -- sure, it's thickening to the west on your Exhibit Number 10, going toward the center of the Basin, but it's also thickening to the south?

A. That's correct.

Q. And if you stepped out far enough to the west, it would be thickening to the east, and even thickening to the north --

A. That's correct.

Q. -- at some point?

A. Now, the -- when you said thickening -- did you say to the west, or from the west? I'm sorry, could you say it again? I might have misunderstood you.

Q. Going back to your Exhibit Number 10, if you stepped out to the west far enough, the sands would be thickening to the east, correct? If you --

A. Right, if I went about --

Q. -- to the Basin?

A. -- probably 40, 50 miles west of the KF area, that would be correct. From that point sediments would thicken to the east, yes, that's correct.

Q. Okay. Let's look at your Exhibit Number 12, and that is one of your 8-by-11 --

A. Ah, okay.

Q. -- published authorities. Now I notice both in

the caption that you've added in the right-hand corner, and also I guess what's under the label "Figure 13", what was part of the original exhibit, it's talking about supplying sediment to the Delaware Basin. Now sediment and sand are not one and the same, are they?

A. Sand is a sediment.

Q. But sediment is not necessarily a sand?

A. All sed- --

Q. Sediment can be a carbonate?

A. Carbonates are not typically transported, carbonates grow in place by accumulation from the extrusion of organisms and their actual shells themselves, so typically carbonates are not transported except in the case where they've already been deposited. They tend to grow in place. If later they are exposed and eroded, then you can have carbonate sediments that -- carbonates that become sediments that are transported.

Q. Okay, so in Exhibit 12 when they're talking about sediments being transported, they don't necessarily mean necessarily sand, because there are other sediments other than sand, correct?

A. Okay, you actually asked two questions. The first part of -- do they mean sand in sediments? They mean the entire sediment package for the Morrow, which is predominantly clastic, which means it's predominantly sand,

silts and shales. Yes, there can be some limestones in it.

Now the second part of your question -- I'm sorry, I forgot it now.

Q. There are other sediments, other than sand?

A. Yes.

Q. So they could be talking about those other sediments --

A. Hypothetically, yes.

Q. -- other than sand?

If you'd look at Exhibit Number 13 for me, please, sir.

A. Okay.

Q. Down at the bottom of the exhibit, "PB Figure 3" says Morrow sediments fed from the north, correct?

A. I'm sorry, where on this are you saying that?

MR. OLMSTEAD: May I approach the witness, Mr. Chairman?

CHAIRMAN FESMIRE: You may.

Q. (By Mr. Olmstead) Again, we're referring to Exhibit Number 13. If you'll read the caption under --

A. It says, "Morrowan paleogeologic map showing early downwarp of the Delaware Basin and Morrow sediments fed from the north." That's correct.

Q. All right, looking at your Exhibit Number 14 --

A. Okay.

MR. OLMSTEAD: Again, if I may approach the witness.

CHAIRMAN FESMIRE: You may.

THE WITNESS: I've got it here.

Q. (By Mr. Olmstead) Okay. We're primarily concerned with label number C, aren't we, or figure number C, Pennsylvanian? Isn't that the time when the Morrow was laid down, in early Pennsylvanian?

A. Earliest Pennsylvanian, that's correct.

Q. Okay. And we see the Central Basin Platform on this Figure C?

A. Yes, we do.

Q. Well, you have to look at the figure. You'll see that in the diagram the yellow wedge, the Morrowan sediments, that's the earliest Pennsylvanian, it's already been deposited. And then you see the Atokan sediments on top of that. That's already been deposited, that's a little bit younger than Pennsylvanian time. And then you see even Strawn reefs indicated, and that's getting up towards the later part of the Pennsylvanian time.

So in actuality, what this time line is showing is a sea level -- really, this is as of late Pennsylvanian time, not early Pennsylvanian time at all.

Q. Where does it say that?

A. Well, if you look here on the yellow wedge,

you'll see it says Morrowan rocks.

Q. Uh-huh.

A. That means they've already been deposited. And then younger than that are Atoka. And the Atoka rocks had already been deposited, so we know we're younger than that in the Pennsylvanian sequence. And then it's even showing Strawn reefs above that, so those have already been deposited.

So this snapshot of time, by definition of what he's showing in the diagram, is Pennsylvanian, but it's actually late Pennsylvanian time.

Q. Okay, so in late Pennsylvanian time the Central Basin Platform was underwater --

A. Some --

Q. -- would you agree?

A. Part of the time, yes.

Q. Okay. And I apologize, I did skip an exhibit. Exhibit Number 11, this is your cross-section. And again, if I may approach the witness, Mr. Chairman --

CHAIRMAN FESMIRE: You may.

THE WITNESS: Which cross-section? Ah, okay.

Q. (By Mr. Olmstead) Now the well farthest to your right, farthest east, the Conoco Meyer B-4 19, is up on the Central Basin Platform, right?

A. Not on the top of it, but it's further up than

the KF is.

Q. Okay. And what is the source of the Morrow? Is it quartz sand?

A. The Morrow sands --

Q. Yes.

A. -- are predominantly quartz sands, that's correct.

Q. All right. So as far as coming off of the Central Basin Platform, that -- the quartz sand would have to come from your Precambrian granite, correct?

A. Not necessarily.

Q. Where else could it come from?

A. It could come from anything that -- any of the -- section that has cherts in it.

Q. And which of those sections?

A. It also could come from -- Which of those sections? The Mississippian had a lot of cherts in it at the time. Also, the Mississippian shales had a lot of clastics in it also, along with the shale it had some sand in it as well.

Q. So you're talking about interspersed sand within these Mississippian lime and these other --

A. No, I'm sorry, I didn't explain that very well. Within the Mississippian you have a lot of carbonates, limestone, but you also have a lot of cherty limestone.

And you have some thicknesses -- good thicknesses of actual, just almost solid chert, with just minor amounts of limestone. Chert is quartz. That's -- that's exactly what it is. So that's -- can be a source.

Also in some of these shales in the Mississippian, they're known to be -- not have just clay minerals, but they also have quartz sands and silts interspersed through them as well.

Q. Well, where would your --

A. So -- Did that clarify?

Q. Yes, sir.

A. Okay.

Q. Where would your cherts and sands be located in this interval here that's shown on your Exhibit 11?

A. Where are they located?

Q. In which sections?

A. They're down here --

Q. No, no, I'm sorry --

A. -- they're down here in the Morrow, because they're already gone from this well.

Q. But they're gone -- they came from where?

A. They came from the Mississippian section. See, the Mississippian section you see in this well number 8, that's a very thin section because it's already been eroded.

Q. How much percentage of the Mississippian section would sand constitute?

A. Of the entire -- well, of sand --

Q. Yeah, the percentage --

A. -- or chert?

Q. Chert.

A. Okay. I've not made that calculation, and I'd say --

Q. You haven't --

A. -- I'd say in any given well -- gosh, I don't know. Depends on which part of the section of the Mississippian you're in. If you take the section -- the Mississippian for the entire thickness --

Q. It's a small percentage, isn't it?

A. It's probably less than 20 percent.

Q. Okay.

A. For the entire Mississippian section.

Q. All right, so 20 percent of this section here, at best, is enough sand to source all of this?

A. Let's back up to where you said this section here. You're pointing to what I've labeled as the Mississippian in well number 8, correct?

Q. Yes, sir.

A. Okay. It's not 20 percent of that section of the Mississippian --

Q. Okay.

A. -- because the bulk of the Mississippian has already been eroded. That chert existed in that part. Not 20 percent of what you see, because that's what's left here and hasn't been eroded by that well.

So there was a -- much more thickness originally of the Mississippian at that point, but because it had been uplifted there at the Central Basin Platform, it had been eroded down to that point.

Q. And the Mississippian was thick enough to source all of this sand, as shown on your Exhibit 104?

A. I never said that.

Q. Well, it must have been, right? Where else could this sand have come from? If it didn't come from the Mississippian up on top of the Central Basin Platform, where did it come from?

A. The sand in the Morrow is multi-sourced, as I said. We are getting sediment from the Pedernales off to the west-northwest. It's coming down and feeding into this area in this -- and you can see the coalescing of these sands in the western part of my map where that thick darker green color is. Some of that sediment has come from -- down in the western part of the map, has come from the Pedernales. We also are getting sediments by eroding the Central Basin Platform.

But then what happens, as you have a transgression, your sea level comes from a lowstand and rises up due to the melting of the glaciers, your sea level comes up. Now when you get that transgression, your shoreline is moving updip. So some of the sediments that came originally from the Pedernales were deposited down here in this lowstand, some of them are getting re-worked back up the flanks of the Central Basin Platform, along with the sediments from the Central Basin Platform.

Okay, then you have a highstand, it turns around and your sea level drops. So then what had been at shore line or below along the flanks of the Central Basin Platform, it's exposed. You have river systems that cut in across it, feeding out into the Basin.

So what are they doing? Those river systems, they're eroding stuff from the Central Basin Platform, but also they're cutting into some of these sediments that had been deposited by the highstand. Those sediments are sourced from the Pedernales and from the CBP. Some of them were deposited down here at lowstand, they got re-worked up on the flanks of the Central Basin Platform and then re-worked back down again as sea level dropped.

So --

Q. Most of your --

A. So when -- so when you talk about the source and

where they started from and where they ended up from, it's a complex picture. So if you've got, say, a sand grain that originally came down from the northwest shelf off the Pedernales --

Q. Let me cut you off --

A. -- and --

Q. -- Mr. Godsey, I think we've gone past my original question.

A. Okay.

Q. So it sounds to me like you're telling me most of the source of Morrow sandstone came from the north, from the Pedernal Uplift?

A. No, I didn't say that either, actually.

Q. Well, where does most of the source come from?

A. For which part? It depends on where you're talking about.

Q. Well, what's shown on your Exhibit GEO 4?

A. Well, if we can be more specific about which part of GEO 4 because, as I'm saying, we're coming into the Basin and we're getting sediments coming from more than one direction.

Now at any one given point along this map, you may have more from one source than another, and that -- I'm not trying to be difficult, I just don't want to give you an incorrect answer.

Q. All right. Well, let's specifically talk about -- well, let's talk about your thick part of the Morrow sand --

A. Okay.

Q. -- over on the western edge of GEO Exhibit -- Exhibit GEO 4. Where was that sand sourced?

A. That sand was multi-sourced from the Ped- --

MR. KELLAHIN: Mr. Chairman, may the record reflect what sections you're looking at there?

Q. (By Mr. Olmstead) Well, I'm going just from the top to the bottom of the left-hand side of Exhibit GEO 4. Where was that sourced?

A. I thought you were talking about -- you said just from the top to the bottom.

CHAIRMAN FESMIRE: I think he's talking about the top to the bottom of the left-hand side.

THE WITNESS: Okay, the left-hand side.

Q. (By Mr. Olmstead) Yes, sir --

A. Okay.

Q. -- where the thickest part of your sand is mapped.

A. And you're asking me specifically what, again? Make sure I understand.

Q. What is the source --

A. Source.

Q. -- of that sand? Is it from the north or from the east?

A. It's both. Actually, north, northwest, east, northeast. All those points are feeding down into here.

Q. Is one source more predominant than the other?

CHAIRMAN FESMIRE: Are you talking about the eastern side of the map?

Q. (By Mr. Olmstead) Yes, sir. Is the north source, the Pedernal Uplift, more predominant in this area of the map? Is that source more predominant than the Central Basin Platform?

A. I think they were about equal. When we're talking about the sediment that was deposited here on the west side of the map.

Q. And what is that opinion based on?

A. It's based on the geology I've done in this area, the geology I've done throughout southeast New Mexico, and some of the literature. My understanding of the regional depositional patterns.

Q. Okay, Mr. Godsey, if you would look at your Exhibit Number 15 --

A. Okay.

Q. -- taken from, I believe, Mr. James', Darrell James', article from 1984 --

A. Okay.

CHAIRMAN FESMIRE: Mr. Olmstead --

MR. OLMSTEAD: Yes, sir.

CHAIRMAN FESMIRE: -- are you going to be much longer? Probably?

MR. OLMSTEAD: Yes, sir.

CHAIRMAN FESMIRE: Okay, why don't we go ahead and -- Is this a good place to break for lunch --

MR. OLMSTEAD: Yes, sir.

CHAIRMAN FESMIRE: -- and come back?

MR. OLMSTEAD: That would be fine.

CHAIRMAN FESMIRE: Okay, why don't we go ahead and break for lunch and come back at about a quarter after one o'clock, and we'll continue from there?

(Thereupon, noon recess was taken at 11:50 a.m.)

(The following proceedings had at 1:15 p.m.)

CHAIRMAN FESMIRE: Okay, let's go back on the record. The record shall reflect that all three Commissioners are still present, we still have a quorum present, and we're reconvening at 1:15 in the afternoon.

I believe, Mr. Olmstead, you were in the middle of your cross-examination of Mr. Godsey.

MR. OLMSTEAD: Thank you, Mr. Chairman.

Q. (By Mr. Olmstead) Mr. Godsey, let's go back to your Exhibits GEO 2 and GEO 3, a couple 8-1/2-by-11 exhibits, log sections of the KF 4 Fed 1 and Osudo 9 State

1, and if I may approach the witness --

CHAIRMAN FESMIRE: You may, sir.

Q. (By Mr. Olmstead) -- and we had an earlier discussion about the source of the Morrow sandstone coming from the Central Basin Platform, and I think you told me that that was primarily chert; is that correct?

A. I'm sorry, I wasn't listening closely, I'm sorry. Say it again. I'm sorry.

Q. Chert was the primary source of Morrow sandstone coming off the Central Basin Platform; is that accurate?

A. That was one of them, yes.

Q. Okay. And if I show you -- if you'll look at Exhibit Number 2, and if I read this right, the mudlogger has distinguished between sandstone and chert, correct? Chert is identified in red?

A. Uh-huh.

Q. And sandstone is identified in yellow?

A. That would be correct.

Q. And in fact, chert does not appear anywhere in any of the pay sands, does it, on Exhibit Number 2?

A. Not necessarily true, because as samples come up the hole they don't come up all in one segment, but that --

Q. Well, I'm just --

A. -- may or may not --

Q. -- asking you --

A. -- that may be true.

Q. -- about this exhibit. Exhibit Number 2 indicates that chert is not straight across from your pay sands; is that correct?

A. That's correct.

Q. Now looking at Exhibit Number 3 --

A. Okay.

Q. -- can you tell me where it says chert anywhere on Exhibit Number 3?

A. No, I don't see any.

Q. So if it's quartz sandstone, then -- if it's chert, it came off the Central Basin Platform; if it's quartz, it came from the north, from the Pedernal Uplift. True?

A. Incorrect.

Q. Why?

A. Because -- Maybe I didn't make myself clear earlier. Chert beds that existed in the -- particularly in the Mississippian, were a source for the quartz grains that formed the sandbodies.

Q. So the quartz --

A. I'm not saying --

Q. -- came out of the chert, started with chert?

A. Chert is quartz, that's what it is.

Q. It's distinguished on the mud log, correct?

A. Sometimes you have rock fragments that look distinctly like chert, but chert also is quartz, and when you break that down enough by erosion and transport it what you see is quartz. Some people may say, oh, this is quartz, some people -- a quartz sand grain; some people may call another piece chert. It's really a judgment call. But what I'm saying is, the source of the quart sand grain, some of it was the cherts that existed in the Mississippian.

Q. Okay. And I think that you've earlier testified that the chert composed up to about 20 percent of the Mississippian? Wasn't that your estimate?

A. I grabbed a number because you wanted me to come up with some kind of number. I said -- I'm going to guess it's probably 20 percent, maybe. That's just a wild guess --

Q. All right.

A. -- because I've not done that work to ascertain the percentage of chert within the entire Mississippian section, okay?

Q. If the Core Lab study -- and you're familiar with, that, right? You referred --

A. Uh-huh.

Q. -- to it earlier, the 2004 Core Lab that Chesapeake --

A. Uh-huh.

Q. -- participated in?

A. Uh-huh.

Q. If the Core Lab study said that the maximum chert was 3.6 percent, would that surprise you?

A. Not necessarily, no.

Q. Well, it's a big difference from 20 percent, isn't it --

A. The 3.6 --

Q. -- in that Core Lab study?

A. Yes, it is.

MR. OLMSTEAD: Mr. Chairman, I'd like to introduce this as Cross-Examination Exhibit Number 1, if that's permissible.

CHAIRMAN FESMIRE: Any objection, Mr. Kellahin?

MR. KELLAHIN: No objection, Mr. Chairman.

THE WITNESS: Okay, so where does it say that?

Q. (By Mr. Olmstead) Chert, and of course that's -- 3.6 is the maximum. I think you were telling me --

A. Okay, could we go back and re-read what your statement was? Because I thought you said this study said there was 3.6-percent chert in the Mississippian. Is that -- because that's what I thought you were saying. I'm sorry, I may have misunderstood what you were saying.

Q. Well, I meant to say in the Morrow sandstone,

this is a study on the Morrow sandstone.

A. Okay, so the 3.6 and the 20 percent really doesn't have any connection or relevance --

Q. Well --

A. -- wasn't that -- because you were talking about in the Morrow. But you'd asked me how much of the Mississippian actually had chert, so I don't understand the connection 3.6 percent of chert, true chert, that you see identified in the Morrow sediments, versus what you were asking me about the Mississippian.

Q. Well, your testimony is that the Morrow sandstone is primarily composed of chert and chert-source quartz for the Central Basin Platform, wouldn't you think that a lot more chert would be showing up in the Morrow sandstone?

A. This Morrow study was for a huge area of southeast New Mexico. In fact, most of the data came from Eddy County. And there was actually very little control that they had over in this part of the Delaware Basin, Okay? So -- I don't see a conflict here, and I actually never said that chert comprised most of the sand in the Morrow.

What I said was, in this area due to its proximity to the Central Basin Platform, due to the erosion of the Mississippian, that the -- one of the sediment sources for quartz grains would be the breakdown and

erosion and transport of what had been chert grain, chert nodules, within the Mississippian. I think -- Does that clarify?

Q. Well, Mr. Godsey, here's a map of the wells that this Core Lab study came from. As you can see, there are several wells right there in Lea County, in our area, that contributed to that Core Lab, correct?

A. Is this from the study showing where --

Q. Yes, sir, that's --

A. -- the conventionally cored wells are? Yes, that's correct.

Q. That's from the same Core Lab study?

A. That looks like it.

MR. OLMSTEAD: I ask that this be marked as Cross-Examination Exhibit Number 2 and entered into the record.

CHAIRMAN FESMIRE: Any objection, Mr. Kellahin?

MR. KELLAHIN: No objection.

CHAIRMAN FESMIRE: Cross-Examination Exhibits Number 1 and 2 will be admitted to the record.

MR. OLMSTEAD: If I may approach the witness, Mr. Chairman?

CHAIRMAN FESMIRE: You may, sir.

Q. (By Mr. Olmstead) So let me -- just to back up, then, a little bit, looking at your Exhibit GEO Number 4,

looking at the two sections -- two quarter sections due west of the new -- the subject well, the KF 4, and the very prolific Osudo 9 State Number 1 well, Chesapeake has yet to stake or drill a well in those two quarter sections, correct?

