UNITED STATES DISTRICT COURT

EASTERN DISTRICT OF LOUISIANA

IN RE: OIL SPILL BY THE OIL RIG *DEEPWATER HORIZON* IN THE GULF OF MEXICO ON APRIL 20, 2010	*	Docket 10-MD-2179 Section J
Applies to:	*	New Orleans, Louisiana
Docket 10-CV-02771, *IN RE: THE COMPLAINT AND PETITION OF TRITON ASSET LEASING GmbH, et al*	*	March 6, 2013
Docket 10-CV-4536, *UNITED STATES OF AMERICA v. BP EXPLORATION & PRODUCTION, INC., et al*	*	

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DAY 7, AFTERNOON SESSION
TRANSCRIPT OF NONJURY TRIAL
BEFORE THE HONORABLE CARL J. BARBIER
UNITED STATES DISTRICT JUDGE

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I N D E X

AFTERNOON SESSION

(March 6, 2013)

12:42PM * * * * *

12:43PM **THE DEPUTY CLERK:** All rise.

1:04PM **THE COURT:** Good afternoon, everyone. Please be seated.

1:04PM All right, Mr. Brock.

1:04PM **MR. BROCK:** Thank you, Your Honor.

1:04PM **CROSS-EXAMINATION**

1:04PM **BY MR. BROCK:**

1:04PM **Q.** Good afternoon, Mr. Heenan.

1:04PM **A.** Good afternoon.

1:04PM **Q.** My name is Mike Brock. We've not been introduced yet, but I just wanted to tell you who I was. And I need to say for the record that I have you on cross-examination. So I'll have just a few questions for you and then, hopefully, we'll get you out of here quickly.

1:05PM **A.** Thank you.

1:05PM **Q.** First, you filed a single report in this case; correct?

1:05PM **A.** Correct.

1:05PM **Q.** You knew that you had the opportunity to file a rebuttal report, but you did not file one?

1:05PM **A.** I had that opportunity and I did not, you're correct.

1:05PM **Q.** And did you look at the expert reports of BP after they were filed?

A. Briefly.

Q. You wouldn't say, as you sit here today, that you did a comprehensive study of those reports?

A. No, I definitely would not say that.

Q. Okay. Thank you.

I've put your report there. It's marked as Exhibit 7528. Do you have it there?

A. Yes, I do.

Q. Just in case you need to refer to it as we go through, I just wanted you to have the opportunity to do that.

A. Thank you.

Q. Let me ask you to start by turning to page 3 of that report.

MR. BROCK: Connie, can we put that up, please. And I want to focus on the top half of the page down to the bottom of the picture, please.

BY MR. BROCK:

Q. Now, this is the -- it says page 3, but it's actually the first page of the report; correct?

A. Correct. I think the rest is just a -- yes. The rest is just a little bio.

Q. And at the very top, you begin by telling the readers that this is the scope of the report; right?

A. Correct.

Q. And you say: "A series of events and decisions resulted

in the Macondo blowout."

Correct?

A. Correct.

Q. And that series of events and decisions, from the work that you did, involved a number of different people and companies?

A. Correct.

Q. And you say: "The elimination of any one of these would have eliminated or at least reduced the magnitude of the event, presumably with a corresponding reduction in loss of life, injury, and environmental impact."

Do you see that?

A. Yes.

Q. And then you go on to use the model from the Bly report to identify the three things that you will speak to in your report?

A. Yes, I did.

Q. And you have described those for the Court now?

A. I have already.

Q. Yes, that's what I mean. You have already described those?

A. Yes.

Q. The point being that you used the Bly report model as the way that you would organize your report here?

A. Yes, that's an accurate characterization.

1:07PM **Q.** Thank you.

Now, I want to ask you to turn to page 7 of your report, if you would, please, sir.

In order to formulate your report, you needed to make some assumptions; correct?

A. Correct.

Q. I want to ask you about the ones right there at the top.

MR. BROCK: If you'll just do the call-out from "Assumptions" down through No. 3.

BY MR. BROCK:

Q. And you say here: "The following assumptions have been generally accepted, appear to be consistent with observations, and supported by subsequent forensic examination of recovered equipment. To date, they have not been disputed by any of the major parties of the event. For this reason, no further attempt has been made to verify them."

Just a couple of questions about this.

A. Okay.

Q. When you speak here of "have not been disputed by the major parties," are you referring to Transocean, BP, and Halliburton?

A. I didn't put a specific -- I would include them -- in fact, I don't recall any significant dispute that I can recall.

Q. Okay. Focusing on -- I'm asking a little bit different question.

A. Okay. Sorry.

Q. When you say "the parties of the event," are you referring to the people that are here in court asking you questions today, the companies?

A. Yeah, the companies, yes. I think, if I understand your question correctly, the answer is, yes, I'm including them in there.

Q. Thank you.

And if you see here No. 1, you conclude: "The flow path of the hydrocarbons was down the outside of the casing, through the cement sheath, up the inside of the shoe track, and up through the float shoe."

Do you see that?

A. I see that.

Q. And is that one of the assumptions that you make that appear to be consistent with observations supported by subsequent forensic examination and recovered equipment?

A. Yes, I believe it is.

Q. Just one point before we get too far into the exam. I want to come back to one of the pullouts that Mr. Underhill showed you, because I just want to make a point for the Court for completion, if I could.

MR. BROCK: Could we pull up Treatment 7528.4.5, please.

1:10PM 1 **BY MR. BROCK:**
1:10PM 2 **Q.** Do you remember you were looking at a quotation a little
1:10PM 3 earlier and we noted that there was -- that there was a
1:10PM 4 sentence missing, "The proposal of the bladder effect, which
1:10PM 5 has no technical basis, and the adoption of that theory
1:10PM 6 demonstrates the abdication of responsibility of both BP and
1:10PM 7 Transocean."
1:10PM 8 Do you remember that?
1:10PM 9 **A.** I remember the discussion.
1:10PM 10 **Q.** Right. But do you remember that in the quote that was
1:10PM 11 pulled up, we did not include -- or Mr. Underhill did not
1:10PM 12 include "demonstrates the abdication of responsibility of both
1:10PM 13 BP and Transocean"? Do you see that?
1:10PM 14 **A.** Yes. I think the part that was missing was the phrase
1:10PM 15 "and the adoption," that line.
1:10PM 16 **Q.** Yes. And it was your conclusion and it is your opinion
1:10PM 17 that both BP and Transocean violated the applicable standard of
1:10PM 18 care in terms of the interpretation of the negative test?
1:10PM 19 **A.** Correct.
1:11PM 20 **Q.** Just a few questions on the roles and responsibilities in
1:11PM 21 the industry from your perspective as an expert.
1:11PM 22 Do you believe that the well construction process is
1:11PM 23 a collaborative effort?
1:11PM 24 **A.** Yes.
1:11PM 25 **Q.** It needs to be a collaborative effort?