A. That's correct.

Q. But that is the thickest part of your sand as you have it mapped, correct?

A. At that point, yes.

Q. Wouldn't a prudent operator have drilled a well in those sections by this time?

A. Well, with the hearing that's going on involving the KF 4 State Number 1, a prudent operator wouldn't drill right now in the southwest quarter of Section 4. And in the north half of Section 9 Mewbourne is the operator, Chesapeake isn't.

Q. But that's Chesapeake acreage, correct?

A. Yes.

Q. If you would, turn to your cross-plot, which is your GEO Exhibit Number 19, please, sir.

A. Okay.

Q. Now are these the only four wells that you cross-plotted in this method? In other words, did you do a cross-plot study similar to this on any other wells?

A. Actually, after you -- well, the short answer is

no. After you have worked with these logs as long as, say Ron and I have, by looking visually at the log, you know where they're going to plot. You do a few occasionally for confirmation if you're not real sure exactly, but you can tell approximately where they're going to plot just by the relative curve analogy of the density and the neutron.

Q. When you perform this cross-plot analysis, as evidenced on Exhibit GEO 19, did you do a foot-by-foot analysis, or did you take an average?

A. I just picked some points.

Q. Oh, you just picked random points from each well?

A. I just picked some points as examples of where they would fall.

Q. Now, to do this Halliburton cross-plot as indicated on GEO Exhibit 19, you have to have a neutron and density log and the cross-plot log, correct?

A. You have to have a neutron log and a density log.

Q. Okay. And a lot of the older well logs don't have -- a lot of the older wells don't have those logs?

A. That's correct.

Q. So what do you look at? What logs do you use to estimate porosity when you don't have the --

A. Well, as I stated in direct, I mean, you work with what you have. If -- It depends on what logs you do have. If you do not have the full log suite of the neutron

density, then you use whatever you have. You give me an example of a log suite, I'll tell you -- I would be glad to tell you what I would utilize.

Q. Well, can you give us an example of what you've looked at on some of these older wells?

A. Yes, there's several wells that had a gamma-ray and a sonic, a couple of them. There were a couple that had gamma-ray, and -- at least one of them had a gamma-ray and a density. And I believe there was one of them that had just a gamma-ray and a neutron. If you're asking me exactly which ones, I'd have to study on that a little bit. But in those cases, obviously, you can't do a cross-plot technique because you don't have the log suites.

So what you would do is, you would go to the gamma-ray curve and say, I'm going to assume that anything less than a cutoff that I've assigned to it, i.e., cleaner than some gamma-ray API cutoff I apply to it, is going to be sand, and I'm going to assume anything that's greater than that is not sand.

Q. And what type gamma-ray cutoff -- what gamma-ray cutoff do you use?

A. It depends on the area.

Q. This area, the subject area?

A. Well, I didn't really have to do that but two or three times. I don't recall what I used on those, to tell

you the truth.

MR. OLMSTEAD: No further questions, Mr. Chairman.

CHAIRMAN FESMIRE: Mr. Hall, do you have a cross-examination of this witness?

MR. HALL: No, Mr. Chairman. Thank you, sir.

CHAIRMAN FESMIRE: Mr. Kellahin, do you have a redirect?

MR. KELLAHIN: Couple of questions, Mr. Chairman, if you please.

REDIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Exhibit 4, Mr. Godsey, is -- Can you see it well from there? It's got an isopach and a structure map on it.

A. Yes.

Q. The structure portion of that display is mapped on top of -- or the base, where is that mapped? Where is the top of that --

A. As I thought I identified originally, the structural contours here are at the top of the Morrow, the top of the entire Morrow formation in this area, and most people will call that the Morrow lime, because that would include the upper Morrow, as well as the middle and lower. So that structural point is at the top of the Morrow.

Q. Let me relate that back, then, to one of your

cross-sections. The GEO 5 --

A. Okay.

Q. -- can you see it well enough from there?

A. Yes, I can.

Q. Where is the top of the Morrow on this cross-section?

A. The top of the Morrow on this cross-section is indicated in red where it says T/Morrow. That is the structural point that this map is on at the top of the Morrow.

The Morrow clastics that I've identified would be this first gray area, as we've talked about earlier, and then this is another point down here that some workers may call the Morrow clastics.

Q. Mr. Olmstead was talking about the paleo-high north of the KF State 4. There was some discussion about whether or not that closed.

A. Yes.

Q. When you go back to Exhibit 4 and find its structural position on Exhibit Number 4, are you talking about the possibility of closing the structure at the very top of that point?

A. That's exactly what this is showing, since it's mapped on the top of the Morrow, that's correct.

Q. Is it your geologic conclusion that there's a

paleo-high in this area of such significance that it's going to deflect the sand and push it to the east?

A. My geologic conclusion is that there was not a paleo-high during deposition of the lower middle Morrow in this area. It would not have controlled sand distribution in this area.

Q. When you go to Section 4 on your Exhibit Number 4, if you look at the south half of Section 4, do you see your lines of structure?

A. Yes.

Q. In which directions are those lines of structure oriented?

A. Well, in the south half of Section 4, the -- of course, the contours are running in a kind of a east-northeast-to-south-southwest general direction, which means the downdip direction would be more or less to the south at that point. You will note that as you follow those contours around, that dip direction, the downdip direction, will change.

Q. Would you expect in this area that the Morrow being produced would be oriented so it's parallel to the structural position in Section 4? Or would it be perpendicular?

A. The sand would be -- it actually can be either/or because what we're looking at here -- This is the

structure, present-day, so that may not -- and probably wasn't -- the exact structural configuration and dip direction at time of deposition of these sands.

Q. Let me ask you to go back to the literature that you referred to in support of your direct examination. If you go to Exhibit 13, please, this is one of the displays that Mr. Olmstead had you refer to?

A. Yes.

Q. He drew your attention on this display -- you see the cartoon in here?

A. Yes.

Q. Down below there, that Figure 3 has got an identification associated with it? Do you see that?

A. Yes.

Q. That's the part he had you read, right?

A. Yes.

Q. Go up now and read for us that portion of this technical paper that starts just below the capitalized word "Pennsylvanian".

A. Okay.

Q. What does that say?

A. The very first sentence here says, The sediments of the Pennsylvanian age Morrow formations (PB Figure 3) are fine-grained sandstone and shales eroded from areas north, east, and northwest of the Delaware Basin.

Q. Is that not what you've been telling us?

A. That's exactly what I've been telling you.

MR. KELLAHIN: Nothing further, Mr. Chairman.

CHAIRMAN FESMIRE: Commissioner Bailey?

EXAMINATION

BY COMMISSIONER BAILEY:

Q. Let's go to Exhibit GEO 2.

A. Yes, ma'am.

Q. One of the interesting aspects about a well log and a mud log is that you can look at the history, a snapshot in time of any specific location by looking at the rock.

A. Yes, ma'am.

Q. I notice that the description of the sandstones that's over here on the right-hand side of the exhibit talked about medium fine grain, small coarse grain. It appears as though there are -- there's a description here of poorly sorted sands?

A. Yes, ma'am.

Q. Subrounded to subangular?

A. Yes, ma'am.

Q. How would you describe that depositional environment where you're going to have subangular to subrounded --

A. Well --

Q. -- poorly sorted sands?

A. Okay, in the most general context, generally speaking, the further sediments have been transported, the more rounded they get. The closer they are to their source, the more angular they are. What's happening is, they're transported in a river system or along a shoreline or something, they're rubbing against other grains and they're knocking off the edges and rounding it, so on and so forth.

So the context of putting this into subangular tells me that they may not have been transported just a real long ways, because the further you transport these sediments, the longer they have been knocking against each other and knocking off the edges, the more rounded they will get.

Q. And how would you describe it as a high-energy or a low-energy environment?

A. A high-energy or a low-energy environment really will have to do with the steepness of the gradient in a fluvial system and the wave action that you get when you get to the shoreline. Now -- So that if you're in a very low-relief coastal plain, your flow regime, your transport energy, is lower because of the -- sorry, that totally distracted me -- is lower because of the low gradient. As you have a steeper gradient, you're moving things a lot

faster.

Did that -- Did that answer what you were asking me?

Q. Yes, that satisfies the question.

The literature describes the Central Basin Platform as emerging after the Strawn time, and it's a low-- swampy, low-energy area during the early Morrow time. How would you respond to that?

A. I'd say the bulk of the literature says it a little bit differently. The bulk of the literature will say that it was hills to small -- small mountainous areas.

Now when you have these highstands, then -- and sea level has come up dramatically, then that -- those highlands are no longer so high, and then I would look at the Central Basin Platform -- really, this is the early parts of the Central Basin Platform -- as being relatively low-relief and kind of swampy.

But when you drop sea level, then, 250 feet to 400 feet, some workers say, then suddenly that's exposed a lot more. It can't be swampy, because you've dropped your sea level down dramatically in there.

So for time periods, yes, during the highstands, the earlier part of the Central Basin Platform was -- probably was swampy with a little sedimentation coming off of it. And then as you drop sea level you start eroding

some of that, because it's exposed a lot higher. And then also you're eroding some of that shoreline that had been developing during the highstand.

Q. And you can see the change in the sea level by the change in the lithology, as demonstrated in this --

A. Yes, the change in sea level is seen by numerous workers in the literature by -- by keeping track of what lithology has been deposited where, and saying, Ah, I'm in a -- I'm way out basinward here, and I've got shoreline facies.

And then you have a flooding event, say a shale package -- which is really telling you I've now flooded this area and you're getting shale deposited there, so you had a transgressive event -- well, sea level has risen.

Then you may have a highstand there, and then it will turn around and sea level will drop down again. Then you'll be able to see these different facies of rock moving laterally and vertically through time.

Q. And the coarsening upwards of the sandbodies that are demonstrated in this particular exhibit will then also indicate the changes in the sea levels and the location of the --

A. That's a -- coarsening upward is a good question. We could talk for hours on that. The coarsening upward sequence you can see in sands many times is a reflection of

obviously the flow regime.

For instance, one example of a coarsening-upwards sequence would be where you have a channel mouth bar coming in. The -- and it has come in and been deposited. When you see that in the rock record, the very upper part is the cleanest part, because you have this channel that has come in and deposited this bar on top of these lower sands.

Now conversely, a point bar, for instance, would typically have a fining-upward sequence, because you'd see the coarser-grain sands in the bottom part, and then as that point bar migrates laterally, you're getting finer and finer sands.

Now the coarsening-upwards and fining-upwards analysis of rocks in the Permian Basin is not a clear-cut a method of looking at your depositional environment as in the Gulf Coast. The method was first identified by workers working the Gulf Coast. That's really just a big sand and shale pile, and that -- those shapes that have been identified to indicate different depositional facies are very well defined and easily utilized in the Gulf Coast because of the sand-shale sequence that exists there.

I think -- gosh, Galloway was one of the big proponents of that from years back in identifying that and working with it. I spent four years working the Gulf Coast and could do that routinely in the Wilcox-Frio-Yegua sands.

When I worked in the Permian Basin, just looking at a log and automatically seeing the typical funnel or, you know, coarsening-upwards or fining-upwards sequences and seeing that on logs, it's a lot more difficult to really see it and to hang your hat on it and know for sure what you're seeing.

Many times what happens is, you may have had, say, a point bar deposited with a fining-upward sequence to it. Then it gets eroded away, part of it gets eroded away by something else and more sand gets deposited on it. So you may have interrupted sequences, so you may have a -- say a fining-upwards or a coarsening-upwards sequence, part of that gets eroded away, something else gets deposited, and then it starts being bell-shaped. Some of that gets eroded away by the next system that comes in, and then you get -- a whole complex of these patterns develops.

So it's a neat tool to use, and -- but it's very complex to utilize, particular in the Permian Basin.

Q. You made the comment that there was restricted ocean current flow within this portion of the Delaware Basin.

A. What -- If I said that, what I mean to say -- the literature says very clearly that during the Pennsylvanian time, Morrow all the way through most of the Pennsylvanian, the continents were together in one very large

supercontinent we call Pangaea. Some workers will call it Pangaea. I worked with a French geologist one time, she said it a way I can't even try to do.

But be that as it may, that large, huge supercontinent stretched almost from pole to pole. That restricted the flow of warm currents along the equatorial line. They couldn't flow freely around the globe, and that restricted the flow of warm currents and affected the climate, which helped add to the ice-house conditions. That's where I was -- what I was trying to say.

Q. The structure maps indicate current structure, not paleostructure; is that correct?

A. That is correct.

Q. And there is continued deformation after the deposition of the model, right?

A. Yes, ma'am.

COMMISSIONER BAILEY: That's all I have.

CHAIRMAN FESMIRE: Commissioner Olson?

COMMISSIONER OLSON: I don't have any questions.

EXAMINATION

BY CHAIRMAN FESMIRE:

Q. Mr. Godsey, can we turn to GEO 1 -- I mean, GEO 2?

A. GEO 2, yes, sir.

Q. And this is the mud log from the KF 4 State

Number 1; is that correct?

A. Yes, it is, correct.

Q. Would you point out, because I've not been really successful in reading them so far today, where the perforations are in this well?

A. Oh, okay. All right, on the left side of the exhibit, on the wireline log, the red boxes that you see in the depth column there of the log are the perforated -- exact perforated intervals. Then the green box would indicate what interval of perforations were produced together.

Q. So you've been consistent, I just haven't been reading them consistently, right?

A. Well, I've tried to be.

Q. In the zones where the well is perforated, would you come over to that right-hand column and translate the description of the samples for me?

A. Mudloggers' descriptions always require some translation.

Q. Well, I think I can read them, but it's been a while.

A. Okay. The top one over here, it says sandstone -- CLR means clear, translucent --

Q. -- light gray to yellow --

A. -- light gray to white to buff, some light tan,

medium defined grain -- he's seeing a little bit of everything in here -- some fine to coarse-grain loose, unconsolidated -- FMP, I asked him about that. I'll have to think on FMP, I don't remember. These days the mudloggers, every one of them has their own pet -- Okay.

Then if we skip down from there, some slightly consolidated, subrounded, subangular -- looks like 10-percent dull blue fluorescence, very slight trace cut wet, poor cut dry. That's that first one, okay?

Q. Okay.

A. The middle one in there, which would be at a depth somewhere of around 11,910, sandstone, clear, translucent, light gray, white, light tan, firm to hard, consolidated, subangular, subrounded, silty matrix, slightly calcareous cement, slightly calcareous cement in part, trace dull yellow fluorescence, some light brown stain.

And then the bottom one, sandstone light brown to translucent to clear to frosted, white, some light gray, moderately firm to firm, very fine to fine-grain, well sorted, consolidated, subangular to subrounded, slight -- oh, silty matrix, slightly calcareous cement in part, trace of light yellow fluorescence, slow light, milky cut, blue -- oh, I'm sorry, slow, light milky-blue trace cut, some brown stain.

Q. Okay. Now correct if I'm right here. If your theory is correct, we're going to have basically a much shorter transportation distance than the stuff coming from the north; is that correct?

A. Wel, for some of it. Remember, part of what's happening here is, you're having sedimentation come from several sources. Yes, from the CBP. But you are also having sediments from the northwest, off -- truly off of the Pedernales, coming across low-relief coastal plain, and they're being deposited down in here in these lowstands that move back and forth with time as sea level goes up and down.

Q. So those grains ought to be more rounded --

A. Right.

Q. -- more worked, finer grain --

A. Correct.

Q. -- than the stuff coming off the uplift to the west; is that correct?

A. The stuff off of the -- truly off the uplift, yes. But also what's happening, as you have a transgression and sea level comes up, these shoreline sediments, some of which were from the CBP but some of which were off from the northwest, that shoreline as it's working up, some of those sediments are being worked up in there. And then you'll have a highstand, and you may have

less sedimentation from the Central Basin Platform but you're also getting sands coming in from the Pedernales.

Sea level drops, so that's exposed, and then it's reworking those same sands. That's why I say it's a very complex question of what's the true sediment source, because some came from there, got deposited down here, got moved back up there, and then got redeposited down again.

Q. Okay, but doesn't the presence in that description of subangular and subrounded materials support your thesis that it's been transported a relatively short distance compared to some of the other stuff?

A. That would support it, yes.

Q. And if it had come from the north it would probably be --

A. -- be -- be --

Q. -- better sorted, smaller grains --

A. It would be finer-grained and more rounded. The sorting, though, wouldn't necessarily be so, because --

Q. It --

A. -- it may have been moved and re-worked and re-deposited.

Q. How far -- You said it's essentially walking distance from the subcrop, which I assume is going to be -- is going to represent the edge of the Basin. How far is that to the KF location? Is that about eight miles, 10

miles?

A. From the subcrop? Well, this is the subcrop line right here.

Q. Right.

A. And the KF is right there. Shoot, that's -- that's a couple of miles.

The five-mile quote I made was that point -- next point of well control that was up on the Central Basin Platform showing the 3600-plus feet of relief.

Q. The KF is producing now; is that correct?

A. Yes.

Q. What's it making now?

A. I think it's hanging in pretty close -- been real steady at about 3 million a day.

Q. Three million a day. Do you happen to know what the flowing tubing pressure is on that?

A. No, I do not.

Q. Will your engineer know that, do you suppose?

A. I hope so.

CHAIRMAN FESMIRE: I have no further questions.

Mr. Kellahin, do you have anything?

MR. KELLAHIN: No, sir, we ask this witness to be excused.

CHAIRMAN FESMIRE: Mr. Gallegos, is there anything else you'd want to --

MR. GALLEGOS: No, your -- No, Mr. Chair.

THE WITNESS: Those are some of the best questions I've ever had when I've testified here.

CHAIRMAN FESMIRE: Flattery will get you nowhere.

(Laughter)

CHAIRMAN FESMIRE: Mr. Godsey, you're excused, I appreciate it.

MR. GODSEY: Thank you.

CHAIRMAN FESMIRE: Mr. Kellahin, your next witness?

MR. KELLAHIN: Thank you. Mr. Chairman, at this time we'll call Jeff Finnell.

CHAIRMAN FESMIRE: Mr. Finnell? Mr. Finnell, you've been previously sworn, have you not?

MR. FINNELL: Yes, I have.

(Off the record)

CHAIRMAN FESMIRE: Mr. Finnell, do you have a card for the court reporter?

MR. FINNELL: A card?

MR. KELLAHIN: Mr. Finnell, do you need to start the --

MR. FINNELL: No, we're open.

MR. KELLAHIN: We're all set?

MR. FINNELL: I think so.

MR. KELLAHIN: Okay, we're all set.

JEFF FINNELL,

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. Finnell, for the record, sir, would you please state your name and occupation?

A. Yes, Jeffrey G. Finnell, I'm an asset manager for Chesapeake Energy.

Q. That is your current employment at this point?

A. Yes, it is.

Q. Where do you reside, sir?

A. In Edmond, Oklahoma.

Q. On prior occasions, have you testified as a petroleum engineer before the Commission?

A. No, I have not.

Q. Summarize for us when and where you got your engineering degree?

A. I received a petroleum engineering degree from the University of Oklahoma in 1986.

Q. Subsequent to graduation in 1986, Mr. Finnell, would you summarize for us your major employment aspects as a petroleum engineer?

A. Yes. Upon graduation I was hired by Mobil Oil Corporation and sent to southern Illinois for four years,

where I worked Illinois and Indiana as an operations engineer dealing in all aspects of waterflooding and the production in Illinois.

I was then -- the property sold, and I transferred to a company called Equinox Oil Company, continued to work in Illinois and Indiana, those properties there, until 1998. I was promoted to -- within Equinox to a district engineer, supervising geologists and engineers working Illinois.

They transferred me to California in 1998 where I spent two years working heavy oil operations as a district manager/engineer for Equinox.

In the year 1999 I went to Wichita, Kansas, and spent the next five years working with independent oil companies, Berexco and Abercrombie Energy, working all aspects of petroleum engineering.

In 2004 I was hired by Chesapeake, moved to the Oklahoma City area and began working the Permian Basin, and I've worked the Permian Basin for Chesapeake for the last two and a half years.

Q. As part of your responsibilities as an engineer with Chesapeake, have you been part of an engineering team of petroleum engineers to study the engineering components associated with the KF State 4 well?

A. Yes, I have.

Q. Have you been involved in that process from the inception of the KF State 4 well?

A. Yes, I have.

Q. In fact, it predates that well and goes back to the Osudo 9 well, does it not?

A. Yes.

Q. As part of that collective effort, have you and the other engineers compiled a series of engineering displays and exhibits to present to the Commission this morning?

A. Yes, I have.

Q. Does that collective work product represent your work product and those of the other Chesapeake engineers?

A. Yes, it does.

Q. As the presenter today, have you reviewed the work of the other engineers in putting together the exhibits?

A. Yes, I have.

Q. And have you met with them and discussed in detail the various components of the information that you base your conclusions upon?

A. Yes, I have.

MR. KELLAHIN: Tender Mr. Finnell as an expert petroleum engineer.

CHAIRMAN FESMIRE: Mr. Gallegos or Mr. Olmstead?

MR. OLMSTEAD: No objection.

CHAIRMAN FESMIRE: Okay. Mr. Finnell, are you a registered engineer?

THE WITNESS: Yes, I am, I didn't mention that. 1994, I'm registered in the State of Indiana.

CHAIRMAN FESMIRE: Any objection, Mr. Gallegos?

MR. OLMSTEAD: No objection.

CHAIRMAN FESMIRE: He will be so accepted as an expert in petroleum engineering.

Q. (By Mr. Kellahin) List for me, Mr. Finnell, some of the major components of your conclusion so that we might have a summary of where we're going with the presentation.

A. Okay --

Q. Can you talk to me about the major areas of investigation?

A. Okay, in reviewing this whole area I came up with four major conclusions.

Number one, the virgin reservoir pressure in the Morrow in this area is greater than 7000 p.s.i.

Number two, in the area reviewed there are three separate reservoirs or pods.

Number three, Chesapeake's mapping is consistent with the engineering data.

And number four, the most reserves in Section 4 are in the south laydown 320 acres.

Q. As part of that study, have you and the other engineers looked at the production data?

A. Yes, we have.

Q. Have you looked at the available pressure data?

A. Yes, we have.

Q. Have you looked at the gas composition analysis?

A. Yes, we have.

Q. Have you calculated to your satisfaction what you think is the volumetrics associated with the area in question in Section 4?

A. Yes, we have.

Q. Have you conducted production decline curves to demonstrate an ultimate EUR for various wells?

A. Yes, we have.

Q. And have you attempted to match the production decline with the material balance in the volumetric calculation?

A. Yes, we have.

Q. In addition, have you plotted the wells in terms of their producing history to track their pressures and performance over time?

A. Yes, we have.

Q. And have you sequenced all those wells?

A. Yes.

Q. And based upon those conclusions, are you able to

determine the facts supporting each of your four contentions this afternoon?

A. Yes.

Q. Let's start first of all, then, with this pressure.

A. Okay.

Q. When you indicate that the virgin pressure in this area was approximately 7000 p.s.i. --

A. Yes.

Q. -- let's start there.

A. Start with the pressure.

Q. Where does that number come from?

A. The pressure comes from looking at the wells. The first wells that were drilled in an area should be the first to penetrate a reservoir, which in turn will give you your virgin pressure.

Q. Let's start off, then, with the production information. If you'll turn to your first slide after your cover sheet, let's look at the PE 2.

A. It's kind of dark. Okay.

Q. This is what wellbore, sir?

A. This is a map of the immediate area surrounding the KF State.

Q. The targeted information is for the Osudo 9?

A. Yes, that is correct.

Q. That's the big well that was --

A. Right.

Q. -- being produced and that you're intending to offset?

A. Yes, that is the -- that was a home-run well that got everybody excited about this immediate area, yes.

Q. Provide for us the information you have concluded on this slide.

A. Well, the original bottomhole pressure that we got here was 6301 pounds based on the mud-weight calculation in March of '05. The well began producing in March of '05. Current gas cum is already 5 BCF of gas. It's 54 feet in the heart of the sand.

Q. The first number here, the initial shut-in bottomhole pressure --

A. Yes.

Q. -- did I read that right?

A. Yes.

Q. It came in at 6301 pounds?

A. Yes, that is correct.

Q. That was not virgin pressure?

A. No, it is not.

Q. Have you made an examination to come to an engineering conclusion about why this is not virgin pressure?

A. Yes, after reviewing Chesapeake's map, it becomes clear that the reason that Osudo 9 is not at virgin pressure is because there's another well in that reservoir that's already produced gas, which would have dropped the pressure below virgin pressure.

And on this map you can see it links up here as the WEL Com State Number 1, which I'll refer to as the WEL. The mapping shows it being in the same reservoir and explains why the pressure is below 7000 p.s.i.

Q. The current cumulative production from the Osudo 9 well is what, sir?

A. 5 BCF.

Q. The thicknesses shown on this map, how were those obtained?

A. Those were obtained from David Godsey's mapping.

Q. Let's turn to Exhibit Number 3. What are you showing here?

A. Okay, this is a chart or a graph of the daily production and pressures versus time. Once again, a very prolific well, at one point sustained rates of 22 million cubic feet a day and is still producing just below 5 million a day.

And you asked earlier about the -- Well, never mind. Okay.

Q. This display also shows information about the

pressure?

A. Yes, and that is the flowing tubing pressure, which has been dropped down to below 1000 p.s.i. and is reported along with the production.

Q. Let's turn to the next slide, Mr. Finnell.

A. Okay.

Q. This is what well?

A. Okay, this is the same map, indicating the Hunger Buster 3 well, which was drilled to the south of the Osudo 9.

Q. In terms of vintage, which well was drilled first compared to the Osudo --

A. The Osudo 9 was drilled first, and this well was drilled approximately two months later.

Q. Again, the footage associated with this well came from Mr. Godsey?

A. Yes, that is correct.

Q. What's the engineering information?

A. Okay, what we tried to match up, you know, as the job -- as the engineer, is to validate the map. Does it make sense?

Okay, the Chesapeake map is showing this well had 11 feet of sand on the edge of the reservoir, not nearly -- not nearly the well that the Osudo 9 is going to be, it doesn't have as much to work with.

And that is, in fact, what we're seeing with the production. The current gas cum is .1 BCF of gas. This is a doggy well on the edge of a reservoir, matches the map.

Q. Let's look at the production decline curve. Turn to Exhibit 5 for us. Exhibit is what, sir?

A. Yes, this is the similar production graph showing daily rates versus time. Once again, the best this well did was 700 MCF a day, and it has fallen off to -- now it's just barely over 100. You know, it's made .1 BCF of gas and matches -- once again, matches the map. It's a poor well, and it's on the edge of the reservoir.

Q. Was there any stimulation or treatment associated with --

A. Yes, there was.

Q. -- the Hunger Buster 3 well?

A. This well was fractured in an attempt to make it a good well, and it was not successful. As opposed to the Osudo 9 well, which was not fractured.

Q. Okay, let's turn to display number 6. Identify for us the well associated with this display.

A. Okay, this is the State WEL Com Number 2, also known as the Apache dry hole. It was drilled just to the east of the Osudo 9 well. Once again, you can see the play developing. There's a good well drilled in the middle, went south, got a doggy well. Now we went east and Apache

got a dry hole, zero feet of pay in this well. Matches the map that Chesapeake has.

Q. So in sequencing the well, what's the relationship between the Hunger Buster, then, and the Apache WEL Com 2?

A. The Apache was drilled after the Hunger Buster, approximately a month later.

Q. All right, let's turn to Exhibit Number 7, Mr. Finnell.

A. Okay.

Q. The well associated with this information is which well?

A. It's the KF 4 State Number 1. It had an initial bottomhole pressure of 6600 pounds based on the mud weight. Coincidentally, we also measured it with a bottomhole pressure bomb. We came up with 6595, which validated our mud calculations to within five pounds.

First production was January of '06. This is a good well. It's 17 feet of pay, it's towards the middle of the reservoir. Not as good as the Osudo 9, we wouldn't expect it to be. Current gas cum is .85 BCF of gas. It's a good well, the map says it should be a good well.

Q. What's the current rate for the KF State 4?

A. It is making just under 3 million a day.

Q. Is there any engineering indication that you see

that this well was at virgin reservoir pressure when it was first produced?

A. Yeah, it was not at virgin reservoir pressure. We're at 6600 p.s.i., which makes perfect sense because it's in the same reservoir as the Osudo 9 and the WEL. Those wells had already pulled some of the reserves which would have dropped the pressure, and that's why we're at 6600 pounds and not 7000.

Q. Turn over to Exhibit Number 8 and identify this for us.

A. This is a production graph similar to the other wells, showing pressure in black and the production rate in red, versus time.

Once again, this well came in natural, no acid stimulation or anything, we just perforated it at 3 million a day. It has remained pretty constant through this whole time interval. The pressures have dropped, but that's more of a function of our controlling of the choke at the surface and matching pipeline pressures. We started out at 1000 pounds, we took it down to about 500 to see if we could increase the flow rate. We got a little bit of a bump, but that's about it. It's been pretty constant throughout that interval.

CHAIRMAN FESMIRE: So we operated under the "if it ain't broke, don't fix it" principle, right?

THE WITNESS: Well, that's where we're at until we're done with this hearing. Let's just leave it alone, it's a good well.

I just had this conversation the other day, if it ain't fixed don't -- or if it ain't broken, don't fix it, yes, sir.

Q. (By Mr. Kellahin) Is there engineering methods and tools available to you where you can compare the production performance over time, the KF State Number 4 well with the Osudo 9 and the Hunger Buster well?

A. Yes, there is.

Q. Have you done that?

A. Yes.

Q. Let's turn to Exhibit 9.

A. Okay.

Q. Give us a moment to find the wells and match the color codes, so start with the green.

A. Okay, the green is the good well, the Osudo 9. The blue well is going to be the Hunger Buster, and then the red well is the KF State. And these arrows correspond with the colors on the production graph.

So what we did is, we put -- all right, let's put all three wells on the same graph and see what they look like.

Clearly the Osudo 9, great well in the heart of

the reservoir. No surprises there.

Hunger Buster, sitting on the edge of the reservoir. Map says it ought to be a doggy well, and it is. It just has not performed well, it doesn't have the reservoir conductivity for it to.

KF State, closer to the center of the reservoir, also going to be a good well, and it starts to fall in line with the Osudo 9. In my opinion, it's a very good match.

Q. As a petroleum engineer, Mr. Finnell, can you conclude from this information that Mr. Godsey's mapping of these three wells in the same reservoir pod is consistent with the production information?

A. Yes, it is. I can't find any bust in this map at all in this area. This works well.

Q. If the production pod in the Morrow was oriented north-south, as Samson contends, what kinds of things would be different?

A. Well, if it was oriented north-south I would expect the Hunger Buster to be a very good well, and it's not.

Q. Have you tabulated the pressure information available?

A. Yes, I have.

Q. Let's turn to that portion of the presentation. If you go past, Exhibit 10 is the pressure data for the CC

3 well?

A. Yes, looking at the CC --

Q. -- 3 --

A. -- Exhibit 11 is where we're at.

Q. Exhibit 11, would you put that on the screen for us?

A. Okay. Okay, the CC State is another key well right in this vicinity, and my job as an engineer is to explain why did it behave the way it did?

We drilled this well, and it was drilled prior to the Osudo 9, came in with an initial bottomhole pressure of 7300 pounds. We took a kick while we were drilling it and had to deal with it, so we knew when we drilled into it that we had good pressure. I would say this is virgin pressure in this reservoir.

Q. Were you directly associated with the drilling of this well?

A. Yes, drilling and completion, yes, sir.

Q. One of the questions for you is whether or not there's any link between the CC 3 well and the KF State 4, right?

A. Yes. Yeah, and my conclusion is that there is not, and here's why.

Q. Show me why.

A. After 28 days of production we had dropped the

pressure in this well from 7300 pounds to 1264 pounds. It was a huge disappointment. When we first drilled it and got the kick, the production kick, while we were drilling it, we thought we had really stumbled into something and were very excited about this well. But immediately, once we started producing, it became apparent that the pressures were dropping daily, the rates were dropping daily, and that this was a limited reservoir.

So we -- after a month of production, we ran a pressure buildup test, which is another engineering tool to see what's going on downhole? Do we have a problem? Is there something that needs to be fixed?

Pressure buildup analysis indicated to us that it was a very limited reservoir. It was estimated to be between 6 and 11 acres, is all the bigger that reservoir is. The well only cum'd .005 BCF, and we shut the well in in August of '05 as uneconomical. As of that point we had completely drained that reservoir that that well was in. It's not in communication with any other well. The virgin pressure is 7300 pounds. That tells me it was virgin, waiting for us to tap into it. We tapped it, we drained it, end of story for this well.

And that is consistent with the way David has -- Chesapeake has this well mapped, is that it's not connected to the larger reservoir that extends to the west.

Q. Have you done additional -- you and the team done additional engineering calculations to further confirm the fact that this is an isolated production pod not associated with any other well?

A. Yes, we have.

Q. What's the area affected by the CC 3 State well?

A. We're estimating somewhere between 6 and 11 acres.

Q. Let's look at your additional work. If you'll turn to Exhibit 12, identify what we're seeing.

A. Okay, this is a cartesian history plot that was done by Pro Wireline. It was a pressure buildup analysis on this well.

And what this is showing is, with the pressure buildup analysis they try to match known curves to specific geometries of reservoirs. Okay? So as we're building the pressure up, which is on the left-hand scale, versus time in hours, the pressure builds up initially, at the beginning, and then slowly slows down. And what this is showing is, the model, which is in red, very closely matches what we actually measured in green.

Q. All right, turn to Exhibit 13. Identify and describe this display.

A. Okay, also the same pressure buildup. This is a semi-log plot, another graphing tool to show

characteristics of the well. Once again, the model is in red, what we measured is in green, and they match very well.

CHAIRMAN FESMIRE: This is the model that shows your three no-flow boundaries?

THE WITNESS: Yes.

COMMISSIONER OLSON: The 6-to-11-acre size?

THE WITNESS: Yes, yes.

Q. (By Mr. Kellahin) Exhibit 14?

A. Yeah, and here's kind of another fun graph on the pressure buildup matching -- you've got your pressure buildup, the log log plot, and then the red line here is the derivative, which means the change in slope of this top line.

And what research has shown is that for specific reservoirs there's a very characteristic type curve that matches that, and that's what this is showing. The solid black line versus the red line, right through this interval, is what the model says it ought to look like. The red is our actual data, and that's what it's showing us. We've got closed boundaries running into a small reservoir, and it's just a very small tank.

CHAIRMAN FESMIRE: Did you have a surface leak? Why the problem there at a value of 1 for the differential? Why did the data scatter there?

THE WITNESS: I don't know. You're referring to this interval right here?

CHAIRMAN FESMIRE: Yeah.

THE WITNESS: I'm not sure what caused that. And once again, that's a change in -- change slope of this line right here. That's what that's a measure of, is that right there. So I'm not sure what bobbled that.

Q. (By Mr. Kellahin) Let's turn to the summary slide on this particular well, if you'll look at Exhibit 15.

A. Okay.

Q. What are your conclusions about the CC 3 State well?

A. Okay, in summary, of all the stuff that we looked at on the CC State, that well is not in communication with the main reservoir, and to somehow draw a thickening or some connection between those two just does not match the production nor the pressure buildup that we ran on this well. CC State is isolated from anything else.

Q. In examining the various pieces of the engineering puzzle to work with, one of those pieces is to look at the gas composition, gas analysis?

A. Yes, it is.

Q. And did you do that?

A. Yes, we did.

Q. Let's turn to that topic.

A. Okay.

Q. Slide 16 is just a cover sheet for this?

A. Okay, moving on to 17?

Q. Yes, sir.

A. Okay. Well, this is just a tabulation of some specific gravities from the wells surrounding the KF State, and what that's showing you is the specific gravity on the right-hand column.

Q. Is this measured data or is it laboratory data? What's the source of this information?

A. Yeah, this would be a gas sample taken at the wellhead and then run through a gas chromatograph by the pipeline company to determine what makes up the gas.

Q. Did you then take this data and plot it?

A. Yes, we did.

Q. Let's turn to Exhibit 18 and see your plot.

A. Once again, this is another piece, to see how does the gas composition -- can that tell us anything about the reservoirs?

And when we plotted this data, interestingly enough, we ran into kind of two groups of data. We've got this lower group, the left three data points. This is approximately this .62 range that group together. And then we ended up with the much higher gas values of .65 to .67.

It's kind of in another grouping over here.

Q. Each one of the plots here is associated with a different well? You've got a total of six wells in the population?

A. Actually, this is five wells --

Q. Five wells.

A. -- with one well being represented twice, two different time slices within the history of the well.

Q. Did you attempt to plot these in some way to make some engineering judgments about whether these were all in the same reservoir?

A. Yes.

Q. If they were all in the same reservoir, would you have this range of separation in the --

A. No, we wouldn't.

Q. -- specific gas gravities?

A. No, we would not, they would all be similar, pulling out of the same tank.

Q. Let's see how you've displayed those. If you go to Exhibit 19...

A. So when you plot those data points on a map, what we find out is that the three wells in the .62 range, ranging from .66 to 6.24 [*sic*], all fall within this upper lobe or what I'm going to call the north reservoir up here. The higher-gravity wells, .65 to .67 are all down here in

this other lobe. Our mapping shows that they're separate reservoirs, so that doesn't surprise me.

Q. You see the northern pod, and look at the well on the far right that's got the 0.624 associated with it --

A. Yes.

Q. -- the WEL Com State 1?

A. Yes.

Q. Is the number value for that enough to matter when you compare it to the two values of the PQ Osudo State 1 down there to the south?

A. No, I would say that they're -- all three of those are very close proximity and statistically are all -- represent the same -- the same source of gas.

Q. I was trying to draw the difference between the WEL and the PQ Osudo to the south.

A. Oh, I'm sorry.

Q. I've got the wrong Osudo well.

A. Okay, yes. Yeah, the difference between .624 up here, and now we've jumped up to .65 to .67 coming out of the same wellbore, yes, that's a statistical difference, it's different gas.

Q. Now compare the WEL in the northern pod to the southern pod that contains the State WEK. With the proximity of these two wells, is that range of difference enough to put them in different pods?