1:11PM **A.** Yes, it does.
1:11PM **Q.** And it involves various entities and personnel, including the well operator, government officials, the drilling contractor, the mud contractor, the casing contractor, the cement contractor, and others?
1:11PM **A.** Yes, "and others." Absolutely.
1:11PM **Q.** Your experience over the last 30 years has been that operators like BP will hire drilling contractors like Transocean to drill wells?
1:11PM **A.** Yes. Typically, operators hire joint contractors, not exclusively, but typically.
1:11PM **Q.** Right. You would say that in the vast majority of wells that are drilled, that a drilling contractor will do that for an operator?
1:12PM **A.** A vast majority, yes.
1:12PM **Q.** And the drilling contractor, in your experience and from your perspective as an expert, will own the drilling rig and provide a crew?
1:12PM **A.** Again, in the vast majority.
1:12PM **Q.** And that's true on land, shallow water, and deepwater?
1:12PM **A.** All of them, yes.
1:12PM **Q.** It's your experience that drilling contractors will have their own well control manuals and safety manuals?
1:12PM **A.** Yes. That's my experience.
1:12PM **Q.** When we talk about safety manuals, is the term "HSE"

familiar to you?
A. Yes.
Q. What is that?
A. Health, safety, and environment.
Q. And is it your experience as an expert in this field that in the area of health, safety, and environment, that the drilling contractor will have its own system in place?
A. Just to clarify, you're saying as an expert in drilling, not in HSE; correct?
Q. Correct.
A. Yes, I would expect --
Q. I'm just asking for your general knowledge in terms of who does what.
A. That the drilling contractor does have such a manual? That was your question; right?
Q. Yes. Is that correct?
A. Correct.
Q. Now, you had talked about in your report that -- one of the things that you said is that BP failed to use the best available and safest drilling technology; correct?
A. Correct.
Q. And you pulled some language out of one of the regulations that you cited in your report that supported that?
A. Yes.
Q. Interpreting regulations is not something that you

regularly do, is it?

A. It's something I do all the time. I'm required to follow regulations in my job of this nature.

Q. Thank you for that. Let met rephrase the question.

Interpreting the U.S. regulations is not something you regularly do?

A. I don't regularly interpret U.S. regulations, but they're the same concept. They're in plain English.

Q. Just one question, please.

A. Okay.

Q. You don't regularly interpret U.S. regulations, do you?

A. Correct, I do not.

Q. Now, you agree that it is appropriate for an operator like BP to hire a contractor to satisfy the requirement of providing the best available and safest drilling technology?

A. I don't know that that by itself satisfies that requirement.

Q. Let's look at your deposition and just see what you've said. Page 93, lines 5 through 16.

Do you see that you were asked the question:

"QUESTION: Let me ask it this way: In using the best available and safest drilling technology to monitor and evaluate well conditions, is it appropriate for an operator to hire a contractor and require the contractor to use the best available and safest drilling technology

1:14PM 1 to monitor and evaluate well conditions?"
1:14PM 2 And did you answer:
1:15PM 3 "ANSWER: Yes, it is appropriate for the operator to
1:15PM 4 hire a contractor to discharge the using of the best
1:15PM 5 available and safest technology. I think that was your
1:15PM 6 question."
1:15PM 7 Is that what you said?
1:15PM 8 **A.** That was what I said.
1:15PM 9 **Q.** Now, do you know that Transocean is one of the largest
1:15PM 10 offshore drilling contractors in the world?
1:15PM 11 **A.** Yes, I'm aware of that.
1:15PM 12 **Q.** And that they are experienced in drilling
1:15PM 13 technically-demanding wells?
1:15PM 14 **A.** I'm also aware of that.
1:15PM 15 **Q.** You have no reason to think that it was a bad idea for BP
1:15PM 16 to engage Transocean to drill the Macondo well?
1:15PM 17 **A.** No, I have no reason to think that's a bad decision.
1:15PM 18 **Q.** In fact, BP's decision to use the *Deepwater Horizon* to
1:15PM 19 finish the Macondo well was a choice to use the best available
1:15PM 20 and safest technology?
1:15PM 21 **A.** I can't tell you whether that was the best available, but
1:15PM 22 it's acceptable.
1:15PM 23 **Q.** All right. If we use your definition that you pulled from
1:16PM 24 the regulation that talks about best available and safest
1:16PM 25 technology, do you agree that BP's decision to use *Deepwater*

1:16PM 1 *Horizon* to finish Macondo was a choice to use the best
1:16PM 2 available and safest technology?
1:16PM 3 **A.** Yes, I believe so.
1:16PM 4 **Q.** Now, one of the things that you've said today is that the
1:16PM 5 gold standard for monitoring most drilling operations is
1:16PM 6 monitoring pit volumes. That's one of the tools that's
1:16PM 7 available to the driller; correct, sir?
1:16PM 8 **A.** Correct.
1:16PM 9 **Q.** And your understanding is the *Deepwater Horizon* had the
1:16PM 10 ability to monitor pit volumes?
1:16PM 11 **A.** Yes. That's my understanding.
1:16PM 12 **Q.** You have no reason to think that the personnel on the
1:16PM 13 *Deepwater Horizon* were not trained to monitor pit volumes?
1:16PM 14 **A.** I have no reason to think that.
1:16PM 15 **Q.** In fact, we talked about this today, that *Deepwater*
1:16PM 16 *Horizon* actually had two flow meters, one Sperry-Sun flow meter
1:17PM 17 and one Transocean Hitec flow meter?
1:17PM 18 **A.** Correct. We talked about that.
1:17PM 19 **Q.** Yes. And you agree it is consistent with having the best
1:17PM 20 available and safest technology for the *Deepwater Horizon* to
1:17PM 21 have two separate flow meters at the time of this incident?
1:17PM 22 **A.** Yes. It's not in conflict with that.
1:17PM 23 **Q.** In fact, having redundancy is a good thing?
1:17PM 24 **A.** Having redundancy is a good thing.
1:17PM 25 **Q.** It shows good care?

A. Yes, it does.
Q. Now, in terms of personnel on a deepwater rig, you agree that having a toolpusher, a driller, and an assistant driller on their tour working in the driller's cabin is consistent with your use of this term "best available and safest technology" to monitor the well?
A. Yes.
Q. In the driller's cabin, if you have a toolpusher, a driller, and an assistant driller present to watch the well, that's redundancy in terms of your ability to monitor?
A. If you have all those three there, yes.
Q. And again, having that redundancy is something that demonstrates due care?
A. Yes. I agree with that.
Q. And if you add to the ability to monitor the well a mud logger, who is separately watching parameters in the well, that is, again, another very good redundant system to have in place?
A. Yes.
Q. And demonstrates due care?
A. Yes.
Q. We're not going to go through the details, because, as you've seen, we've spent a lot of time in the trial on training. So I just want to ask you one question so I can get your perspective as an expert. Okay?
A. Sure.