A. I think it is, yes.

Q. Let's turn to the part of the puzzle that's associated with the volumetrics.

A. Okay, Exhibit 21.

Q. Yes, sir.

A. What are you attempting to test here? What concept are you attempting to test, Mr. Finnell?

A. Okay, another tool in my tool bag is to say, Okay, if you map and you planimeter the area on the map, is it large enough to hold the amount of gas that we think is going to be producing? How much gas is it? Is it reasonable to expect that?

So we planimetered all of area A here, which is our north lobe, to see if it made sense on volumetrics. And when we did that, we came up with 23,500 acre-feet, which holds 30.2 BCF of recoverable gas in place. That's what the volumetric calculations showed us.

Q. Is this a standard, well-recognized engineering methodology?

A. Yes, it is.

Q. It's taught in all the schools by Craft and Hawkins?

A. Yes, it is. Not exact, there's a lot of variables. But it's a good tool to see, are you in the ballpark with what we're projecting here?

Q. So when the geologist hands you a map, from that map you can determine a thickness and planimeter the area to see how big that container is volumetrically?

A. Yes, that's correct.

Q. When you come up with a size and a shape for your container --

A. Yes.

Q. -- and then you put some values in it and decide how much gas is contained in the container --

A. Yes.

Q. -- how do you check against the accuracy of that?

A. Well, you have to make some generalizations across the area. We pick a porosity, we pick a water saturation that's going to be consistent, and you use good engineering judgment and you use reasonable numbers. Once again, this tool is not going to be -- calculate exactly how much gas is there. It's a tool to say, Is this reasonable to expect this much reserves from this area? Does it fit? Is the tank large enough?

Or is the tank way too big and we're not seeing that we're going to recover this much gas, and therefore it puts into question the map? And that's the purpose of this, is to validate the map.

Q. Once you see the container volumetrically --

A. Uh-huh.

Q. -- has about 30 BCF of recoverable gas, is there any way to compare production and forecast production to see if those numbers will validate your volumetrics?

A. Yes, there is.

Q. How do you do that?

A. We use a decline curve analysis.

Q. Have you done that?

A. Yes, we have.

Q. Is there a display that shows that?

A. Yes, Exhibit 22, PE 22. Okay, and this is the other way to approach the reserve numbers, is to, all right, look at the performance of each well and then predict from its decline how much gas is going to be produced out of each well. And so it's trying to come at the same number, we're just coming from a different methodology. And when we do that for the area within -- with the wells within area A, our decline curve analysis shows us that we're going to recover approximately 27.4 BCF of gas.

So 27.4, coming at it from this approach, 30.2 when we planimeter the map. Reasonable. The container is large enough to hold this much gas.

Q. Which wells have been analyzed to come up with this decline curve for Exhibit 22?

A. This is going to be, in the order that they were

drilled, the WEL, the Osudo 9, the Hunger Buster, and the KF State.

Q. These, then, are all the wells currently available in this pod --

A. That are producing, yes.

Q. -- and from which you could do a production decline curve, and so you've summed all those together --

A. Yes.

Q. -- and that gives you this composite decline curve?

A. That is correct, yes.

Q. Your estimates of ultimate recovery, then, are what, from decline curve analysis?

A. 27.4 BCF of gas.

Q. Has Mr. Godsey built his container too large or too small?

A. The container that he's drawn is maybe just a hair larger than what this is going to show, but it's reasonable, it matches pretty well.

Q. Were you asked to take your engineering expertise and to attempt to apportion the reservoir volume of the recoverable gas among the six 160-acre tracts within Section 4?

A. Yes.

Q. Have you done that?

A. Yes.

Q. Do you have a summary slide that shows you the distribution?

A. Yes, we do.

Q. Let's turn to that.

A. Okay, PE Number 23.

Q. To make this calculation, you need what, Mr. Godsey [*sic*]?

A. We needed Mr. Godsey's map, and then once again we applied porosity, water saturations, evenly throughout his map to determine the thicknesses and the reserves in each of those sections.

Q. And for this calculation you've used his Exhibit 4?

A. Yes. Yes, the overall map of the Morrow, uh-huh.

Q. And if your challenge is to orient a spacing unit that consists of two 160-acre spacing units that have the greatest potential recoverable gas volume associated with it, what orientation would that be?

A. It would be -- the most gas in this section is in the laydown 320, right here.

Q. Let's go to a different part of the puzzle, Mr. Finnell. Let's talk about taking the pressure and the production, analyzing it together, and looking at the available data in the wells in sequence.

A. Okay.

Q. So have you prepared a pressure-over-time -- pressure-versus-time plot that shows all the key wells in the study area?

A. Yes, I have.

Q. Let's turn to that. Give us a moment to understand your map. The color codes at the bottom are identified with a shape and a color associated with various wells?

A. Yes.

Q. And then above that you have the actual plots, and the color code remains the same?

A. Yes.

Q. You've numbered the color codes. What is the relationship of the numbers to the wells?

A. The numbers are the order in which the wells were drilled.

Q. When you read through the sequence of numbers, there's number 8 that's missing?

A. Yes.

Q. What's that?

A. That's the Apache dry hole. There was no data points for that well.

Q. Starting, then, over in January of 1969 and looking at the pressure line, the vertical line, what is

the first pressure you have for the first well?

A. The first well would be the State WEK, and it came in at greater than 7000 p.s.i., approximately 7300 pounds.

Q. Is that reservoir pressure virgin pressure in your mind?

A. Yes, it is, first well drilled into the reservoir, that's virgin pressure.

Q. The next data point to the right identifies the number 2. What's that?

A. Yes, that is the WEL Com Number 1, drilled to the north of the WEK. It also came in at just over 7000 p.s.i. pressure.

Q. As you examiner the pressure over time, are you able to reach a conclusion about whether the first and second well, the WEK and the WEL, are in fact in the same reservoir?

A. It becomes -- it looks interesting from the standpoint that the pressure signatures of these two wells are very different. The WEK well initially produced at these pressures and then fell off into this regime down here, while the WEL didn't do that, it acted differently, which brings up a question of -- it doesn't appear that they're in the same reservoir.

Q. In your own mind as an engineer, if they were in

the same reservoir what would happen to the pressures?

A. The pressures should fall in line with each other. They're pulling out of the same tank, and the pressures should begin to equalize across that tank, and you should see the same response in all the wells that are pulling from it.

Q. Go back and find the number for the number 1, which is the WEK well.

A. Yes.

Q. And you move over and see the number 2, which is the WEL.

A. Yes.

Q. During that period of time between the two wells, there's approximately how many BCF of gas removed by the first well?

A. Approximately 6.4 BCF of gas.

Q. Does there appear to be any effect on the second well by production from the first well?

A. It does not.

Q. Let's go over farther to the right and pick up the third well. The third well is the State 15?

A. Yes, the State 15-1, and it initially came in at a very high pressure also. But then you'll notice, it very quickly drops straight down and now starts to fall in the same pressure regime as the WEK well. It follows the same

path.

Q. And your conclusion then?

A. When I first looked at this well, this was a concern to me, because if you look on the map, this well should -- is very close to the WEK well, and it concerned me that the pressure was this high. But then it immediately fell down into the same reservoir, and so my conclusions are that the bulk of the reserves that are produced from this well are in the same reservoir that's in the WEK.

This first pressure point must have been from a small sand sliver that was also perforated, that initially would have had a high pressure, depleted very quickly, and the bulk of the reserves for this well is associated with the main reservoir that's in the WEK.

Q. Do you have a locator map available to you up there?

A. Yes.

Q. We're going to flip back and forth for a minute --

A. Okay.

Q. -- but let's go to Exhibit 26 now.

A. Okay.

Q. I'm looking at the relationship of the State 15 and the State WEK. Can you find those two wells for us?

A. Okay, the WEK is right where the arrow is pointing.

Q. And where is the 15?

A. The 15 is down here.

Q. Mr. Godsey has put them in the same reservoir?

A. Yes, he has.

Q. They appear to act as if they were in the same reservoir; is that not --

A. They certainly do, the pressure data would tell you that.

Q. Now let's draw the comparison between the State WEK and the well you just talked about, the WEL, to the north and the south half of 10.

A. Okay, once again the WEK is here by the arrow, the WEL is to the north up here.

Q. Flip back to Exhibit 25 now.

A. Okay, back up to the graph.

Q. How does that pressure and time compare, then?

A. Okay, they trend very differently. The WEL to the north maintains a higher reservoir pressure throughout the life of the well. It is not this lower pressure that we see in the WEK.

Q. Your conclusion?

A. Different reservoir.

Q. In your opinion has Mr. Godsey drawn them

correctly?

A. Yes, he has.

Q. Two separate reservoirs?

A. Two separate reservoirs, that is correct.

Q. Okay. Look at the data point in about January of 1991. Come up to the 5000-foot line. Do you see that?

A. Right there.

Q. What's that?

A. To me, that would look like an erroneous data point. I'm not sure what caused that pressure to be reported that high, but it clearly does not follow -- There are 23 data points for this well, and that one is anomalous.

Q. Let's go now and pick up the number 4 well.

A. Okay.

Q. The number 4 well is the PQ Osudo?

A. Yes.

Q. How does that well compare over time when you compare the pressure to time?

A. Okay, now we're starting to see that the reservoir pressures that we're drilling into are now below 7000 p.s.i. The well came in initially just above 6000 pounds but quickly fell down and fell right in line with these other two wells, the WEK and the State 15-1.

Q. Flip over to Exhibit 25 now -- 26. Are the PQ

Osudo and the State 15 in the same pod?

A. Yes, they are. Here's the PQ Osudo well, here's the State 15 well.

Q. What in your opinion accounts for the pressure reduction in the PQ Osudo well?

A. Okay, being that it's all in the same reservoir, the same tank, the WEK well has been producing all this time, drawing gas out of this reservoir. And we add the 15, the State 15 well drawing more gas, and by the time the PQ Osudo well was drilled, reservoir pressure was being depleted because of these two other wells.

Q. If the reservoir is oriented north-south through the west half of Section 10 and 15, that should connect the State WEL and the State WEK wells?

A. Yes, it should.

Q. Are they connected when you look at the bottomhole pressure over time?

A. The pressure does not match.

Q. Let's go to the fifth well on your Exhibit Number 25.

A. Okay.

Q. We're looking at the CC 3 State well?

A. Yes, that's one data point over here on the right, number 5.

Q. Your conclusion about this well is -- ?

A. Okay, once again it's above the 7000-p.s.i. line, virgin pressure, and as we talked about before, it depleted almost immediately, not connected to anything else. But virgin pressure when we drilled into it.

Q. Let's turn to the sixth well, that's the Osudo 9 --

A. Yes.

Q. -- which is the well in the north half of 9?

A. That is correct.

Q. What does that data show you?

A. Okay, once again, now we're even dropping a little further, we're below the 7000 line. It's in a reservoir that's already been tapped by another well, and it's not virgin pressure.

Q. All right, let's come back to Exhibit 27 at this point.

A. 27?

Q. Uh-huh. What are you doing here in 27? What are you plotting?

A. Okay, this is just a graph of the specific pressures associated with the WEK over time.

Q. Dealing with single -- the single well itself --

A. That's right.

Q. -- with the pressure data?

A. This is essentially the same graph that had all

of them compiled. This is just the single well, WEK.

Q. And then again you plotted this point at 5000 pounds in January --

A. Right, we took all of the public data, we didn't throw anything out, we took it all and plotted it on the graph.

Q. Turn to Exhibit 28. You've got a green circle?

A. Yes.

Q. And a number associated with it. What does that say?

A. What this map is doing is showing you, versus time, what's happened with the drilling of these wells. At the time the WEL was drilled, 2.9 BCF of gas had been withdrawn from the WEK. It's an attempt to visualize what's happening with the reservoirs.

Q. So you're putting this in a sequence of timing so that we can see production and pressure --

A. That's right.

Q. -- in the sequence of wells drilled?

A. Yes, because it helps tell the story.

Q. Let's turn to Exhibit 29. What are you doing here, Mr. Finnell?

A. Okay, now we're taking two wells, plotting them on the same graph, the WEK and the WEL, once again showing that the pressures are very different, different pressure

regimes, indicating to me that these are in two separate reservoirs.

Q. Exhibit 30? Exhibit 30 is dealing with the State 15?

A. Yes, it is.

Q. That's the third well drilled in the sequence?

A. That's correct.

Q. At the time that well has been drilled, how much gas has been removed from the area?

A. Okay, we've taken 5.3 BCF of gas out of the WEK, we've taken .3 BCF of gas out of the WEL.

Q. Let's see what happens when you plot that versus time.

A. Okay, Exhibit 31, this is the two wells. This is the WEK and the State 15-1. Once again, these two wells fall into the same pressure regime. We're reading the same pressure, bottomhole pressures, which is telling me that they're in the same tank, the same reservoir.

Q. All right, sir, if you'll turn to Exhibit 32, describe what we're looking at here.

A. Okay, now we're comparing the WEL to the north with the 15-1 to see if there's a comparison between those two wells, and what we see is, there is not. You've got the WEL once again maintaining its pressure, the 15 drops down and the reservoir is at a much lower pressure. These

two wells are in separate reservoirs.

Q. So if your task is trying to check the pressure production over time and link these wells north-south, are you able to do that?

A. No, I'm not, this shows me they're coming from two different sources, two separate reservoirs.

Q. Let's look at Exhibit 33. You're now looking at which well?

A. This is now the PQ Osudo well, and a time slice for that --

Q. This is the fourth well in the sequence?

A. That is correct.

Q. And prior to that you've withdrawn how much gas from these pods?

A. We've taken -- now we've taken 6.3 BCF of gas out of the WEK, .6 out of the WEL, .4 out of the State 15, and then the PQ Osudo is drilled.

Q. Okay, let's turn to see how they plot out on the pressure versus time, if you'll look at Exhibit 34.

A. Okay. Once again, now, we've got three wells which are all mapped in the same reservoir. The WEK comes in, falls down. The State 15 comes in, falls down right in line with the WEK. And now the third well, the PQ Osudo, comes in at a lower pressure and immediately falls down into the same pressure regime. All three of these wells

are coming out of the same reservoir, the same tank.

Q. Let's go to Exhibit 35. What are the wells being compared here?

A. Okay, now we're comparing the WEL with the PQ Osudo. Once again, different pressure paths. These are different regimes, which would tell me they're in separate reservoirs, they're not coming from the same source.

Q. And that's consistent, then, with Mr. Godsey's map?

A. Yes, it's very consistent with that map.

Q. Let's go now to Exhibit 36.

A. Okay.

Q. I'm going to ask you to compare a typo in the cum to date. See down there at the bottom?

A. The PQ Osudo --

Q. The PQ Osudo 9, it should be something else?

A. Yes, that shows .0. That's not correct, that's a typo. That should be .8.

Q. And .8 actually shows on the rest of the display?

A. Yes. Yeah, it matches.

Q. So the typo is just associated with preparing the exhibit?

A. Right.

Q. What are you trying to see now?

A. Okay, once again, this is showing the development

of the reservoirs, okay? We've got -- This is as of 1991, we're showing 6.3 BCF of gas in these separate reservoirs, and if we continue on with this, we see -- This is 1991. The WEK block to the south has cum'd very little additional reserves. Okay?

That's in contrast to the northern reservoir which has cum'd much more gas. In other words, the northern reservoir has continued to produce gas, the southern reservoir has petered out, it was drained.

These circles, then, represent the sum of the smaller circles and show that since 1991 only .9 BCF of additional gas has been taken out of this entire reservoir, in contrast to the 8.4 BCF of gas that's been continued to be drawn out of here.

The conclusion being that this reservoir was drained by the WEK well initially and is separate from this northern lobe. Had they been connected, you would have seen continuous gas spillover into this. They would have equalized, and you would have had gas being produced from all the wells. But we don't see that. These wells have run out of bottomhole pressure. And if you think back to the pressure graph that we just had, they were very low pressure. This drained it, not much left to get, and it's not being fed from another larger reservoir, which is this reservoir to the north. It's separated -- the way David

Godsey has this mapped, it's separated. That's why these wells are continuing to be prolific wells, they're not affected by this work that was done down here.

Q. Taking all the pieces together now, Mr. Finnell, summarize for us your conclusions.

A. Okay, let's go on to Exhibit 37. Okay, our data supports the laydown 320 acres. Okay, when you look at the production data, that matches. It's very consistent with Chesapeake's map.

When you look at the CC 3, that's consistent with the map.

When you look at the gas composition, it also fits very nicely in with the map.

Look at the volumetrics. It fits.

The area pressure data. It fits.

The mapping all fits together.

When we looked at all of these -- we're investigating -- as an engineer, I'm investigating -- looking at all of the possible tools I've got in my tool bag to make or break this map, and everything we looked at fit very neatly together to match Mr. Godsey's map. We didn't have to adjust anything, it all made sense when you put the puzzle pieces together.

MR. KELLAHIN: That concludes my examination of Mr. Finnell. We move the introduction of his Exhibits 1

through 37.

MR. OLMSTEAD: No objection.

CHAIRMAN FESMIRE: Seeing no objection to the introduction of Exhibits 1 through 36, they will be so introduced.

MR. KELLAHIN: I'm sorry, it was 37.

CHAIRMAN FESMIRE: 1 through 37. They will be so introduced.

At this time, why don't we take a break until three o'clock. It's my intention to go until five o'clock this afternoon, and then we'll start again tomorrow morning at ten o'clock, for anybody that needs to do some planning and calling over the break.

With that, we'll be adjourned until three o'clock.

(Thereupon, a recess was taken at 2:48 p.m.)

(The following proceedings had at 3:00 p.m.)

CHAIRMAN FESMIRE: Let's go ahead and go back on the record. Let the record reflect that it's three o'clock. We will be reconvening Causes Number 13,492 and 13,493.

The record shall also reflect that all three Commissioners are present as a quorum.

I believe, Mr. Kellahin, you have an announcement?

MR. KELLAHIN: Mr. Chairman, I would like to correct a statement that Mr. Finnell made on one of his exhibits.

Q. (By Mr. Kellahin) Mr. Finnell, would you go to Exhibit 25?

A. Yes.

Q. I think I confused you with my question. I asked you in comparing well 1 to 2, at the time 2 was tested and produced to --

A. Okay.

Q. At the time you started the second well --

A. Yes.

Q. -- the gas withdrawal from the first well was what?

A. 3.1 -- I'm sorry, I'm sorry, 2.9 BCF.

Q. I think you said 6?

A. Yes, I did. And it's further explained on Exhibit PE 28, if I may go to that. And this -- that's the production bubble down here at the bottom. It says 2.9 BCF of gas was pulled out when the WEL 1 was drilled. That is the correct.

MR. KELLAHIN: Thank you, Mr. Chair.

MR. DEBRINE: Mr. Chairman, one other matter to correct. Over the lunch break I brought the new GEO 7 and GEO 9 exhibits and distributed them to the Commissioners

and to counsel. We would just ask that those be admitted and the record reflect that.

CHAIRMAN FESMIRE: Yes, the record will reflect that the Commissioners have replaced Applicant's GEO 7 and GEO 9 with the revised, and that that has been provided to the other side; is that correct?

MR. DEBRINE: Yes.

MR. OLMSTEAD: Yes, sir.

CHAIRMAN FESMIRE: Okay. Mr. Olmstead, are you heading all the technical cross-examinations?

MR. OLMSTEAD: Yes, sir, if that's okay.