1:19PM **Q.** I'm just telling you, you can relax, I'm not going to go through all of the training modules.

But you are aware that the Transocean drilling personnel on tour the night of April the 20th had gone through well control training?

A. I assumed they had, yes.

Q. In the industry of deepwater drilling and drilling in general, you're familiar with the concept of "stop the job" or "stop-the-job authority"; correct?

A. Yes. It comes under lots of names; but, yes, I'm familiar with it.

Q. And the concept is such that any individual involved in an operation, if he sees something that he believes is unsafe or potentially unsafe or has an understanding that it could lead to a safety issue, he has the authority to stop the job?

A. That's a good summary.

Q. You're aware, are you not, that on the evening of April the 20th, there was actually a stop-the-job called during the conduct of the first negative test?

A. I hadn't heard it termed that way, but I suppose --

Q. Were you here for Mr. Ezell's testimony?

A. Yes, I was.

Q. Do you remember him saying that the test wasn't lined up per the APD, and so he stopped the job; that he talked to the crew and said, "Get the test lined up, get the agreement of BP,

and then run the test on the drill pipe"?

Do you remember that?

A. I recall that it was stopped. But your context was as a safety issue, and I think that was more of a compliance issue.

Q. Compliance with Transocean policy?

A. Compliance with the approved APD, I believe is the term.

Q. All right. So I don't want to make this a memory test, so let me just ask a question and just see, make sure we're on the same page.

Did you hear -- were you here when Mr. Ezell testified that between the first and second test, he stopped the job, he told Jason Anderson to conduct a safety meeting, make sure that everyone was on the same page, get with the BP well site leader, make sure there was alignment, and then do the test on the kill line?

A. I don't remember exactly what he said; but on that general concept, they stopped Procedure A, if you will, changed to Procedure B.

Q. Okay. Fair enough.

Now, again, I'm not going to run through all the policies with you today, because I think the folks here have got a pretty good sense of what some things are, but I need your perspective as an expert on just a couple of issues.

You agree, do you not, that the drilling crew has the primary responsibility to monitor the well during all

operations?
A. Primary, yes.
Q. From the time the vessel arrives on-site and begins drilling until it pulls the BP -- the BOP up and sails off, the drilling crew has the primary responsibility for monitoring the well?
A. The primary responsibility, yeah.
Q. And the person within the system who has that primary responsibility is the driller?
A. Correct.
Q. Is that true on the drilling operations that you participate with up in Canada?
A. Yes, it is.
Q. When you're in port or traveling, who's watching the well?
A. In the hierarchy, if you will, so the driller is watching it, assuming it is drilling, as you've described; and then, of course, there's a hierarchy above him. There's several levels between me and them.
Q. But in the operations that you are familiar with and in the work that you do, it's no different just south of the Arctic Circle than it is in the Gulf of Mexico: The driller for the contractor has the primary responsibility for watching the well?
A. The driller has the primary responsibility, and he is employed by the contractor.

1:23PM **Q.** Now, the driller's cabin is located right where the rotary table is located for a reason, isn't it?
1:23PM **A.** I presume you're asking if it's so he can see what's going on?
1:23PM **Q.** Yes.
1:23PM **A.** Yes, that's why it's there.
1:23PM **Q.** Because it's his responsibility to look after the well, physically his office is located right there at the rotary table where the action occurs in terms of drilling operations?
1:23PM **A.** Certainly some of the action occurs there. There are many other places as well, of course.
1:23PM **Q.** Sure. Yes.
1:23PM **A.** But that's the central location.
1:23PM **Q.** That's the idea.

Now, there's been a lot of talk in this case about loss returns. You've probably heard some of it. Loss returns is something you have experienced in drilling, is it not?
1:24PM **A.** Yes, I have.
1:24PM **Q.** And loss returns are not unusual in drilling, are they?
1:24PM **A.** No.
1:24PM **Q.** Just a couple questions from your perspective as an expert on behalf of the United States.

You agree that any time there are indications of a kick, prompt action by the crew is required?
1:24PM **A.** Yes.

1:24PM **Q.** Part of the purpose of well control training is to detect kicks as rapidly and efficiently as possible so that they don't turn into blowouts?

A. Yes.

Q. Just because you have a kick doesn't mean you're going to have a blowout?

A. No, it does not.

Q. In fact, the entire industry is organized around detecting influx of hydrocarbons into the well and getting the well shut in before the event turns into a blowout?

A. Well, it's a very important part of the industry, anyway.

Q. And Transocean's policy of giving the driller full authority to flow-check or shut in the well as he sees fit is an appropriate and within the standard of care policy?

A. It is.

Q. It's what you would expect on a deepwater drilling well?

A. I absolutely would.

Q. Now, it's recognized in the industry, isn't it, that there are a number of major causes of kicks?

A. There are -- yes, there are a number of causes.

Q. Okay.

MR. BROCK: Let me see, please, Exhibit 15 -- 1454.45.2, please.

BY MR. BROCK:

Q. I'm just going to show you one section here to get your

perspective on this. If we look at 1454.45.2, do you see that one of the causes of a well control event can be displacement of the riser with seawater or a lower density fluid?

A. Just give me a second to read what's on the screen here.

Q. Sure.

A. (Witness reviews document.)

Okay. I see that.

Q. Do you agree with the testimony of Mr. Ezell and others that during displacement of the riser, there is always the risk that you could have an influx of hydrocarbons?

A. If the well does not have integrity, yes, sir.

Q. Correct.

And that for well control personnel, such as the driller and the assistant driller, that is a time when they should be very careful to watch the activities of the well?

A. One of many, yes.

Q. Well, that makes a good point. Because in well control, the folks that are involved in that really don't have the luxury of ever letting their guard down, do they?

A. No.

MR. BROCK: Let me see, please, Exhibit 7651.1.2.

BY MR. BROCK:

Q. This is an e-mail that we obtained from Transocean. I just want to ask you about whether or not you agree with these principles. This was written, as you can see, in 2004. I just

1:27PM 1 want to focus on the language of it.
1:27PM 2 "Well control. One of the more important aspects of
1:28PM 3 our business and one that we are 100 percent
1:28PM 4 responsible/accountable for when the . . . hits the fan, is the
1:28PM 5 drillers/ADs know in their hearts that the toolpusher, OIM,
1:28PM 6 you, me, Jurgen and on up to Bob Long expects 100 percent,
1:28PM 7 supports them to SI" -- which would that be shut-in?
1:28PM 8 **A.** Shut-in, yes.
1:28PM 9 **Q.** -- "if there are any questions or doubts. Not an area
1:28PM 10 where we wait to see what the company man wants to do."
1:28PM 11 Do you see that?
1:28PM 12 **A.** I see that.
1:28PM 13 **Q.** Does that describe in lay terms the responsibility of the
1:28PM 14 driller to shut in the well if he has even the slightest doubt?
1:28PM 15 **A.** It does say exactly that, that the driller has the
1:28PM 16 responsibility to shut in the well if he has any doubt.
1:28PM 17 It says a couple other things, too. It says one of
1:28PM 18 the more important aspects of our business, yes, one that we're
1:29PM 19 100 percent responsible/accountable for. They are accountable
1:29PM 20 for it, not to the exclusion others.
1:29PM 21 **Q.** Sure. But in terms of who is primarily responsible for
1:29PM 22 that, it would be the drilling crew; correct?
1:29PM 23 **A.** Primarily, as we said, yes.
1:29PM 24 **Q.** You talked a little bit earlier with counsel for
1:29PM 25 Halliburton about some of the well control options that are

available to the driller in the event of a well control event; correct?
A. In terms of?
Q. Well, we talked about the location of the controls for the BOP.
A. Where the controls are or where they're not is what I think we were talking about, yes.
Q. And the controls for the BOP are typically in the driller's cabin because the driller is the closest to the operation, both physically and in terms of knowing what's going on, and would enable him to take action if he's called on to do something?
A. Yes.
Q. You know that a well site leader on a deepwater drilling rig has many, many responsibilities?
A. He does.
Q. And it's not his primary responsibility to watch the well?
A. He doesn't physically watch the well all the time, no.
Q. He has to attend meetings; he has to interact with others on the rig; he's responsible for ordering equipment and sequencing equipment that's coming out to the rig and going back; he has to manage people coming to the rig and going back. He has many responsibilities.
A. He certainly has many responsibilities. Which of those ones you've just described are delegated, I don't know; but he

has many responsibilities.

Q. Now, let's turn to the issue of the backup system, as you describe it, for well monitoring. You understand that Halliburton, through it's Sperry division, provided mud loggers on the *Deepwater Horizon*?

A. Correct.

Q. And you agree that it was good oil field practice for BP to contract with Halliburton, Sperry-Sun to provide mud loggers to monitor all operations during the drilling of the Macondo well?

A. Yes.

Q. That's another redundancy in the system in terms of being able to watch for problems that might occur?

A. Correct, that's another redundancy.

Q. The program that was in place reflects due care?

A. What are we speaking of in terms of programs?

Q. When I say "the program," having a backup set of eyes and tools to watch the well reflects due care.

A. Yes.

Q. Do you agree that mud loggers are in the information business?

A. Yes, that's probably a good characterization.

Q. And that there are situations in drilling where the mud logger personnel -- mud logging personnel would be the first to be aware of a potential kick indicator?

1:32PM **A.** Potentially, they might be the first ones to notice it. That's what you're asking; right?
1:32PM **Q.** Yes.
1:32PM **A.** Yes.
1:32PM **Q.** And if they do, in the context of the way the contractors are organized, communicate with one another, what does the mud logger do if he detects a kick?
1:32PM **A.** He would call the driller if he saw a kick indication.
1:32PM **Q.** He doesn't have the ability to actually run the devices that would shut in the well, but he would be obligated to pick up the phone quickly and call the driller to see if the driller had noticed it or, if not, to bring it to his attention?
1:33PM **A.** He has two parts. Yes, he doesn't have the controls; but he does have the obligation to contact the driller.
1:33PM **Q.** I haven't used that term yet today, but let me just see if you agree with this. Do you agree that well control is a team sport?
1:33PM **A.** Yeah, I don't think it's a sport, but it is a team operation.
1:33PM **Q.** That's fair enough. I'll rephrase it.
1:33PM You agree that well control is a team operation?
1:33PM **A.** Yes.
1:33PM **Q.** And you need good communication between your drilling crew and your mud logger?
1:33PM **A.** Yes.

1:33PM 1 **Q.** As well as with your derrickman, who might be monitoring
1:33PM 2 the pits?
1:33PM 3 **A.** With whoever is monitoring the pits, which might be the
1:33PM 4 derrickman.
1:33PM 5 **Q.** All right. I want to turn our attention now to the
1:33PM 6 evening of April the 20th, and I'm going to fast-forward in
1:33PM 7 time a little bit to the time of 2052, which you have discussed
1:34PM 8 here a little bit today.
1:34PM 9 **A.** Yes.
1:34PM 10 **Q.** And let me ask you, first of all, do you recall that
1:34PM 11 around 8:52, the pumps were slowed as the seawater was
1:34PM 12 displacing the mud?
1:34PM 13 **A.** That's the time when the spacer comes to surface; is that
1:34PM 14 correct?
1:34PM 15 **Q.** No, that's a little later.
1:34PM 16 Let me see if I can refresh you.
1:34PM 17 **MR. BROCK:** Let's look at 7528.20.1. 7528.20.1.
1:34PM 18 **BY MR. BROCK:**
1:34PM 19 **Q.** This is a pull-out from his report.
1:34PM 20 **A.** Okay. The pumps were slowed at 2052.
1:35PM 21 **Q.** So if you see here, according to both BP and Transocean
1:35PM 22 calculations, the well began to flow as early at 2038,
1:35PM 23 Transocean, or at 2052, BP.
1:35PM 24 For the purpose of your opinion, that time doesn't
1:35PM 25 matter to you?

1:35PM 1 **A.** That difference is not critical.
1:35PM 2 **Q.** Correct.
1:35PM 3 But you say: "Whatever the exact time, the pumps
1:35PM 4 were slowed at 2052."
1:35PM 5 **A.** Correct.
1:35PM 6 **Q.** Do you see that?
1:35PM 7 "Displacement continued as formation fluids began to
1:35PM 8 enter the wellbore." Do you see that?
1:35PM 9 **A.** Yes, I do.
1:35PM 10 **Q.** So your opinion is that the well was flowing at 2052?
1:35PM 11 **A.** The modeling done by both parties says that, and I have no
1:35PM 12 ability to dispute it or no desire to dispute it.
1:35PM 13 **Q.** Okay. Now, let's look at 7528.20.2. Now we're moving to
1:36PM 14 this period of time of 2108 -- 2101 to 2108. Are we on the
1:36PM 15 same page?
1:36PM 16 **A.** Yes, I think so.
1:36PM 17 **Q.** "Circulation continued at a further reduced rate." Do you
1:36PM 18 see that?
1:36PM 19 **A.** Yes.
1:36PM 20 **Q.** Does that mean they slowed the pumps again?
1:36PM 21 **A.** Yes.
1:36PM 22 **Q.** "During all this time, the mud in the annulus, at
1:36PM 23 approximately 14 pounds per gallon, was being replaced with
1:36PM 24 8.6 pounds per gallon seawater. If all other parameters were
1:36PM 25 constant, the drill pipe or standpipe pressure" -- and then you

cite exhibits -- "would be expected to go down."