CHAIRMAN FESMIRE: Well, I guess the witness is yours.

MR. OLMSTEAD: Thank you, Mr. Chair.

CROSS-EXAMINATION

BY MR. OLMSTEAD:

Q. Mr. Finnell, when you go ahead and -- Let's go to your Exhibit Number 2.

A. Yes, sir.

Q. And now you've said that virgin pressure in this area is 7000 pounds.

A. Is greater than 7000 pounds.

Q. Greater than 7000?

A. Yes.

Q. And what's that based on?

A. It's based on the reservoir pressures that we saw from the WEK, the WEL and the CC State.

Q. What is the discovery well in this area?

A. Of the wells that we looked at that are on this map, the WEK was the first well drilled.

Q. Well, what's the discovery well for the Morrow field in this area?

A. I don't know what is, sir.

Q. If I told you it was the North Wilson P Unit in Section 31, a mile or two northwest of the KF 4 well, would you disagree with that?

A. No, I would not disagree.

Q. Do you know what the initial bottomhole pressure was for that well?

A. No, I do not.

Q. If I told you it was 6745 pounds, would you disagree with that?

A. I would not think that would be -- no reason to disagree with that.

Q. So wouldn't that be virgin pressure for the Morrow field?

A. In that reservoir, it would be.

Q. Okay. So virgin pressure can vary?

A. It certainly can, it has to do with the deposition, yes.

Q. Okay. Let's get to -- Let's go to Exhibit Number 3. What's your estimated ultimate recovery for this well?

A. We're estimating 16 BCF of gas.

Q. And how do you get to that?

A. From a decline-curve analysis.

Q. And what's the relationship on this Exhibit Number 3 between your tubing pressure and your gas rate?

A. Really isn't, that's just a reported flowing tubing pressure. It's monitored at the surface.

Q. No relationship?

A. The relationship -- the flowing tubing pressure can be affected by two things. One, it can be affected by what your pipeline pressure is, as the pressure goes -- continually drops from the reservoir to the pipeline.

Q. What is your pipeline pressure out here?

A. I don't operate that well, sir, I don't know. I'm going to guess that it's in the neighborhood of 500 pounds.

Q. What's this well currently producing?

A. I believe it's just under 5 million a day. Once again, we don't operate that well, but I believe it's just under 5 million a day.

Q. Do you know what the capacity is for this well?

A. I want to say the capacity is about 5 million, in my understanding. If you look at the way the -- the tubing

pressure, which is over here on the right, okay, initially they had it choked back -- we're in the 20-million-a-day rate, they choked it back, and then they opened the well up to get as much gas out of it as they possibly could. Then they've held it constant. And as they've held the surface pressure constant, the rate has dropped down as a function of decline in reservoir pressure.

Q. Let me ask you about that black dot right there, tubing pressure. Does that represent a shut-in tubing pressure?

A. I don't know what -- probably. It may have been shut down for a pipeline issue or a gas plant issue that would have affected that pressure. Because, you know, it correlates very well with a very low flow rate, right here at the bottom.

Q. Okay, let's go to your Exhibit 5, talk about the Hunger Buster 3. Were you aware that when they tried to complete -- excuse me, when they tried to -- Are you aware of the parted casing and other completion problems they've had with the Hunger Buster 3?

A. I do recollect that that was an issue with that well.

Q. And so you know, then, that they weren't able to get a frac because of the borrowed casing and that they, in turn, dumped the frac water onto the formation around the

wellbore? Are you aware of that?

A. No, I was not aware of that.

Q. Assume just for the purposes of this question that that's correct. Would those type of completion problems adversely affect the production rate and ultimate production from the Hunger Buster?

A. That could be a problem with that well, yes.

Q. So it could be just the poor completion, and not the amount of sand, that is actually adversely affecting the Hunger Buster production?

A. You could build a case for that, yes.

Q. Let's go to the next exhibit, Number 6. okay, the State WEL Com Number 2 well is the closest well to the Osudo Number 9 well; it's only 1320 feet away, correct?

A. Yes.

Q. All right. Doesn't that condemn any east-west-trending sand?

A. It doesn't condemn the map, because the map is not -- in that particular lobe, obviously a sandbody is not a linear function. But in this particular map, the way David -- If you look at the big picture, yes, it's east-west. If you look at those two data points, no, they do sit directly east-west of each other, but it doesn't condemn the map.

Q. Okay, next Exhibit Number 7, dealing with the KF

4 State Number 1. Let's see -- Now this KF 4 bottomhole pressure was actually higher than the Osudo, correct?

A. Yes, it is.

Q. And in fact, if I understand it right, the Osudo came on line, produced 2 BCF before you took -- over six months before you took this pressure reading?

A. Yes.

Q. And then it produced another BCF before you put it on line, right?

A. Yes.

Q. So 3 BCF, and then the KF State comes in hat high pressure. How can these two wells possibly be in communication? Wouldn't you expect a lower pressure in the KF 4?

A. No, because of the size of the reservoir and the distance between the two wells. Once again, if you look at the pressure regime, the first well was down here, that was the highest. Then we came to this well. It had been affected by that well, but at 54 feet of sand this a large, large reservoir, and it had affected the KF State, dropping it from somewhere above 7000 pounds down to 6600, but it has not dropped it to the same pressure that we see here. So I don't see a problem with that at all.

Q. Let's go to Exhibit Number 8, production graph. Let's see, so you've got a -- looking at your production

rate, that's a pretty flat rate, right?

A. Yes, it is.

Q. And what do you say your initial flowing tubing pressure is?

A. The initial flowing, the data is kind of scattered. Somewhere in the neighborhood of 2000 pounds, which would be about right there.

Q. I'm sorry, could you show me that again?

A. Yes, about 2000 -- flowing tubing pressure of 2000 pounds.

Q. And how much less tubing pressure is that than the Osudo 9, initially?

A. Let's go back and look. Back on Exhibit 3 we were showing, you know, 4000 pounds.

Q. Is this well choked back?

A. Which well, the KF State?

Q. The KF State 4?

A. Currently -- not now. It was up until that point right there.

Q. I'm sorry, okay.

A. Okay, you see the pressure difference?

Q. Yeah.

A. Our production personnel out of the Hobbs office maintained -- tried to keep it between 1000 and 1100 pounds by manually controlling the choke. At this point we made

the decision to open the well up to increase the maximum amount of rate, and opening the pressure here really did not affect our rate a whole lot. We got a little more, but not much.

Q. So you opened the choke to maintain the rate?

A. We opened the choke to maximize the rate.

Q. And so this well is producing at capacity at this point?

A. Yes, it is.

Q. At about 500?

A. A flowing tubing pressure of 500 to 600 pounds. Once again, which is more of a function of the pipeline pressure in the area and not the choke.

Q. And what's the pipeline pressure in this area?

A. Approximately 500 pounds.

Q. What's your EUR for this well?

A. I'll have to look at that up here. Well, I'm going to guess that this number is not going to be a very accurate number because of the lack of decline in this well. When you're doing a decline curve analysis, you have to have some sort of a decline to project. We're showing it on our books at 11 BCF.

Q. And what decline rate did you use to get that?

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

Q. Have you got a guess, an estimate?

A. It would be just a guess.

Q. Can you calculate it with the numbers you've got here on Exhibit 8?

A. No, I wouldn't want to attempt to do that right now.

Q. Well, at what flowing tubing point do you think this well will begin declining? At what flowing tubing pressure?

A. Well, the tubing pressure is going to remain constant. I don't see that --

Q. Because of line pressure?

A. Because of line pressure. We're not choking it back at the surface. The reservoir is what's determining how much gas is coming out of this well, not the choke at the surface.

Q. Let me direct your attention to this point on Exhibit Number PE 8. Does that reflect shut-in tubing pressure, do you think?

A. Yes, I would say that it does, because it matches up with the zero flow rate right down there.

Q. Did you do a P/Z graph on that?

A. No, I did not.

Q. Okay, let's go to Exhibit Number 9, and this is where you've got decline curves -- a separate decline curve on each well; is that correct?

A. Yes.

Q. And those wells are which ones?

A. We've got the Osudo 9 in green, the Hunger Buster in blue and the KF State in red.

Q. All right, let's go to Exhibit Number 11. Again you've got essentially a dry hole, the CC 3 State Number 1 well, due east of the KF 4, correct?

A. That is correct.

Q. And in your caption here you say that that little pod the CC 3 is in is about 6 to 11 acres, correct?

A. Yes.

Q. Well, just looking at your map, it looks a lot bigger than that to me. It looks like it covers up, you know, a substantial portion of that south 320. I'd estimate 80 to 100 acres. What would you estimate, based on your map?

A. The map would show 80 to 100 acres, I wouldn't disagree with that at all.

Q. Why the discrepancy?

A. Because David drew the map before I did the pressure buildup. So the pressure buildup is showing more pessimistic than David's map on that issue.

Q. So you might suggest Mr. Godsey's map is wrong at that point?

A. David's map may show that the reservoir goes

further to the east than it actually does. But once again, this -- Well, let me rephrase this. This map is a total net sand map of the middle Morrow. Okay, there are several -- this is accumulation of several sandbodies. The pressure buildup test on the CC State of the wells that were in communication with the wellbore are 6 to 11 acres. There may be other sands in this area that were not perforated in the CC State that may extend this way.

So when you break it down into the little pieces, 6 to 11 acres may be correct. When you add them all up together, it may look like a picture like that.

Q. Well, it might, but I think as you just pointed out, there's really no control to draw it over to the east like that, is there?

A. No, there's just one data point in that reservoir, and that confirms our pressure data.

Q. Okay, let's look at Exhibit Number 12. What's the date down there in the bottom left-hand corner? I can't read it.

A. I can't read it either.

Q. When was the bottomhole pressure run in this well?

A. It would have been one month, I believe, after the well was drilled.

Q. So that would have been 2004?

A. I believe that to be correct. Yeah, the CC State was drilling in September of '04 --

Q. Okay --

A. -- and the buildup test is dated November 17th -- the report is dated November 17th of '04.

CHAIRMAN FESMIRE: The date on the bottom there looks like --

THE WITNESS: September?

CHAIRMAN FESMIRE: -- October 11th, 2004.

Q. (By Mr. Olmstead) Well, that's actually before Mr. Godsey drew his map, correct?

A. I don't know.

Q. You don't know when Mr. Godsey drew his map?

A. I can't tell you the exact date that he drew that version of that map.

Q. Can I get you to go back to the Exhibit 11, please?

A. Sure.

Q. Did any of your engineering data or analysis get incorporated into where that boundary was drawn right there? Was --

A. I don't believe so.

Q. I'm sorry, I interrupted you.

A. I don't believe that my engineering data was involved in David's mapping.

Q. Okay --

A. I think David's --

Q. -- so there's no engineering data implied in this map?

A. No, my engineering data is to confirm that map, and it did.

Q. Okay, let's skip to Exhibit 15. Now again, in your caption you say, Mapping thickening sand between the two wells would be inconsistent with engineering data. So I assume you're talking about that area right there?

A. Inside the black circle, yes.

Q. Don't you have the exact same thing right down here between the State Well Com Number 2, which has zero feet, over here toward the Hunger Buster and the Osudo, a substantial thickness?

A. Yes, there is thickness down here. We're going from a zero line to a thicker line. The difference between those two data points is, on the dry hole here, we're starting at zero and moving to a thicker point. On the CC State I'm starting with six feet, I have to go to zero, start at zero, and then thicken. That's the difference between those two data points.

Q. Okay, but you just testified that there is no engineering incorporated in this map, correct?

A. My engineering cal- -- My engineering

conclusions, I don't believe influenced David's mapping of this. I was just --

Q. And earlier today, when I was asking Mr. Godsey some questions, he confirmed that he had some earlier maps that connected those -- connected that pod, correct? Were you here this morning?

A. Yes.

Q. Okay. Okay, let's see, Number 19. Now, do you know what the specific gravity is for the CC State Number 3 well?

A. Yes, I do.

Q. What is that?

A. It's .64.

Q. Why did you leave that off your -- That would be right there, wouldn't it?

A. Yes, it would.

Q. Why did you leave that off your exhibit?

A. Okay, at this point in our determination we had already convinced ourselves that the CC State was in a separate reservoir. Based on the production, based on the pressure buildup, that well was separate. So we didn't worry with that when we looked at the specific gravity. Our main concern was differentiating between this reservoir and that reservoir. That's why we left it off.

Q. Well, if we went with one of Mr. Godsey's earlier

maps where that pod was connected --

A. Uh-huh.

Q. -- so that you would use the .64, that would pretty much bust your specific gravity analysis, wouldn't it?

A. It certainly would, because that would be saying that they're in the same reservoir, which is contradictory to our pressure and our production data.

Q. Did you look at any other specific gravities for any well -- any other wells, say up in here, in the northwest?

A. No, we did not.

Q. You just looked at these -- these three?

A. Right.

Q. These six, I mean?

A. Yes.

Q. Is it five or six wells?

A. It's five wells, with one of the wells having two data points --

Q. Oh, okay.

A. -- over time.

Q. Let's go to 21. Well, let me back up, I'm sorry, I missed a question on Number 19.

A. Okay.

Q. Isn't it generally true that downdip wells are

richer and heavier? Isn't that a general rule of thumb? Therefore they would have higher specific gravity?

A. I would say in general that would be -- that's what you would think, yes.

Q. That's what you would think?

A. Uh-huh.

Q. So that's what we have here, right? These wells with the high specific gravity are downdip --

A. Are downdip from --

Q. -- and deeper?

A. Yes.

Q. So that could explain the difference in the specific gravities, correct?

A. That could be one explanation. But if you look at -- look at David's map, I was trying to draw an analogy within the same pod of the difference in structural elevation, but I haven't looked at that enough to answer that question.

Q. And in fact, specific gravity changes with time in each well, doesn't it?

A. Yes, it does.

Q. And would you generally expect specific gravity to decline over time, of a well? Over the life of a well?

A. I would -- well, let's look at -- Exhibit 17 shows the Osudo 1 over a 14-year period. Yes, it did

decline, it went from .67 to .65.

Q. Okay, let's go to your Exhibit 21, please, sir. Now, volumetrics is just a geometry problem, right?

A. Yes, you're taking an area and -- yes, building a tank.

Q. You're taking a container that's been provided to you by Mr. Godsey --

A. Uh-huh.

Q. -- and then you figure out how much it takes to fill that container?

A. It was the volume of that container.

Q. Okay. And so if a container is wrong or flawed in some way, your engineering is just going to confirm that flaw?

A. That's correct. That's why we did that.

Q. What did you use -- what did you assume for abandonment pressure in your volumetrics?

A. Reservoir pressure, I believe, of 1000 p.s.i.

Q. And what about porosity?

A. We used 12 percent.

Q. How did you get an h? Did you just take an average or --

A. No, we planimetered each of the isopach. So once again, we're trying to get a three-dimensional volume. So area A is going to be two dimensions, and then we isopach

each contour line within the isopach to get our height, to get our h.

Q. But you only planimetered within area A, right?

A. That is correct.

Q. Now, so why did you draw the boundary of this container right here on the lease line?

A. It had to do with well control in an area that we thought would be effectively drained by the wells that were already drilled.

Q. So you think that container, that area, stops right there at that west lease line?

A. For the area that's going to be affected primarily by the wells that we looked at, we thought that that was a reasonable place to draw the line. I mean, obviously you had to stop someplace. You couldn't planimeter this whole thing, that would just skew all the data. So we looked --

Q. But you've got the same thickness of sand right here to the west, all of this area here, correct? So you just arbitrarily --

A. We looked at a reasonable place to draw the line, and that's where we drew it, right there.

Q. Did you analyze the area -- how much area the WEK might drain -- the WEL?

A. You're talking about this well right here?

Q. Yes, that well right there, the WEL Com.

A. No, we did not analyze -- You mean from a volumetric standpoint? No, we did not do that.

Q. Now, for your volumetrics analysis to work, all four of these wells have to be in pressure communication, correct?

A. No.

Q. No? If they're not in communication with each other and -- so they're in separate reservoirs, your volumetrics will still work?

A. Yeah, the volumetric calculations will work. We're looking at a total volume. Now if they were in separate reservoirs, you would have zero lines in between them.

Q. Right.

A. Okay, so it would still work. So we volumetrically analyzed this map, the way it is drawn. So volumetrics isn't going to take int account...

Q. What did you assume for your water saturation?

A. I believe it was 10 percent.

Q. How about your formation temperature?

A. I don't have that recorded here. But on the assumptions that we use, we're consistent across the whole area.

Q. Okay, so can you give me a formation temperature

across the whole area?

A. I don't have that recorded here in front of me to tell you what that is. I'm assuming it's going to be in the neighborhood of 170 to 180 degrees.

Q. How about your reservoir pressure?

A. We had an initial pressure of 7000 pounds, and we took it to an abandonment pressure of 1000 pounds.

Q. And your Z factor, initial Z factor?

A. I don't have that recorded here.

Q. What was your recovery factor?

A. 82 percent.

Q. Okay, can you give me the EUR for the WEL well?

A. WEL. We're showing EUR of approximately 4.5 BCF.

Q. All right, let's go to Exhibit 22, please, sir. Now, did you use a computer program to -- Well, let's back up, I'm sorry.

A. What are we at, 21?

Q. No, sir, I'm sorry, 22, but I --

A. Okay.

Q. -- Let me start with a better question.

A. Okay.

Q. This black line going from top to bottom, that's your data line through the last date of production?

A. Yes.

Q. And what is that date?

A. I don't know what date is. It's not indicated. Sometime in, I believe 2006.

Q. Would July of '06 be approximate?

A. Approximate, yes.

Q. And so these two data points that you've dotted right here --

A. -- are projections.

Q. -- are projections?

A. Uh-huh.

Q. And did you use a computer program to project those data points?

A. Yes, we did.

Q. And what parameters did you use for that?

A. Well, it's going to be consistent. We can see from this, as these wells are coming on, we're very early in the decline stage, so an accurate -- a very accurate decline analysis is going to be difficult because of how early these wells are in their history. But by taking a similar decline to what we see up here, in this part of the line up here, we chose a reasonable decline and projected it forward.

Q. What area are you modeling there?

A. These are all the wells that are producing in area A.

Q. On this curve right here?

A. Yes, that's the summation of all of these wells, and this is where the total pod is producing in area A. That's the sum of those wells.

Q. Okay, you're talking about area A? Where is your model for the decline here?

A. Where is our model for the decline?

Q. Did you testify earlier that you used this -- you used a model for this?

A. No.

Q. To get up to here?

A. No.

Q. All right, then let me ask that again. How did you get these two points?

A. Okay, the last two points here are a projection of what we thought was a reasonable decline coming off of these two actual data points.

Q. Okay.

A. Okay, and the way to verify -- once again, it's a guess, it's a projection, but that line is a little more pessimistic or closer resembles this decline, which we've got more data, so we see what wells in the area look like, and then, you know, this part of the curve right here.

Q. Wait a minute. So -- I mean, so you could really toggle this line up and down --

A. You certainly could --

Q. -- fairly easily?

A. -- engineering judgment at that point.

Q. And going back to this decline here --

A. Uh-huh.

Q. If I can get the Commissioners just to refer back to Exhibit Number 9, because that's made up -- that's a total combination of the three wells, right? The Osudo -- So your total decline up here is actually a combination decline of the three wells represented on Exhibit 9, the Osudo 9, the Hunger Buster and the KF 4?