Do you see that?

A. Yes.

Q. And would you describe for the Court, please, why you would expect the drill pipe pressure to go down when you're in this displacing period.

A. At this point in time, you've already displaced -- down the drill pipe is full of seawater. You're pushing heavy mud out of the well. As you have less and less mud in the annulus, there's less and less -- we call it "back pressure" -- you're lifting less and less out of the well, I think is the best way to put it.

Q. And then you identify in your report that during a period of time when you would expect the drill pipe pressure to be going down because of what you're lifting out of the well, actually the trend reverses?

A. Correct.

MR. BROCK: All right. Let's see D-4319, please.

BY MR. BROCK:

Q. Now, this is a demonstrative I've just created for purposes of our discussion. Okay?

A. Okay.

Q. And just to orient you to this, the area that I've marked in yellow there is the period that we've just been talking about, 2052 to 2108. Do you see that?

1:37PM **A.** Okay.
1:37PM **Q.** And you might see here that I've put the bullet point you and I have just talked about, flow starts at 2052.
1:37PM Then over a period of time, 2101 to 2108, we see a
1:38PM 100 psi increase with the pumps at a constant rate. Do you see
1:38PM that?
1:38PM **A.** Yes.
1:38PM **Q.** That's what you referred to as "reversing trend"?
1:38PM **A.** Yes. You can see earlier on, it's going down.
1:38PM **Q.** Correct. Correct.
1:38PM When you say you can see earlier that it's going
1:38PM down, if you see where the arrow is, just as you enter the 2052
1:38PM period, it's just level or maybe slightly descending?
1:38PM **A.** Yes. And prior to that, at the higher rate, it's more
1:38PM noticeable.
1:38PM **Q.** When you're pumping at a higher rate back in the period of
1:38PM time, say, around 2015 to 2045, you see decreasing -- decreases
1:38PM occurring there?
1:38PM **A.** Exactly.
1:38PM **Q.** All right. Now, let's look at 7528.20.3. And just a
1:39PM couple of questions on this before I ask you about it. I'll
1:39PM give you a chance it read it, so you don't have to do two
1:39PM things at once.
1:39PM Do you want to read it first, and then I'll ask you a
1:39PM question?

1:39PM **A.** Just the highlighted section?
1:39PM **Q.** That's fine.
1:39PM **A.** (Witness reviews document.)
1:39PM Okay.
1:39PM **Q.** Okay. As you've testified to earlier today, there's no way for us to know, unfortunately, at this point in time precisely what the men in the drill shack were looking at in the hour or so before the unfortunate blowout; correct?
1:39PM **A.** Correct, you can't tell exactly what they were watching.
1:39PM **Q.** But you have been able to say, as an expert to the Court through your report and today, what they should have seen?
1:40PM **A.** Correct.
1:40PM **Q.** Now, you went back and looked at scales that were proposed by Transocean, and you also looked at the Sperry-Sun mud logging chart; correct?
1:40PM **A.** Correct.
1:40PM **Q.** And then if we look at this, it reflects precisely what I've just said: "As stated by Transocean, scales selected determine how obvious the trend is, but the increasing trend is apparent on the full scale 0 to 7500 psi, HITEC display proposed by Transocean."
1:40PM Do you see that?
1:40PM **A.** I see. That.
1:40PM **Q.** So what you're conveying there is even on the scale proposed by Transocean, you see this as evidence that would

1:40PM 1 have been observed by a diligent crew?
1:40PM 2 **A.** Yes, sir.
1:41PM 3 **Q.** Now, you agree that the pressure increase from 2101 to
1:41PM 4 2108 was most likely due to an influx from the formation?
1:41PM 5 **A.** Yes.
1:41PM 6 **Q.** Let's look at 7528.21.2.
1:41PM 7 Is this the paragraph where you give your explanation
1:41PM 8 for how -- for what was happening during that period of time?
1:41PM 9 **A.** Yes, I believe that's right. Without fitting it all into
1:41PM 10 context, I believe that's correct.
1:41PM 11 **Q.** Correct.
1:41PM 12 This is what you were describing as the indication of
1:41PM 13 a kick?
1:41PM 14 **A.** Yes, the increase in pressure.
1:42PM 15 **Q.** Yes.
1:42PM 16 And let's look at 7528.21.3, please.
1:42PM 17 And you note here, in fairness, that there are other
1:42PM 18 possible explanations for the pressure changes. And I think
1:42PM 19 what you're saying is: If you were sitting there at the time,
1:42PM 20 if you didn't have the benefit of retrospect, which we have
1:42PM 21 now, but if you're sitting in the chair at the time, there
1:42PM 22 might be other explanations for the changes. A partial
1:42PM 23 plugging of a drill string during circulation might be one of
1:42PM 24 those things; right?
1:42PM 25 **A.** Yes, there might be.

1:42PM **Q.** In retrospect, we know the well was flowing?
1:42PM **A.** Yes.
1:42PM **Q.** But you say: "Whether these are correct, credible, or likely is ultimately not really the question. The anomalies needed to be investigated."
1:42PM Correct?
1:42PM **A.** Correct.
1:42PM **Q.** "The standard of care required investigation of this anomaly at 2101 to 2108 by the Transocean drill crew."
1:43PM **A.** Yes.
1:43PM **Q.** "As well as by the Sperry-Sun mud logger."
1:43PM **A.** Whoever noticed them.
1:43PM **Q.** Well, you understand that the Sperry-Sun group was actually monitoring the well at the same time?
1:43PM **A.** Whether they're watching at that moment, I don't know; but they were on tour, as it were.
1:43PM **Q.** "And if on tour and watching, as they were required to be, this is something that they should have noticed and reported."
1:43PM **A.** Yes.
1:43PM **Q.** And you make the note that: "Tragically, the personnel involved either did not notice the change that they should have recognized or they didn't realize its significance."
1:43PM **A.** Yes.
1:43PM **Q.** An investigation at this point in time, in the period of time 2101 to 2108, would have been -- one of the techniques

that could have been used would have been a flow check?
A. Yes.
Q. And as you've described earlier, that's something that can be accomplished quickly?
A. Yes. You can do the initial quickly; and if it's obvious it's flowing, it's obvious very quickly. If it's subtler, it takes longer.
Q. So what you would have to do at 2101 to 2108 to do a flow check, would be -- you would need to shut the pumps down?
A. Correct.
Q. And once you shut the pumps down, the well should be static?
A. Exactly.
Q. And that happens quickly?
A. Especially in cases like this.
Q. And then you would ask someone to visually inspect for flow by calling down to the pits, or the driller or assistant driller could do it themselves?
A. The proper -- you'd certainly call someone to look, and exactly how the driller and assistant driller were configured for telemetry and information is -- there's some debate about that.
Q. But in any event, your view would be that a flow check should have been conducted at this point; and if it had been, flow would have been recognized?

1:45PM **A.** Yes.
1:45PM **Q.** And this accident would have been avoided?
1:45PM **A.** Presumably.
1:45PM **Q.** Now, let's go to the next period of time, briefly.
1:45PM During the period of time 2108 to 2114, there was an
1:45PM operation on the rig that called for the pumps to be shut down?
1:45PM **A.** That's the time of the machine test, I believe?
1:45PM **Q.** Yes.
1:45PM **A.** Yes.
1:45PM **Q.** And the reason that you'd shut the pumps down is you
1:45PM actually have to determine where the fluids are in terms of
1:45PM what's coming back?
1:45PM **A.** Yes. Specifically you want to confirm that the fluids
1:45PM you're about to get back can be dumped overboard.
1:45PM **Q.** So if you've got the water-based materials that are coming
1:45PM back, then it's appropriate, from an environmental standpoint,
1:45PM to pump those overboard?
1:45PM **A.** Exactly.
1:46PM **Q.** Again, as we were saying a minute ago, when the pumps are
1:46PM shut down, there should be no flow?
1:46PM **A.** Correct.
1:46PM **Q.** Because if you're not pumping down into the hole with
1:46PM materials, nothing should be coming back; the well should be
1:46PM static?
1:46PM **A.** Yes.

1:46PM 1 **Q.** Unless there's a problem?
1:46PM 2 **A.** Unless there's a problem.
1:46PM 3 **Q.** Now, during this period of time with the pumps off, flow
1:46PM 4 continued, and you had a significant increase of drill pipe
1:46PM 5 pressure; correct?
1:46PM 6 **A.** Correct.
1:46PM 7 **Q.** Let's look at 7528.21.7. I'm not going to go through the
1:46PM 8 whole note, just to make one point.
1:46PM 9 At 2108, the pumps were shut off to allow a sheen
1:47PM 10 test to be performed on the returning fluid prior to the
1:47PM 11 returns being pumped overboard. 2108 to 2114, the drill pipe
1:47PM 12 pressure increased from 1,017 to 1,263. And then you make the
1:47PM 13 note: "With the pumps off."
1:47PM 14 Correct?
1:47PM 15 **A.** Correct.
1:47PM 16 **Q.** And you call that a "disturbing trend"?
1:47PM 17 **A.** Yes.
1:47PM 18 **Q.** Why is that?
1:47PM 19 **A.** Because they -- with the pumps shut off, the pressure
1:47PM 20 should be constant. We talked earlier on, with it
1:47PM 21 circulating -- about trends -- sometimes they're clear and
1:47PM 22 sometimes they're not; but this one is absolutely clear.
1:47PM 23 **Q.** And you say that: "This disturbing trend is visible not
1:47PM 24 only on the BP reconstructed data" -- and you picked that up
1:47PM 25 out of the Bly report; correct?

A. Correct.

Q. -- "but also in the Transocean interpretation" -- it appears in their report; correct?

A. I'm sure that's the reference.

Q. Yes.

And on the Sperry chart that you had access to?

A. Yes.

Q. And you say that: "This was very significant and an almost certain indicator of a kick."

A. I couldn't imagine anything else it would be.

Q. And from your perspective, this was an event that occurred that demanded immediate investigation?

A. Yes.

Q. And an immediate investigation, just like earlier, would have reflected that the well was flowing?

A. Yes.

Q. And this one is not even close, is it?

A. Close?

Q. In terms of the indication that you have from the data that you have a kick?

A. This is a very strong indicator of a kick; and the next step, the flow check, would have been conclusive.

Q. And there's still time to conduct that flow check and shut in the well before there's any damage or injury to persons or property?

1:48PM 1 **A.** Yes. I think the fluids are estimated to come above the
1:48PM 2 BOP about 2130, if I recall.
1:49PM 3 **Q.** Correct.
1:49PM 4 So let me just show you briefly D-4320, please.
1:49PM 5 You see here I have in the yellow box: "With the
1:49PM 6 pumps off, flow continued and drill pipe pressure increases by
1:49PM 7 over 250 psi."
1:49PM 8 **A.** Yes.
1:49PM 9 **Q.** Is that the anomaly that we have just been discussing?
1:49PM 10 **A.** That is the one, yes. Yes, I believe -- yeah, the pumps
1:49PM 11 are off, yeah.
1:49PM 12 **THE COURT:** What time is that? 2108?
1:49PM 13 **MR. BROCK:** 2108 to 2114.
1:49PM 14 **THE COURT:** Okay.
1:49PM 15 **MR. BROCK:** The pumps go down at 2108 and then stay
1:49PM 16 down during that period of time.
1:49PM 17 **THE COURT:** All right.
1:49PM 18 **BY MR. BROCK:**
1:49PM 19 **Q.** Given the displacement that was taking place during that
1:50PM 20 period of time, again, is that a period during which you would
1:50PM 21 expect the drill pipe pressure to be decreasing?
1:50PM 22 **A.** 2108 to 2115?
1:50PM 23 **Q.** Yes.
1:50PM 24 **A.** No, the pressure should be constant because the pumps
1:50PM 25 aren't running.

1:50PM 1 **Q.** Correct. Thank you very much for that. That's right.
1:50PM 2 So if the pumps are not on, you should have a level
1:50PM 3 pressure; correct?
1:50PM 4 **A.** Constant pressure, yes.
1:50PM 5 **Q.** Constant pressure.
1:50PM 6 And instead, you get an increase?
1:50PM 7 **A.** Correct.
1:50PM 8 **Q.** Now, let's turn to 2131 and I don't think we need to go
1:50PM 9 into a lot of detail with this one because it's been covered
1:50PM 10 today and I'm trying not to redo things. So let me just --
1:50PM 11 let's just turn to my Demonstrative 4321.
1:50PM 12 If you see at the top here, I think we have
1:51PM 13 summarized the points that you have been discussing. The pumps
1:51PM 14 are shut down to diagnose anomalous pressure readings. With
1:51PM 15 the pumps off, the flow continues and the drill pipe pressure
1:51PM 16 increases by 550 psi.
1:51PM 17 What does that tell you?
1:51PM 18 **A.** Pumps off, the pressure increases?
1:51PM 19 **Q.** Yes.
1:51PM 20 **A.** Is that your question?
1:51PM 21 **Q.** With the pumps off.
1:51PM 22 **A.** It would suggest that there's an influx into the well.
1:51PM 23 **Q.** And then we have Caleb Holloway being told to bleed off
1:51PM 24 the pressure. We've talked about that.
1:51PM 25 Will you confirm that bleeding off pressure when you