A. And the WEL.

Q. And the WEL.

A. Yes.

Q. And as you testified earlier, the KF 4 has no decline rate at this point?

A. That's correct.

Q. The Osudo doesn't have much of one, so you don't have much data to work with right there?

A. Yeah.

Q. And the Hunger Buster may be trashed because of the completion problems?

A. Or poor reservoir. You know, keep in mind, the Osudo 9 and the KF State came on natural, without needing to be stimulated. The Hunger Buster has been a dog from the very beginning, even before they tried to frac it.

Q. All right, but looking back at your Exhibit Number 9, all three of those wells are declining at different rates, and so now you're summing them up and assuming one decline rate for all four wells.

A. That's correct.

Q. Is that correct? Wouldn't it be more accurate to take each well's decline rate and get your EUR that way, and then sum those numbers?

A. You could do that. But once again, we're so early in the -- you know, all -- the Osudo 9, the KF State and the Hunger Buster are all in this area right here. I mean, this peak right here is the Osudo 9. The Hunger Buster is drilled after, we just don't have much data to work with. So to look at a bigger picture would be to go back in time and look at the whole reservoir in area A.

Q. Okay, let's go to Exhibit 23. Now which map -- which of Mr. Godsey's maps are these numbers based on?

A. I believe it's GEO 4, I believe that to be correct.

Q. Okay. And now, I'm sure you're aware that Chesapeake provided some volumetric numbers as part of their post-hearing brief, from the first hearing?

A. Uh-huh, yes, I am.

Q. Did you calculate those numbers?

A. I was involved with that calculation as well.

Q. Okay, and do you remember what those calculations were?

A. I have them somewhere in here, yes.

Q. Well, why don't I just refresh everybody's memory, and I'll show you what is a copy of that and ask this be marked and introduced as Cross-Examination Exhibit Number 3.

And now, would you state what volumes are in the southern 320 unit on Cross-Examination Exhibit Number 3?

A. Yes, when we did the original calculation we came up with 5.53 in the southwest, 2.01 in the southeast.

Q. Okay, and now your numbers on Exhibit 23 are somewhat larger, right?

A. They are.

Q. Why is that?

A. It has to do with the methodology and the map that we used. When the original map was done, we planimetered the three individual isopachs of the sandbodies that were done. Okay? That does not represent David Godsey's total net sand map. Okay, there's more gas in there than just those three reservoirs.

So we thought a more accurate number would be to map the whole net sand thickness, which is Exhibit 4. And that's why the numbers are different.

Q. Okay, so you used the same map for both

calculations?

A. No, that's not correct. On the first mapping we broke it down into three smaller pieces and then added them together to get the 5.53 that's on this piece of paper.

Q. Uh-huh.

A. We went back and thought, Well, wait a minute, that doesn't capture all of the gas that's in area A. That number is more reflected on the total thickness map, which is Exhibit 4, and when you do that map you end up with more gas, obviously, because there's other sand members besides those three that were isopached.

Q. Okay. All right, let's go to Exhibit 25, please, sir. Let's see, I think you previously testified that your abandonment pressure is 1000 pounds?

A. That's what we were using for reservoir pressure, yes.

Q. Well here you've got a whole bunch of reservoir data points below 1000 pounds. You've got the WEK 1 producing for about 30 years below abandonment pressure?

A. Yes, that is correct.

Q. How can that work?

A. Maybe we should have looked at a lower abandonment pressure. However, you'll notice that the amount of additional gas that was produced once that well got below 1000 pounds was very small.

CHAIRMAN FESMIRE: Your bottomhole flowing pressure is not going to equal your abandonment pressure, is it?

THE WITNESS: The bottomhole flowing pressure --

CHAIRMAN FESMIRE: Your average reservoir pressure at abandonment is going to be greater than your bottomhole flowing pressure prior to abandonment, isn't it?

THE WITNESS: Yes, I think that to be correct.

Q. (By Mr. Olmstead) Now these two data points here indicate that pressure reservoir -- bottomhole reservoir pressure increased. That doesn't happen, does it?

A. No, unless the wells were shut in for an extended period of time. Yeah, that does not fit the trend. Those two points do not fit that long trend right there, no.

Q. Does that indicate that these are bad data points?

A. I would not think so. And when I've got 23 data points and I've got two that don't quite fit the line, I wouldn't throw the 21 out to save the two, I'd do it the other way around.

Q. All right, let me ask you about well number 1 and 2 on your Exhibit 25.

A. Uh-huh.

Q. Well Number 2, the Osudo 9 --

A. No, Number 2 is the WEL.

Q. I'm sorry, WEL, came in at slightly less reservoir pressure --

A. Uh-huh.

Q. -- after just a couple of years. You don't think it was affected by the production from the WEK?

A. No, I do not. If you just looked at those two data points, you might come to that conclusion. But when you look at the whole picture, my conclusion is no, they are not connected.

Q. Well, if that's the case, then, if you're looking at the overall reservoir pressure around January of '03, it's got to be somewhere between 1000 and 2000, correct?

A. Which reservoir?

Q. Either one.

A. That's where it's headed, yes.

Q. Okay. And yet all of these wells came in at near virgin pressure. They couldn't possibly be -- If they were connected to any wells in these reservoirs down here, wouldn't you expect substantially less pressure in these new wells? I mean, that's 5000 pressure difference.

A. Due to the distance from these new wells from that well, the WEK, no, I think that's unacceptable -- or WEL.

Q. Well, how far is the WEL from the WEK? Did you factor distance into this?

A. Yes.

Q. How far away are they?

A. I have to look at the map. Approximately a mile. It looks like a little less than a mile apart.

Q. Okay, about the same distance as these wells to the new wells, correct?

A. Right, but it's also going to be a function of how large the container is. You know, you take a certain amount of gas out of a smaller container, it's going to have more of an effect than if you take that same amount of gas out of a larger container.

Q. Well, it's also going to be a function of how well connected they are, correct? I mean, you may have good permeability between these two wells or bad permeability, and they can still be connected?

A. Permeability will be a function of how fast they equalize. But over time, they'll equalize.

Q. Wasn't WEK a good well? It had good permeability, didn't it?

A. Yes. And that's exactly what this graph is showing. WEK was a good well, and it's sitting down here and it's not affecting the WEL to the north of it. I mean, if it was affecting it, they'd all be down here in the same pressure regime, and it's not. This WEL well has held its reservoir pressure independently of these other three wells

that are down here on the bottom.

Q. Wouldn't that really make the WEL tight, instead of permeable? I mean, it's still hanging up here.

A. Permeability may have an effect on it. I don't think it proves that.

Q. Okay, let's go to Exhibit 26. So again, you said virgin pressure is greater than 7000 --

A. Yes.

Q. -- and here we've got virgin pressure of 7354, so I assume virgin pressure has a range?

A. Yes.

Q. It varies, as you testified earlier, all over the area?

A. Each reservoir is going to have its own virgin pressure that may be slightly different, yes.

Q. Okay, Exhibit Number 27, again, I guess this is the same well we looked at before. It's got these two higher reservoir pressure points at the end --

A. Yes.

Q. -- where we know it can't be. Something's got to be wrong, right? --

A. Something's --

Q. -- either these two points are wrong, or those are wrong?

Exhibit 28, I think -- Let's go to 29 -- Okay,

Mr. Finnell, we're just about done. Let's go to Exhibit 36.

A. Okay, this is -- at what point --

Q. Okay, walk me through this one more time. What is --

A. Okay, the significance of this is, this is a picture that was taken in 1991, the way the slide is depicted right now, which is going to be different than the handout, okay? Showing the cum gas that had been produced at that point.

Q. Uh-huh.

A. Okay, since 1991 the southern block has cum'd very little additional reserves. The northern block, the northern pod, has continued to mature and produce a whole lot of gas. If you sum them all up, looking at them individually, the northern reservoir has produced an additional 8.4 BCF since 1991, while the southern has only added an additional .9.

Q. Okay, but if you just roughly look at this -- This is what you're calling the upper reservoir.

A. Yeah, don't include these two circles. That's a summation of these circles.

Q. Okay, I'm sorry.

A. Okay.

Q. This reservoir and this reservoir look about the

same size on the map, correct?

A. Yes.

Q. How much gas is left down in this reservoir?

A. I'd say very little, because it's not getting any support from this sand up here.

Q. So you started with the same size containers up here --

A. Yes.

Q. -- roughly 30 BCF up here?

A. Yes.

Q. So you would expect that about -- about that down here?

A. I haven't planimetered that lower section.

Q. But I mean just eyeballing it, it looks similar --

A. Okay.

Q. -- correct? This lobe up here has produced 8 in that time frame since 1991 --

A. Yes.

Q. -- this lobe down here has produced .9.

A. Yes.

Q. Does that indicate that the geology may be wrong?

A. No, that indicates the geology is right, because -- you know, this is since 1991. These wells weren't drilled until, you know, 15 years later. If these

reservoirs were connected, the gas in this reservoir would have been equalizing down here. These wells would have continued to produce. And we see that all the time, when you've got a well that doesn't look all that good on the logs and just produces and produces and produces, you know you're tied into something much bigger, something's feeding it.

This is telling me nothing is feeding this down here, it's isolated --

Q. So there --

A. -- from this up here.

Q. I'm sorry. So there were never any reserves down in this lower --

A. No, there were reserves, but they were all drained by the WEK. This well here drained the bulk of the reserves that were down here. So when you add this well, the 15-1, and the PQ Osudo, they don't help you much because you've already drained it with this, and there's not more gas feeding into this area from someplace else.

Q. And so the EUR for the WEK is what?

A. I don't know that off the top of my head.

Q. Oh, it's over here?

A. Okay, that's cum to date, that's not EUR.

Q. Oh, okay.

A. But it's cum'd 6.4 BCF, and this -- you know, in

essence, this pod down here is about done. And once again, if they were connected this gas would be trying to go to a lower pressure area regime and would be showing up being produced out of the -- in particular, this well right here.

Q. Okay, what are the sum of the WEK, State 15-1, PQ Osudo?

A. When you add them all together --

Q. Yes.

A. -- it's about 7.6 BCF of gas.

Okay, so why are the containers different? Because you've got a 50-foot contour in this pod, and there isn't one in this one. This container is bigger than that container is.

Q. Not by much. I mean, that's not a very big 50-foot area right there, is it? But that's a substantial difference in recoveries.

A. That's a substantial difference in container size when you're looking three dimensionally.

Q. Do you think maybe permeability may be the difference?

A. No.

Q. Permeability has no effect on this?

A. On ultimate recovery, no. Permeability will reduce the amount of time it takes to get it, but ultimate recovery should -- it will show up.

Q. So if Godsey's map is right and we planimeter this, we're only going to get 8 BCF. 8 BCF was here, and it's been drained?

A. In the sands that are connected -- that are in these wells, yes, I would assume that that's what that would tell us.

Q. So if the map would show more than that, the map has got to be wrong, correct?

A. That piece of the puzzle wouldn't fit.

Q. I'm sorry, Mr. Finnell, let's go back to Exhibit 23. Were you part of the decision to drill the KF 4 State?

A. No, I was not.

Q. Okay. Well, based on your Exhibit 23, where would you have drilled the KF 4 State?

A. You know, my job function doesn't go on picking locations, but down in this laydown 320 would be where I would drill.

Q. Wel, look at the north-south 320. It's almost as much, isn't it?

A. Once again, this is just one piece of the puzzle. When I'm sitting here with a 20-million-a-day well here, I want to get as close to that well as I can, because I know that's good. I'm guessing on this other area, I know that's good. I want to get as close to that well as I can get.

Q. You're guessing on the 6.4 BCF? in the southwest quarter?

A. We're taking in to parameters that we're having to infer, okay? There's some error here. When I'm selling 20-million-a-day gas, that's a captured quantity.

Q. Well, let me ask you this --

A. Uh-huh.

Q. -- does Chesapeake anticipate drilling a well in that quarter section?

A. I don't know.

Q. Wouldn't that make sense? Wouldn't that --

A. I'd have to --

Q. -- make sense to drill a well?

A. I'd have to look at the economics and determine whether the KF State is going to drain that whole 320 or not. I don't know.

Q. Well, I mean, you all could do a nonstandard unit and drill a well there, and you'd have 100 percent of 6.41 BCF, whereas now you've only got 50 percent of 9 BCF? Isn't 100 percent of 6 better than 50 percent of 9?

A. The picture is always clearer after the well is drilled.

Q. But you could do it now, right? You can do a nonstandard unit now, drill your own well on your property, give Samson back their well on their property, and you'd

come out ahead, based on your numbers, correct?

A. That takes in way more functions than I'm in control of.

Q. Well, I mean looking at Exhibit 23, I mean it's simple math, right?

A. This is a thicker sand here, yes. I mean, there's more reserves, according to our planimetering, here than there is here. Whether this well will drain or -- involved in that, I don't -- I mean, that's going to be part of it. How much is going to be left --

Q. But you testified earlier that the KF 4 EUR is what, 11 BCF?

A. I think that's correct.

Q. That's got to be coming from somewhere, huh?

A. Well, there's 11 BCF -- or close to 9 there, so it's going to be draining back to that map a little, potentially a larger area.

MR. OLMSTEAD: No further questions.

CHAIRMAN FESMIRE: Mr. Hall?

MR. HALL: No questions.

CHAIRMAN FESMIRE: Any redirect, Mr. Kellahin?

MR. KELLAHIN: No, sir.

CHAIRMAN FESMIRE: Commissioner Bailey?

COMMISSIONER BAILEY: (Shakes head)

CHAIRMAN FESMIRE: Commissioner Olson?

COMMISSIONER OLSON: Just a couple questions.

EXAMINATION

BY COMMISSIONER OLSON:

Q. On Exhibit 18, this is supposed to -- 18 and 19, with the specific gravity --

A. Okay.

Q. -- data, in a lot of your analysis, you used the Hunger Buster, but I didn't see any specific gravity for the Hunger Buster on this. Did you not have that data?

A. No, I don't think we did.

Q. Okay. And then on Exhibit 25, I think from all your testimony you were talking about differences in the initial bottomhole pressure from early drilled wells versus later drilled wells. You're showing a lower pressure, say, for the -- what you were seeing for the Osudo and the KF 4, versus the WEL. But then I notice for the WEK and the State 15, the State 15 came in 10 years later, but it had a higher initial --

A. Yes.

Q. -- bottomhole pressure.

A. Yes.

Q. I mean, how does that fit into your --

A. Okay, initially, like I said, I was very concerned about that. As I was looking at verifying David's map, that point bothered me initially.

Q. Right.

A. Okay, until we looked at the logs, and there is a stringer open in that well that's not open in the WEK. Okay, so the explanation for this is, the pressure support for that first data point came from a virgin reservoir that was very small in size. Okay? So when we perforated it we saw that pressure, then very quickly depleted, and when we take our next data point it's way down here.

So that explains -- the pressure could have come from that small sand lens. We drained it very quickly, and now we're tied into the larger reservoir that the WEK is in, and we get on line with that pressure. Okay? Does that make sense?

COMMISSIONER OLSON: Yeah.

THE WITNESS: Okay.

COMMISSIONER OLSON: That's all the questions I had.

EXAMINATION

BY CHAIRMAN FESMIRE:

Q. Mr. Finnell, my questions -- a lot of them revolve around this exhibit also.

A. Uh-huh.

Q. These pressure points, they came from the time that the OCD was requiring periodic shut-in pressure reports; isn't that true?

A. I believe that's correct, yes.

Q. And those reports required you to simply shut it in for 24 hours, was it?

A. I think that's correct.

Q. And take a surface pressure and calculate a bottomhole pressure from that?

A. Yes.

Q. Some of these wells are producing liquids, aren't they?

A. A little bit, I think that's correct.

Q. You say a little bit. If we look at the decline curve from area A --

A. It may show more than that.

Q. Which exhibit is that?

A. Twenty-two.

Q. You know, at some point we were making, oh, 7000 barrels a month; is that right? Of oil, in the three wells?

A. Yes.

Q. Okay, that's a pretty significant liquid cut, isn't it?

A. Right. But when you look back -- Okay, that's going to be the new high-volume wells that wouldn't have been that pressure reporting. You look back into the 1970s, now we're looking at making 30 or 40 barrels a

month. That's one or two barrels of oil a day --

Q. Okay.

A. -- when all that pressure data was taken.

Q. But the fact is, if you're going to calculate a bottomhole pressure from the surface and you don't know where the top of that liquid column is --

A. You need to know --

Q. -- you're going to have a significant error --

A. That is --

Q. -- in your calculations?

A. That is correct, that takes into -- the gradient takes into account that.

Q. Okay. And one of these wells -- and I can't tell from that graph -- one of these wells started producing water, didn't it?

A. It looks like there's a little bit of water on this graph, it shows up in the late 1990s, and then we've got some water with the newer wells.

Q. Okay. And --

A. About three barrels a day.

Q. Yeah, notwithstanding -- Yeah, about 180 barrels a month max, I guess. Notwithstanding what happened in the 1990s, only one of these wells looks to have produced any significant amount of water; is that correct?

A. Yes.

Q. If they're in the same reservoir, why would one produce water and the other two essentially not produce water?

A. One possible explanation would be the -- You know, there are several reservoirs that are open and, you know, several sands that are open. One of those may be wet. I haven't looked at that phenomenon, why one of them is making a little bit water.

Q. Okay, but you can see why I would be concerned that, you know, we're arguing they're in the same sands, they're in communication, they're the same thing, and all of a sudden one of them starts producing water.

A. Yeah, I was trying to look for a structural component that one might be down further. Yeah, I don't -- I can't rectify that with what I know right now.

Q. Let's go to Exhibit 23, and the KF well is in the quarter section there that has reserves of about 2.56 BCF; is that correct?

A. Yes.

Q. And the -- Chesapeake wants to make the laydown unit, the 320 laydown unit, so that it can -- so that the rest of that unit will be comprised of the quarter section that has approximately 6.41 BCF; is that correct?

A. Yes.

Q. So that's a total of about 9 BCF, and this is a

point that we touched on peripherally a minute ago. If you've got an EUR from that well of 11 BCF, where are the rest of those reserves going to come from?

A. Okay, it's going to -- Remember the reservoir picture. This is all nice and fat reservoir down here. So you could have some overflow coming from here. You know, we'd have to back to Godsey's map to show that, you know, the reservoir just doesn't stop at this line. It spills over, you know, a little bit into here. You know, and then you've got this nice thick area laying to the point here.

Q. Okay, so again going back to some of the questions that came up on cross-examination --

A. Uh-huh.

Q. -- would you have -- would this have been your calculation prior to drilling the KF?

A. I think David's map has changed slightly, but it would be close to that, but without a lot of well control in this area over here.

Q. Okay. And you may not be the one to ask this question, and the point of asking the question may not be to get an answer here, but why -- if you had that 6.41-BCF quarter section under lease, why would you have drilled in the other section?

A. Okay, I -- once again, I was not on the decision process. My understanding of management's decision goes

back to, you've got a 20-million-a-day well right here. You know that's good reservoir. We're mapping this over here, but we don't have a lot of well control to be 100-percent certain. I'm 100-percent certain that that well is making 20 million a day, so close-ology plays into the effect of our decision, management's decision to drill that well.