have an anomalous event like this is not a well control step?
A. It's not well control action.
Q. Did you look at the modeling of the influx of hydrocarbons in terms of where gas was in the well and when it reached the riser? Was that one of the things that you did as part of your look at this case?
A. I didn't do any of the modeling myself.
Q. What I'm asking you is: Did you go back and look at the work of Morten Emilsen and ADD Energy and the language that was input into the Bly report?
A. I looked at the summary, for want of a better word -- this is the OLGA modeling; correct?
Q. Yes.
A. Okay. So I looked in the body of the report, the interpretations of flow described as -- from OLGA modeling. I didn't go into the stuff behind it.
Q. The reason I'm asking, I'm just asking: Can you confirm that at 2131, from the time lines that you looked at, that there was approximately 300 barrels of hydrocarbon influx by that point in time?
A. I don't remember the exact time or volume, but that's the right order of magnitude and time scale.
Q. At 2131, you have a massive kick underway, don't you?
A. 300 barrels is a pretty massive kick.
Q. And it's still undetected?

1:53PM **A.** And it's getting worse.
1:53PM **Q.** And even though the pumps were shut down for ten minutes, there was no indication that a flow check was done?
1:53PM **A.** No, not as far as I'm aware.
1:53PM **Q.** You agree that the responsibility for detecting these anomalies that we've talked about is equally divided between Sperry-Sun, the mud logger, and the Transocean drilling crew; correct?
1:53PM **A.** I'd prefer not to say "divided." I say either one is responsible. I don't think you can divide that responsibility.
1:53PM **Q.** All right. You would say either one is responsible for detecting this kick and taking appropriate action to get the well shut in?
1:53PM **A.** Detecting the kick, appropriate action, of course, is physically done by the drilling crew.
1:53PM **Q.** Sure. For Sperry-Sun, it would be a call for notification. For Transocean, it would be to shut in the well immediately?
1:54PM **A.** It would be to perform the flow check followed by a shut-in.
1:54PM **Q.** And you've already discussed that, I won't go back into it. Thank you.
1:54PM Do you agree that if the parameters available to the rig crew and the mud loggers had been observed, interpreted correctly, and acted upon, the events of April 20th would have

been avoided?
A. Yes.
Q. Now, you were asked some questions -- I'm turning to another subject now. Thank you for that.
You were asked some questions earlier about different operations that were going on on the rig. I want to just ask you a couple of questions in terms of your knowledge base.
Are you aware that the Halliburton mud logger, Joseph Keith, testified in deposition that there was nothing unusual about the activities that took place on the afternoon and evening of April 20th?
A. I believe that's what he said.
Q. Would it be correct on the afternoon and evening of April 20th that both Transocean and Halliburton had the ability to conduct a manual flow check at any time?
A. Transocean would have had the ability to conduct that flow check. And you said Halliburton?
Q. Yes. I'm talking about through Sperry-Sun.
A. Right. Not on their own because they don't have the ability to shut in the pumps.
Q. Okay. With the pumps shut down, with knowledge that the pumps were shut down, would the Sperry-Sun mud logger know how to conduct a flow check?
A. Yes, he would know how. Whether he would be able would depend on the lineup.

1:55PM **Q.** Well, there are a couple ways to check for flow. One is to check a camera; another one is to go and look?
A. Correct. Those are the two ways.
Q. So in terms of a visual flow check -- that is, This is serious, I'm going to send someone to look to see if there is flow at the different places where that can be detected -- the Sperry-Sun mud logger could conduct a visual flow check?
A. I don't think that's an accurate characterization. I don't think he would -- it would be appropriate for him to leave his mud logging cabin and run down and look.
Q. So in your view, he would be limited to what he could pick up on his monitor?
A. On his data, yes.
Q. And there's just some dispute about whether he would have access to both the Sperry-Sun information as well as the Transocean HITEC information?
A. Yes, I don't have an answer. I looked and I couldn't find a conclusive answer either way.
Q. You were not aware of any testimony from any witness in this case who says that they could not do their job because of simultaneous operations that were taking place on the night of April the 20th?
A. I don't recall any testimony in that regard.
Q. In fact, Joe Keith testified that there were no activities that were going on on the rig that he felt like affected his

ability to consistently and accurately monitor the well; correct?

A. He did say that. Yes, I was surprised.

Q. And why is that?

A. Because with the open circuit system I referred to, the non-closed loop, I would think that would affect his ability.

Q. But at least from his point of view, in terms of his understanding of what was going on that evening -- he was there; you, obviously, were not -- you understand that his testimony is there was nothing that interfered with his ability to consistently and accurately monitor the well?

A. I understand he testified to that fact; and, no, I was not there.

Q. All right. I want to talk just a little bit about negative pressure tests in general. Okay?

You're not aware of a law or a code provision in Canada or the United States that required a negative pressure test on April the 20th, 2010; correct?

A. The law doesn't require one, per se, that I'm aware of, but once it's been put into the program -- and the law's the same in both jurisdictions, I believe. Once it's in the program, it is now implicitly required, if you will.

Q. See if you can just focus on my question. Thank you for that.

There is no free-standing law or regulation that

requires the conduct of a negative test as part of a temporary abandonment procedure; true?

A. No, there's not.

Q. You're not aware of any textbook that addressed negative pressure tests that was in print prior to April 20th, 2010?

A. I'm not aware of one, no.

Q. You weren't aware of any published papers or peer-reviewed articles from the drilling community concerning the proper way to conduct a negative test prior to April 20th, 2010?

A. I'm not aware of any.

Q. Have you seen many times, in terms of instructions that are given to drilling crews about negative tests, that the instruction would be something as simple as, "Conduct a negative test"?

A. Occasionally I've seen instructions that look like that, yes.

Q. You're aware that there were no IADC guidances on how to conduct a negative test prior to April 20th, 2010?

A. That's my belief.

Q. You know who SPE is?

A. I do.

Q. I'm asking because I can't remember.

A. Society of Petroleum Engineers.

Q. Right. Thank you.

You're not aware of any guidance that they have on

how to conduct a negative test?
A. I'm not aware of any.
Q. Same for the Canadian Association of Petroleum Producers?
A. Same thing.
Q. You're a member of that group?
A. I am.
Q. They do not have a procedure for that?
A. They do not.
Q. When you teach your courses, you don't include a presentation on how to conduct a negative test?
A. I don't, but they're very basic courses, as we've covered.
Q. You personally have not seen any written policy from operators prior to April 20th with respect to how to conduct a negative test?
A. I don't believe I have.
Q. You cannot identify an industry-accepted procedure for conducting a negative test that was in existence prior to April 20th, 2010?
A. I cannot.
Q. Now, you shared with us that negative tests that you have been involved in commonly involve two steps.
A. I'm missing what you're saying.
Q. Yeah. Let me rephrase the question. That probably wasn't a good one.
The negative tests that you have supervised or been

involved with in your operation consist of two steps, displace the well with water and check for flow?