Q. I've heard an awful lot of engineers make that argument, and never a geologist. But the fact is that the initial rate of the well ought to be somewhat a function of the ratio of the reserves, and if you were to drill on a quarter section that you had under lease, as opposed to a quarter section that you didn't have under lease, you probably should have made double the well or better. Is that a good analysis? Using your numbers, using your numbers that you changed when you drilled the --

A. Post-looking -- Okay, keep in mind, we had no data points here before we drilled this well. Okay, so nothing in this section. It's all going to be inferred geology from David as to where he thinks that reservoir goes. Now we've got a data point right here that makes me feel much more comfortable about these numbers now than I would have before we drilled it.

Q. Okay, but you told me that they wouldn't have changed -- they would have changed little, if any, prior --

from the numbers you had prior to drilling.

A. That's right, but my confidence level in those numbers has gone up dramatically.

Q. Okay. Let's look at the specific gravity analysis on the gas.

A. Okay.

Q. Which one is that? Number 18? Do you happen to know how these samples were acquired? Were the bottomhole samples, were they --

A. No, I think they were pipeline samples.

Q. Pipeline samples?

A. I think that's correct.

Q. So what they did was, they take the flowing GOR and recombine it to get a bottomhole sample -- what somebody has calculated to be a bottomhole sample?

A. I don't know that. I think it's more a -- take a gas sample, run it through a chromatograph, and print out what the gas is.

Q. Okay. So you're the reservoir engineer. At some point as you lower the pressure in the flowing formation, at different points along that curve, along that pressure drop, you're going to have liquids fall out of the stream, are you not?

A. Yes.

Q. Okay. And depending on where you are in that

producing stream, your gas gravity is going to change as the liquids fall out, isn't it?

A. Yes.

Q. So if you were to take a downhole sample under static conditions --

A. Uh-huh.

Q. -- you could get one specific gravity. And then you flow that well for a couple of days, and at some point within the profile of the pressure drop to the well, you get below the dew point, you're going to change the specific gravity of that gas significantly, would you not?

A. Yes, as the heavy ends drop out, yes, your gas will get lighter.

Q. In fact, you just said it, it will get lighter.

A. Uh-huh.

Q. So this analysis, while very clever, could have been affected by how those samples were taken, couldn't it?

A. Yeah, I suppose it could have. And when we looked at this analysis, this wasn't the nail in the coffin, it was just one more piece of data that -- well, looky there, look how the numbers line up, and they fall right into the map, just the way the data mapped it.

Q. Now you made a statement -- and we'll have to go back, I think it's Number 1 that shows where the wells are -- that --

A. Number 2?

Q. Yeah, I'm sorry, 2. If the sandbodies were oriented north to south, the Hunger Buster would have been a better well. Can't you say that if the sandbodies were oriented east to west the WEL Com Number 2 would have been a better well?

A. Yes, you could probably make that statement.

Q. Okay, and the last question, and I say this with all due respect because I've been in exactly your seat answering the same questions --

A. Uh-huh.

Q. -- there's an awful lot of judgment in a decline curve, especially when you don't have any --

A. Absolutely.

Q. -- points?

A. Absolutely.

Q. So, you know, the analysis has some error inherent in it?

A. It certainly does. We're way early to be doing a decline curve. But we can use the best data we've got, make the best guess we can, and does it look reasonable?

Q. Now that decline curve was 25 or -- ?

A. Which one for area A?

Q. Twenty-two, I'm sorry.

A. Twenty-two.

Q. If your theory is correct, the EUR you calculate from the decline curve for the first well plus -- should equal the EUR you calculate from the decline curve for the two wells should equal the EUR you calculate off of the decline curve for the three wells; is that correct?

A. I think, if I understand your question right, yes. When you add them all up, they should equal.

Q. Right, because all that we're talking about is the rate at which it will be recovered. The total recovery should be the same, theoretically --

A. Theoretically.

Q. -- during that time; is that right?

A. I think that's correct, noting that the decline right now is going to be dominated by the Osudo 9 well.

Q. Okay, but you didn't attempt to extrapolate -- granted, you don't have much of a decline on the one well -- reservoir, but you didn't attempt to extrapolate those out to see if they were equal. Would that not have been a pretty definitive analysis of what we're looking at here?

A. You lost me.

Q. Okay --

A. Okay, so you use the decline on this part right here?

Q. Yes.

A. Okay, no, because this is already captured oil.

Okay? So our decline analysis for EUR is going to take this increment of oil that's left to be produced and add it to the oil that's already been produced as of our date line.

Q. But if it's true in one reservoir, and no matter how many wells you have in it, shouldn't your --

A. Shouldn't you drain the whole thing with the one well?

Q. Should be draining the same reservoir?

A. Right. And if you notice, this well kind of goes flat through this area.

Q. And one would expect that for a large --

A. Sure.

Q. -- reservoir?

A. For a large reservoir, and that is what I said. When you run into those, you know, you look like it ought to be depleted, and the well keeps hanging in there, hanging in there, hanging in there. That's telling you you're connected to a much larger reservoir, you need to start looking for an offset because there's more out there than what you've found.

Q. Okay, but now with the two wells in it, you've got a pretty well established decline there, don't you?

A. Okay, are we talking about this area right here?

Q. Yeah.

A. Okay, once again this is the same well. Okay? This well, I believe, was stimulated back here in 1991. Additional wells don't come on line until up here.

Q. Oh, that's both of the wells coming on line?

A. Yes. I mean, this is -- all the flurry of activity that happened since 2005 is all contained right in that little spot, right there.

Q. Okay, so this is one well producing for twenty-some-odd years?

A. Yes --

Q. Then being --

A. -- thirty years.

Q. -- stimulated?

A. Right, twenty years, right, being stimulated --

Q. Okay, and then two wells added later?

A. Two added --

Q. Okay.

A. -- right up there.

Q. Right. But theoretically, shouldn't the decline curve from the stimulated one well equal the total EUR --

A. So if you drew this line all the way out here --

Q. Right.

A. -- and it's a flatter decline than what this is showing, yeah.

Q. Right, but --

A. The area under the curve looks like it's going to be similar.

Q. So if you do that analysis and the number comes out the same, wouldn't that be pretty definitive support for your theory?

A. At first glance I would say yes. The only problem that you run into is just how long -- I mean, if you're trying to drain a well and you're trying to drain reserves that are a mile and a half away from you, when you get down to the very skinny part, does the well go uneconomic and you don't recover those reserves because of a time factor.

CHAIRMAN FESMIRE: I don't have any other questions. Mr. Kellahin --

MR. KELLAHIN: No, sir.

CHAIRMAN FESMIRE: -- do have any redirect?

MR. OLMSTEAD: No, sir.

CHAIRMAN FESMIRE: Okay, I'm assuming that the witness can be excused?

MR. KELLAHIN: Thank you.

MR. OLMSTEAD: Yes, sir.

CHAIRMAN FESMIRE: Thank you, Mr. Finnell.

Do you have another witness today or --

MR. KELLAHIN: Mr. Chairman, our direct is concluded at this point.

CHAIRMAN FESMIRE: Okay. Do you want to close or reserve your close for the end of --

MR. KELLAHIN: We'll reserve our close for the end of the entire presentation, when we hear the opposition case.

CHAIRMAN FESMIRE: Okay. Mr. Olmstead, are you going to be doing the direct on the technical case also, or --

MR. OLMSTEAD: Part of it. We're going to share that, if that's all right, Mr. Chairman.

MR. GALLEGOS: We'll need a little break to change the computer and all the electronics around here and --

CHAIRMAN FESMIRE: How long do you need?

MR. GALLEGOS: -- the projector and stuff. Ten minutes.

CHAIRMAN FESMIRE: Okay, why don't we take a 10-minute break and reconvene at 20 after?

(Thereupon, a recess was taken at 4:11 p.m.)

(The following proceedings had at 4:20 p.m.)

CHAIRMAN FESMIRE: Why don't we go on the record, and Cheryl will be in in just a minute?

The first thing we need to do is, Mr. Olmstead, your witnesses are all present?

MR. OLMSTEAD: Yes, sir.

CHAIRMAN FESMIRE: We're going to need to swear them. Would you ask them to stand and be sworn?

MR. OLMSTEAD: Please stand and be sworn.

(Thereupon, the witnesses were sworn.)

CHAIRMAN FESMIRE: Let the record reflect that we've gone back on the record and that all three Commissioners are present, the quorum is thusly still in effect.

Mr. Olmstead, your first witness, please?

MR. OLMSTEAD: Yes, sir, it's Mr. Lynn Charuk. May I make a short opening statement?

CHAIRMAN FESMIRE: You may, sir.

MR. OLMSTEAD: Thank you, sir.

Samson will be presenting two geologic witnesses and one engineering witness in support of its numerous technical exhibits.

Samson's first witness, Lynn Charuk, is an independent prospecting geologist who's sold some of these very prospects to Chesapeake. Mr. Charuk will testify that he showed Chesapeake's geologist and management his maps in the middle Morrow sand, that Chesapeake bought his prospective acreage and immediately drilled a well based on Mr. Charuk's mapping.

What you will see is almost identical to the mapping of Samson's geologist, Ron Johnson here. In fact,

Samson recently purchased a seismic line that runs on the north line of Section 4 here, which completely confirms Samson's geologic interpretation.

The Central Basin Platform to the east of the subject unit is the key to this dispute. If the Central Basin Platform is not capable of sourcing the subject middle Morrow B sand in this area, then Chesapeake's case crumbles.

We will show that the overwhelming weight of the published authority clearly demonstrates that the Central Basin Platform was not a source of any Morrowan sandstone, and that the middle Morrow B sand is, as Samson mapped it, a series of very narrow fluvial river channels flowing from north to south and sourced from the huge Pedernal Uplift up to the north.

The record will show that the Central Basin Platform did not take its current size and shape as represented here until 20 million years after the Morrow was deposited.

On February 27th, 2005, Mewbourne logged over 40 feet of middle Morrow sand pay in the Osudo Number 9 well here, just south of the subject KF 4 here. Within two weeks, Chesapeake had filed its APD for the KF 4 due north of the Osudo 9 well. Immediately thereafter, Chesapeake filed an APD for the Cattleman State Number 4 well, again

due north of the KF 4 well location.

As you can see, all of Chesapeake's actions have been in a north-south direction, not east-west. In fact, even though Chesapeake owns the acreage due west of the Osudo 9 and the KF 4, they have yet to file an APD for anything west of the subject area. So Chesapeake's actions are completely inconsistent with its own alleged interpretation.

However, Chesapeake's actions are consistent with Samson's geologic interpretation. Thus we know that Samson's southwest quarter, here, is productive because of the KF 4 Number 1 well. Accordingly, Samson knows that its middle eastern 160-acre tract immediately north of the KF 4 is also productive. Samson obtained the appropriate unitization agreement from the New Mexico land commission and pooled these two quarter sections into a standup 320 unit. Samson was prohibited from drilling its voluntary pooled unit due to Chesapeake's prior APD for the KF well.

Conversely, Chesapeake's acreage to the southwest quarter is essentially condemned as nonproductive by this dry hole immediately to the north, which is the Jake Hammon State Number 1 well. Because Chesapeake's southwest quarter is nonproductive, it has no correlative rights to protect.

Notwithstanding Chesapeake's claims, I think

you've seen that Chesapeake has been very selective and inconsistent in its well analyses and mapping and has, in fact, had to manipulate the engineering and geologic data to force it to fit its very strained interpretation. The valid reservoir pressures actually support the north-south trend.

Chesapeake has no independent corroboration of its interpretation, but Samson has at least two here today, Mr. Charuk and Mr. Jim Wakefield of Kaiser-Francis. Kaiser-Francis and Mewbourne both support Samson's interpretation, even though they have no dog in this fight. They have -- they will have the same interest, regardless which unit is approved. Their only motivation is to be in the unit which contains the best second well. They both know that the standup 320 proposed by Samson will provide them the best second well.

In fact, Mewbourne just permitted this well down here in Section 15, in the thickest part of the sand as mapped by Samson, and Samson just permitted a well due north of the KF 4 in Section 32, both consistent with a north-south trend and Samson's map.

Thank you very much, and we will call Mr. Lynn Charuk.

CHAIRMAN FESMIRE: Mr. Charuk, you've been sworn?

MR. CHARUK: Yes, sir.

MR. GALLEGOS: And Mr. Chairman and members of the Commission, let me advise you that we'll be referring to Exhibits 54 through 57. They are in Volume 2 of the white exhibit notebooks that have been provided to the -- or, I guess in some cases, red wells [*sic*] where you Commissioners held on to your exhibits from the last hearing.

LYNN S. CHARUK,

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

DIRECT EXAMINATION

BY MR. GALLEGOS:

Q. Would you state your name, please?

A. Lynn S. Charuk.

Q. Where do you live, Mr. Charuk?

A. Midland, Texas.

Q. What is your business or profession?

A. I'm a petroleum geologist and prospect generator and an independent.

Q. What is your education that has prepared you for that profession?

A. I have a BS in geological sciences from Penn State University, 1979.

Q. What have you done in the oil and gas business after obtaining that degree from Penn State in 1979?

A. I traveled down from Pennsylvania to Midland and found a job as a mudlogger, and I logged wells in the Delaware and on the eastern shelf. I probably logged, in a period of two years, 700,000 or 800,000 feet of samples.

After that I got a job with J.C. Williamson, who was an old prospector from Midland. He was active in many big discoveries in the early part of the Permian Basin, and when I got there early we discovered some Delaware -- very prolific Delaware fields in Eddy County. I worked with J.C. for approximately eight years until 1989.

I went independent and as a consultant for Kerry Petroleum out of New York City, who was an offshoot from the board of directors from the U.S. Mining, Smelting and Refining Company, and I ran their office in Midland from 1989 as a consultant.

And I went totally independent in 2002, and I've been an independent ever since.

Q. And when you say you've been totally independent, would you describe what you do?

A. Well, over the years I've acquired, you know, oil interests, oil and gas royalties and working interests, enough money to, you know, maintain my family, and we generate prospects like this one here, the Osudo area.

We usually -- my partner and I -- I have a partner, his name is Mitch Cheney, he's also a petroleum

geologist, used to be with Exxon. He lives in Houston now. We generate prospects, we go to the federal and the state lease sales in New Mexico. It's all -- I'm strictly a New Mexico, southeastern New Mexico, prospect generator.

And we go to the lease sales, and we usually have a couple of investors that will put up -- help us with acquiring leases in specific areas that we want to, you know, drill our prospects on. And we put our own money in the prospects as well. We buy in the leases, you know, we'll sell the prospects to operators like Samson and Chesapeake, and part of our trade will include some overrides that will keep individually, and we'll also usually take a working interest in everything we do.

Q. Can you give the Commission some rough idea of how many -- in how many instances over how many years you've examined in detail potential oil and gas prospects in southeast New Mexico?

A. Oh, I've been prospecting southeast New Mexico for 26 years. I've been really heavily involved in the Morrow sands, particularly in Lea and Eddy and Chaves County, for the last dozen years or so. I've drilled many successful wells in the Morrow. The last well we drilled and completed is currently making 5 million a day and 300 barrels of oil up the casing up in Chaves County, so it's probably been 30 or 40.

Q. Let me ask you specifically about mapping the Morrow, and what I'd like to have you tell the Commission, your experience personally in mapping the Morrow, as well as being exposed to other experts in the field doing that kind of mapping.

A. Well, I like to first go through an area like the Osudo area and generate several east-west cross-sections and north-south cross-sections and determine which sand, whether it's Morrow B or Morrow A, which sand is the most prolific, how many completions it has in it. I use a porosity cutoff of about 6 percent -- exactly 6 percent, and we generate -- based on those parameters we'll generate isopach maps and structure maps.

Q. What is your knowledge concerning the custom and practice of others who are petroleum geologists working in that area, as far as their mapping practices?

A. I think I'm pretty much conventional with everyone else. I feel -- From talking with other geologists over the years and going to meetings and reading the various publications that are out there, I feel like I'm pretty much conventional with most -- 98 percent, 99 percent of the other geologist that work the Morrow.

Q. Mr. Charuk, have you previously had your qualifications accepted in order for you to testify as an expert petroleum geologist before the New Mexico Oil

Conservation Division?

A. Yes, I worked on the West Lovington-Strawn Unit for Charles B. Gillespie several years ago, and yes, I have testified here before.

MR. GALLEGOS: Okay. Mr. Chairman, Mr. Charuk is primarily being called as a fact witness, but we would ask that his qualifications be accepted as an expert petroleum geologist.

CHAIRMAN FESMIRE: Mr. Kellahin?

MR. KELLAHIN: One question on voir dire, Mr. Chairman.

CHAIRMAN FESMIRE: Please.

VOIR DIRE EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Charuk, did you participate in or draft any of Samson's geologic exhibits --

A. No.

Q. -- that are using in this case?

A. None. My exhibits --

MR. KELLAHIN: No objection.

THE WITNESS: -- are totally independent of Samson's.

CHAIRMAN FESMIRE: Okay, Mr. Kellahin has no objection, so you'll be so accepted as an expert --

THE WITNESS: Thank you.

CHAIRMAN FESMIRE: -- in addition to the fact.

DIRECT EXAMINATION (Resumed)

BY MR. GALLEGOS:

Q. (By Mr. Gallegos) I will be asking you about Exhibits 54 through 57. Were those prepared by you, Mr. Charuk?

A. Together with my partner Mitch Cheney, yes.

Q. Okay. Now did you develop a prospect in the Osudo field in Township 21 South, Range 35 East, in the last few years?

A. Yes, I did, I've been very active in this area since about 2003, when I first started to investigate this area, and this was probably before -- well, it was before all the other activity has occurred in the last several years. But when I first started in this area I noticed a lot of well control in a north-south trend in this western channel on the western side of my map.

Q. For the record, are you referring to Exhibit 54?

A. Yes, Exhibit 54.

Q. All right. What does that show?

A. It shows a very, you know, linear trend of production, and all these wells that are circled green here are Morrow completions. It also shows, also, a fairly high density of wells right in this area. And at the time there was a pretty huge gap of open acreage right in here, and

then down to the south there was a series of some very nice Morrow completions in this area as well.

And what this isopach is, we've -- and I've explained it to several of the people here previously. It is a -- After we did a series of east-west cross-sections, in this direction, and north-south, we found through our analysis that there was one sand that primarily produced in 85 percent -- approximately 85 percent of all these wells, and we called that the Osudo sand.

And so we focused primarily on one sand in the middle B Morrow clastic zone. We didn't group all the sands together, because we felt like that was getting confusing. We wanted to see what the main pay was doing and how much EUR could be made out of that one sand, because we figured that if we drilled for that sand we would have enough serendipity to find several of the other sands stacked in there, and that would just be icing on the cake.

So in this map here you might see some bubbles that indicate Morrow production that are outside of my isopach map, and that's because those wells and several others in the area are actually completed in another sand, and the Osudo sand was zero, according to my evaluations.

Q. Okay, so is what you're referring to as Osudo sand, is that fairly commonly known as the Morrow B sand?

A. Well, it's one sand in the Morrow B sand package, it's just one individual sand, and some of my other cross-section montages in the other exhibits will show that.

Q. I just wanted to clarify because you've used the term "we" several times. Are you referring to you and your partner?

A. Mitch, Mitch and I, Mitch Cheney.

Q. And what are Mr. Cheney's -- what is his profession?

A. Well, he graduated with a petroleum geology degree from the University of Michigan, and he worked for Exxon for seven or eight years before -- prior to being an independent.

Q. Okay. Now when did you do the work that's reflected on Exhibit 54?

A. I started this study in -- sometime in 2003. And this is just a portion of the area that I studied. I actually had another four townships down here and a couple more to the west that I included, and this is one portion. It was like a quarter of it.

Q. What was the objective that you and Mr. Cheney had in mind in doing this work?

A. Well, when we first started to look at this area we noticed a lot of good wells along here, the Wilson wells, the discovery well, the 28-BCF well there in Section

4. We saw a long linear trend of really good Morrow production over here.

And then in this third channel over to the east we found a couple 10-BCF-type wells down here in Section 33. And then what really caught my eye as an explorationist is a series of three wells, the Hunt well, the WEK well in Section 15, and the WEL well in Section 10. And at the time, those were the only three producing wells. There was a dry hole right over here to the east, the Julia well, drilled by Matador several years ago. No sand. There's the C&K well, the Wilson State Number 1, right here in Section 9, completely no sand.

So as I modeled these linear north-south trends here, I applied the same logic to this third trend over here, even though I had limited well control. My initial prospect idea was, well, here's three wells in a row. I mean, you know, it's not rocket science, but let's drill a well right up here in Section 3 to the north and continue on to the north and see what kind of a Morrow sand we can find over there.

At the time this well, the WEL well, had made about, I think, 3 BCF, but I noticed one thing about it was that it was frac'd in 1995, which indicated to me that these two reservoirs were probably in communication, but there was a permeability barrier between them, because this

WEL well was very tight. But when they did a bottomhole shut-in pressure on that well, they actually discovered very high pressures. And when they frac'd it, that's when they really, you know, made that well come alive, and it's probably double -- it's going to double its EUR.

So that area here told me that there was at least some, you know, conductivity between these two wells, and going north in the southwest quarter of 3 there would be a logical place to drill a well.

Q. Okay, was there anything in the study that you and Mr. Cheney did that indicated that there was any kind of an east-west trend in these Morrow sands?

A. From my experience, I'm a proponent of the Pedernales that runs up here to the northwest, as well as the Matador Arch that runs across here in an east-west trend that's kind of north of Lubbock County and that direction. I'm a proponent that that sourced all the Morrow sands.

I don't know of any source on the Platform that would be able to provide enough clastic quartz to feed a channel system running east-west in here. When you look at the -- There's plenty of seismic lines that have been shot on the Central Basin Platform, there's plenty of well control, it's tightly drilled. There's just not any quartz sources, other than the basement rock below the

Ellenburger, that could provide enough source for any kind of clastic sediments coming off the Central Basin Platform. It's true that there was probably some sediment shed, but it just wasn't the right kind of sediment.

Q. Did -- In performing this study, did you also prepare some cross-sections?

A. Yes, we have two montages. This first one here is a field study that we did --

Q. This is Exhibit 55?

A. Exhibit 55, and it's a north-south field study starting up here in this central channel, which actually showed the -- goes through the discovery well right here, which is the British American North Wilson Number 1 in Section 31, and going down through the second British American Well Unit Number 2, which is the big well in the township, it's made the 28 BCF. And we continued it further on down south until we got into, I believe, Section 17, the old Texaco well.

And the two maps that I've generated, this is my marker here, this dark line right here. It's called the Morrow clastics. That dark line is what I generated my structure map on. And then you can see in the Morrow B, which is right under the Morrow clastics marker, a series of sands. But the one that -- you know, that we felt like was the most continuous is a dark yellow here. We call

that the Osudo sand. And that's the sand that I isopached to generate this isopach map.

Q. Okay. And then was there an additional cross-section that --

A. Yes, there's another cross-section --

Q. All this was done at about the same time?

A. Yes, all this was done like over the Christmas of 2003 to January, February of 2004. And this is the prospect cross-section. It goes through the three wells that I talked about earlier, the Hunt well that made about, I believe, a half a BCF and 30,000 barrels of oil.

Then this is the WEK well. It's perforated in two sands, the little skinny one being what I'm calling the Osudo sand, and this lower big fat one is kind of a stray second zone.

And we go updip to the north, and we're also thinning in the Morrow B as we go north. This is the WEL well in Section 10, which shows the Morrow Osudo sand present right there. And then finally going through my prospect location in Section 3 and then over to the Jake Hammon well -- No, I'm sorry, the Warrior WEL well in Section 32, right over here. Because at the time, that was the only well that we had in this area to tie the north end of the cross-section to.

And you can see it had several DSTs, I believe.

I'm trying to read, it's kind of -- it's been a few years since I looked at this, so forgive me, Mr. Chairman. But there's not very much sand, Morrow clastic sand, in that section there.

Q. Okay, about how much time did you and Mr. Cheney spend in order to work up this prospect?

A. Oh, when you put a prospect together, you know, you lose track of time. I mean, I'm thinking 200 to 300 hours apiece, easily, work on this, to do the studies, to generate the maps, to change the maps, to -- you know, just get everything just right, you know.

Q. Okay, now based on your studies and the work you did, did you and Mr. Cheney endeavor to obtain lease positions in this Osudo field area?

A. Yes, we did. Can we go to --

Q. Can we go to Exhibit 57?

A. Yes, this is a good map. This is actually the structure map that we generated based on well control and also on some old ARCO (BP) 2-D seismic that we had available to us in this area. We were working at the time -- we had a kind of an agreement with ARCO (BP), and we had access to some of their well files, and we had some old 2-D seismic that ARCO had shot, and --

Q. Okay, so slow down and point out to the Commission where you were able to obtain lease acreage in

this Osudo field, as portrayed on Exhibit 57.

A. The first acreage we acquired was this dark green acreage, and it was all a term lease that we acquired from BP in -- I guess it was 2003, 2004. It's about a section and a half total acres, and it's in this dark green.

The second tract of acreage that we acquired in 2003 was this south half of 15, which is just south of the WEK well, which was the discovery well for this easternmost channel, and also we acquired the southwest quarter of 14. And those are both state leases that we bought at the state sale for -- I think we paid $500 an acre for.

And similarly, I think the next state sale, this acreage came up, another 480-acre tract --

Q. Section 27?

A. Twenty-seven, in the same north-south trend, and we acquired that together with two other partners I have in Midland.

Q. Okay, so at that point, considering all the work, the studies you've done, the displays you prepared and the acquisition of the leases, what was your investment in this prospect?

A. Half a million dollars, maybe a little more.

Q. Okay, and at that point were you ready to develop it yourself, or what was the next step that you took?

A. We don't operate, we always put these things

together and make a nice package, and then we go find a good, credible operator that was willing to take, you know, 75 or 85 percent of the prospect, and then my partners and I, somehow we'll take the balance and we'll drill with them. Or if we think the operators are kind of -- maybe a little too expensive for our blood, we may just sell the whole thing out and not join but keep an override.

Q. All right. So in your effort to sell this prospect did you contact Chesapeake?

A. Yes, Chesapeake was on our list, along with Samson. We showed it to Samson, we showed it to Chesapeake, uh-huh, but Chesapeake --

Q. Okay, let me ask you specifically about that. About when did you contact Chesapeake concerning this process?

A. It was probably April of 2004, maybe May of 2004, maybe the early part of May, a couple of years ago.

Q. All right, and what happened when you mad that contact?

A. They were immediately interested. We talked to Mike Hazlip, who is their head landman, and we called them. They called us back very fast, they wanted to see it as soon as possible. And we had a meeting scheduled in Tulsa, and right after that we drove from Tulsa to Oklahoma City to meet with Chesapeake.

Q. Okay, and that probably was in May of 2004?

A. Yes, yes, sir.

Q. Okay. And when you met with Chesapeake, who was present in that meeting in behalf of --

A. Mike Hazlip was there, Linda Townsend, who is a land person at Chesapeake, David Godsey and Mike Brown.

Q. Okay. Do you -- We know Mr. Godsey, but do you know what the discipline is of Mr. Brown?

A. He's a geologist.

Q. All right. At that time did you put a price on this prospect?

A. We talked about the prospect first, we presented the geology to them. Everybody seemed to really like the prospect. I saw a lot of nodding heads in the room, we were all in agreement. We talked about the Pedernales as the source, we talked about the Matador Arch as another possible source.

Q. Well, let me ask you specifically. In your presentation, did you lay out and make available for examination what we now see here in this hearing as Exhibit 55 -- excuse me, 54, 55, 56 and 57?

A. They have copies of 56 and 55.

Q. All right.

A. We presented these larger maps, but we don't like to leave these larger isopach or structure maps, because we

feel it's too much data to leave at an office. We're not comfortable with leaving all our ideas and all our work.

So if you go back to the other -- what we end up leaving with our prospective buyers are montages that show the relationships of the sands, and portions of the structure map and a portion of the isopach map that shows our prospect area.

Q. Okay, but my question was not what you left with them, but what did you show to them?

A. What we're looking at here today.

Q. At least all four --

A. Oh, yes, I think there were several others, other cross-sections that I didn't include.

Q. All right.

A. This was the majority of it. And this is also in the area of interest that we're talking about today. Section 4, as you can see, is right there to the west of Section 3 where they drilled their CC State Number 1.

Q. All right. Now to ask the obvious, is it clear that what you presented to them showed a north-south depositional framework?

A. Yes, we felt the north-south was pretty well defined on this isopach map, uh-huh.

Q. Okay. Did you discuss the nature of those sands?

A. We discussed the direction of deposition, and

generally we were talking about north-to-south deposition.

Q. Do you recall any discussion about the Central Basin Platform having any kind of role in the --

A. Well, this is --

Q. -- in the laydown of these Morrow sands?

A. -- this is the Central -- the western edge of the Central Basin Platform, right over here. And no, there was no discussion of an east-west channel trend or anything like that.

Q. Okay, I'd like to ask you in particular if there was any reaction by Mr. Godsey that indicated any sort of challenge or disagreement with your mapping of --

A. No, we felt like at the time we left the meeting that -- and we've been in lots of meetings selling deals over the years -- we felt like Chesapeake really liked our work, they really --

Q. Any challenge -- Excuse me, and Mike Brown who you said --

A. There was no challenges of anything, other than just minor little things, maybe of a wellspot location or a cum or something like that.

Q. All right. And what happened next in regard to presenting this to Chesapeake?

A. Well, this was approximately 4:30 in the afternoon when we left the Chesapeake offices in Oklahoma

City, and we got a call from Mike Hazlip the next morning at 8:20, before we even got on the airplane from Midland, and they wanted to buy our prospect --

Q. Okay, and what -_

A. -- acreage.

Q. -- and then what happened?

A. Well, we got into a negotiation with our price versus what they wanted to pay, and also on the acreage that they wanted to acquire, versus what we owned. And at that time they wanted to acquire --

Q. Is it better to use --

A. Yeah, let's go back to --

Q. -- 57?

A. -- go back to 57. We wanted -- At the time, we were talking with Mike. They wanted to acquire this acreage in green, and they wanted to acquire this 480-acre state lease in Section 27, and they actually didn't want any of this state lease in Section 15 and 14, because they felt that that area could have been drained by the WEK well, I guess. But they never were really specific on why. They just wanted this northern acreage and this southern acreage.

Q. And so did you make a deal, and were those leases assigned to Chesapeake?

A. Yes, we made a -- we finally came to terms on a

price and on a net revenue and on a -- you know, on a -- you know, on a back-in override after the well paid out. Yes, we came to terms, pretty quick too.

Q. All right. And did you later learn whether or not Chesapeake acted based on your geology?

A. Yes, they -- I hadn't -- I didn't talk to David for a while, but I called and eventually found out they had already spudded the well in Section 3 at my recommended location, exactly where I told them I would drill this prospect if I were them. They drilled exactly there.

Q. In the southeast quarter of Section 3?

A. Yes.

Q. Do you know what that well is named?

A. The CC State 3 Number 1.

Q. Okay. And what was the result?

A. We came in pretty much on prognosis as far as structure was concerned, we came in pretty much on prognosis as far as -- we had 12 feet of sand mapped, I believe we got 6, close to 6.

During the drilling of the well it tried to blow out. We never really got a chance to look at the Morrow sands because the well was gassing so much it just kicked all the samples out of the sample box, so I never got a chance to look at the samples myself. I look at all the samples on every one of my prospects, I'll go out there and

I'll sit on the well with the mudlogger, and I'll watch samples, because -- I just learned that from a very young age from J.C. Williamson, who was the premiere sample guy of the Permian Basin, and so I always go out there. So I was there.

Q. Well, but basically it's a nonproducer?

A. Well, it didn't look like it at the time. We -- It looked like a very good well. It was a thin sand. We had a very small drilling break, but it was -- a lot of times if the sand has got tremendous perm and it's only five feet thick, it could be a pipeline into a thicker sand, you know, 300 or 400 or 500 feet away, you just don't know.

And it was acting like that, it was taking an 11.8-pound mud to hold the well down. If it got lower than that, they would start kicking on them again. So we ran pipe. And like Chesapeake testified earlier, it came in at a very nice rate, but the tubing pressure dropped down, and in less than a month we were drained.

Q. Okay. Have you -- Besides the experience of that well, have you informed yourself concerning what has occurred in the drilling and completion of the well known as the Osudo 9 and the KF 4 State?

A. Yes, I was very -- That was a gutsy location, the Osudo 9, because after you drilled the CC well, which was

right here, and you had very little sand and limited reservoir, and we knew that, and right over here in Section 9 you've got the C&K Wilson well, which has zero feet. It's an old log, it was drilled in, I believe, the early 1960s. And it has no gamma-ray, no sand at all --

Q. Could we go back to Exhibit 54?

A. Yes, okay.

Q. Yeah.

A. Section 9, right there --

Q. What did these three wells say about your mapping?

A. Well, the axis of the channel, I missed it by about a quarter of a mile. It tells me that my channel axis, after this well right in here, somewhere turns over and comes through the Number 9 and goes through the K 4 in Section 4 and goes on north a little further west than I have it mapped. But I haven't been able to change my maps today. This is the original map, so it's what -- it's my original thinking.

But you know, with the current well control, yeah, sure, it's moved a little west.

Q. Okay. In other words, you were a little east on that easterly channel?

A. Uh-huh.

Q. All right. Does the development of these wells

do anything to change your conclusion that the channels are on a north-south alignment?

A. Well no, not really, if you look at the well activity that's occurred since we drilled the CC Number 1 right here. We drilled the W -- or the Osudo 9, which is the big well, we drilled the WEK well right here.

There's the Hunger Buster location here. That was a mechanical failure. It actually tried to blow out in one of the Osudo sands. It took a kick in a four-foot sand. They had to kill it, and then subsequently when they were trying to go in and frac it, the casing parted, and they've never been able to do anything much with it, and they lost a lot of barite and drilling mud in the sands, and they've never been able to clean it up.

And the other -- Go ahead, do you --

Q. Yeah --

A. I was just going to --

Q. What I want to ask you, sir, is, have you continued to do some work and develop prospects in this area in addition to the one that you've told us about that was purchased by Chesapeake?

A. Yes, sir. Could you go back to the other map, Lezlye?

Since all this activity over here, we went out and we bought the northwest quarter of 15 to add to this

acreage plot right here with our south half, and we competed against -- I believe we competed against Samson and Kaiser-Francis and Mewbourne in that area, and we ended up buying that northwest quarter for $2300 an acre.

Q. Was that a state lease?

A. That's a state lease.

Q. All right.

A. And so now our activity is, we've applied for and gotten -- Well, let me take that back. We -- actually, we -- this well, the WEK well, was still -- was never plugged by -- I don't know who owns it now, I think Matador. But we -- finally we got permission to buy that well or -- we actually owned the well when we bought the lease, so we plugged that well.

And we called up Mewbourne and asked them if they wanted to buy this northwest quarter in the south half of 15, to drill a well right in the northwest of the northwest of 15. And they bought it for half a million dollars. We didn't even have to show them any maps. So they felt like they're -- you know, and I feel like -- they have it mapped the same way I do.

Q. Is the well staked?

A. The well is staked, and the rig is going to be moving in in a week or so.

Q. And what will be the 320-acre spacing unit for

that?

A. The west half of this Section 15, this 320 acres.

Q. West half standup unit?

A. Yes, sir.

Q. All right. And have you -- do you retain a financial interest in that, Mr. Charuk?

A. Yeah, I have an override, and I've also taken 1-percent working interest in the Mewbourne well, which is roughly a $30,000 bill, and when you have three kids in college, $30,000 is a lot of money, you know, these days. So I am in it, and I firmly believe in it.

Q. All right. Let me ask you, you've told the --

CHAIRMAN FESMIRE: Mr. Gallegos, before we get into that, it's five o'clock. I'd sure like to stay on schedule today. Would this be a good place to break, or do you have some place to break in the near future.

MR. GALLEGOS: I could finish my direct in, I think, three or four minutes here --

CHAIRMAN FESMIRE: Okay.

MR. GALLEGOS: -- if that -- if that's all right.

CHAIRMAN FESMIRE: Go ahead, and we'll do it that way.

Q. (By Mr. Gallegos) All right. All I wanted to ask you, you've told the Commissioners about your own experience mapping in the area. Have you in all of your

experience dealing with the geologists that work this area -- and I'm excluding Mr. Godsey, but have you ever seen any other geologist map the Morrow sands on an east-west basis?

A. No.

Q. Have you seen any literature that supports mapping on an east-west basis?

A. I've seen some of the articles that we've discussed today that talk about sediments, and I've also seen articles that talk -- that don't mention anything about Central Basin Platform sources. And also I've noticed, in a lot of the articles they differentiate between sediment and sand sources. So I've seen -- yes, I've seen both.

Q. All right. And in the literature is there support for what you have concluded is the correct --

A. I believe so.

Q. -- north-south --

A. I believe so.

Q. -- alignment?

A. Yes, sir.

MR. GALLEGOS: Okay, that concludes my direct.

And we offer for admission into the record Exhibits 54, 55, 56 and 57.

MR. KELLAHIN: No objection.

CHAIRMAN FESMIRE: Mr. Kellahin? All right, Mr.

Kellahin has no objection to the admission of record of Exhibits 54, 55, 56 and 57, they'll be so admitted.

At this time we will adjourn until ten o'clock tomorrow morning, Friday the 15th. I intend to finish this tomorrow, so it may be a late day, depending on how much more testimony we have. So we'll see you all at ten o'clock -- I'm emphasizing, ten o'clock tomorrow morning.

(Thereupon, these proceedings were continued at 5:03 p.m.)

* * *

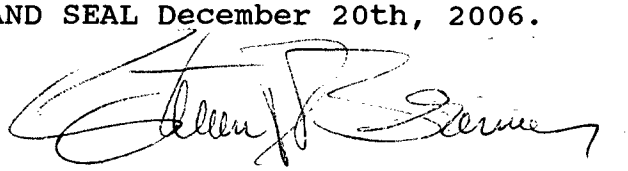
CERTIFICATE OF REPORTER

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 December 20th, 2006.



STEVEN T. BRENNER
CCR No. 7

My commission expires: October 16th, 2006