A. I described that as a general test, I believe, process.

Q. The negative pressure tests you have supervised or been involved in in your operations consist of two steps, displace the well with water, check for flow?

A. Okay. I guess I took that out of context. I understand what you're saying.

Yes.

Q. That's true, isn't it?

A. Yes.

Q. You did some work with MGM Energy?

A. Yes.

Q. What was your role there?

A. I'm their drilling manager.

Q. Is that still true today?

A. Yes.

Q. The drilling that you're doing just south of the Circle, is that who you're working with?

A. That's also for MGM.

Q. When we took your deposition, other than the two-step negative test that we've just described, that's all you had?

A. You mean is that all that we --

Q. For the negative test?

A. That's all that we -- that's the process, yes.

2:02PM **Q.** You've done some work for Paramount also, haven't you?
2:02PM **A.** Yes.
2:02PM **Q.** What are they? What do they do?
2:02PM **A.** They're also an oil company.
2:02PM **Q.** And you don't think they have a written negative pressure test procedure?
2:02PM **A.** I don't believe they do, but I should clarify that the process that we use is a little different.
2:02PM **Q.** I'm sorry. Say that again.
2:02PM **A.** The process -- the cementing process is somewhat different than they're doing, so it's not 100 percent applicable.
2:02PM **Q.** I'm just asking about your experience with negative tests. Have I accurately described it?
2:02PM **A.** Yes.
2:02PM **Q.** Now, you agree that a drilling engineer can design an appropriate negative test without a written policy or guidance?
2:03PM **A.** Yes, I believe you could.
2:03PM **MR. BROCK:** Just one second. I apologize.
2:03PM **BY MR. BROCK:**
2:03PM **Q.** Shifting gears just for a second to the temporary abandonment procedures that were in place in that period of time, April 12th to 16th.
2:04PM Do you remember there was a chart put up that laid out the provisions of your reports --
2:04PM **A.** The various different programs, yes.

2:04PM 1 **Q.** Yes. Yes.
2:04PM 2 **A.** Yes.
2:04PM 3 **Q.** It's true, is it not, that some of the documents that you
2:04PM 4 were shown were the back-and-forths that were taking place
2:04PM 5 between BP engineers onshore and the BP well site leaders on
2:04PM 6 the rig; correct?
2:04PM 7 **A.** I believe that's correct, yes.
2:04PM 8 **Q.** And that's a good way to go about formulating a final
2:04PM 9 procedure, isn't it?
2:04PM 10 **A.** It's a good way to seek additional input.
2:04PM 11 **Q.** Because at the BP office onshore, there's an engineering
2:04PM 12 capability that's not present on the rig; correct?
2:04PM 13 **A.** Correct.
2:04PM 14 **Q.** And on the rig, there's an awareness and knowledge of
2:04PM 15 operations and what equipment is available on the rig that also
2:04PM 16 should be input to the final temporary abandonment procedure?
2:04PM 17 **A.** That seems true, yes.
2:05PM 18 **Q.** Yeah. So coordination and the back-and-forth is a good
2:05PM 19 thing?
2:05PM 20 **A.** Coordination is a good thing, yes.
2:05PM 21 **Q.** It's not sinister that there was back-and-forth and drafts
2:05PM 22 going on in terms of what the temporary abandonment plan would
2:05PM 23 be?
2:05PM 24 **A.** I would not characterize it as sinister, no.
2:05PM 25 **Q.** You're not aware of any Transocean *Deepwater Horizon*

personnel who claimed after the accident that they didn't understand how to conduct a negative test, do you?

A. I haven't heard that.

Q. You haven't read any notes where anyone has said, We didn't know what was going on, we didn't know how to conduct the test?

A. I didn't see anything like that, no.

Q. You have expressed that you believe that Transocean breached the standard of care grossly -- strike that.

You said that Transocean breached the standard of care in terms of the interpretation of the negative test on the evening of the 20th?

A. I believe I said Transocean and BP.

Q. Yes.

Others have focused on BP; I'm going to focus on Transocean.

A. Okay. Fair enough.

Q. For Transocean, you would expect that the men who were there interacting with BP about the interpretation of the test would understand the significance of the drill pipe pressure that was being seen while the test was being conducted on the kill line?

A. Yes, I would expect that.

Q. Now, I want to focus on the negative pressure test that was utilized at the Macondo well.

2:07PM 1 **MR. BROCK:** If we could bring up Exhibit 97.1.1,
2:07PM 2 please.
2:07PM 3 **BY MR. BROCK:**
2:07PM 4 **Q.** Do you see that this is the April 20th Brian Morel note to
2:07PM 5 Don Vidrine, Bob Kaluza, Lee Lambert, and others?
2:07PM 6 **A.** Yes.
2:07PM 7 **Q.** And you have looked at this ops note for the final
2:07PM 8 negative pressure test procedure that was utilized at the
2:07PM 9 Macondo well; correct?
2:07PM 10 **A.** I think this is the final one.
2:07PM 11 **Q.** Yes.
2:07PM 12 **A.** Yes.
2:07PM 13 **Q.** And you agree that this ops note reflects good oil field
2:07PM 14 practice?
2:07PM 15 **A.** As written, yes.
2:07PM 16 **Q.** You would agree that this negative pressure test, as
2:07PM 17 written here, would reflect good practice?
2:08PM 18 **A.** Yes. It would be better if it had specified the negative
2:08PM 19 tests in more detail.
2:08PM 20 **Q.** Okay. Let me ask you -- let's just look at your
2:08PM 21 deposition here, if we could.
2:08PM 22 If we go to 233, lines 2 through 14, please.
2:08PM 23 And do you see here, my colleague, Mr. Regan is
2:08PM 24 asking you:
2:08PM 25 "QUESTION: Is it your opinion that what's set forth

in this April 20th, 2010 e-mail does not represent good oil field practice, as you have defined that term?"

And was your answer:

"As written, I don't think it fails to meet -- I would consider it good oilfield practice. It isn't perfect. There are possible improvements in the program. It would probably be considered good practice."

Correct?

A. Correct.

Q. So if you look at this procedure, all of the steps that are in it, that procedure is within the standard of care for operators engaged in deepwater drilling?

A. Yes. As I said, it's probably within that standard; but it could be better.

Q. Let me ask a really straight question, and let's see if you agree with this. BP met the standard of care for an operator in the way that the negative pressure test is written?

A. Yes.

Q. Now, the goal of the negative pressure test is to simulate the hydrostatic condition that the well would experience once temporarily abandoned; right?

A. Yes.

Q. So in doing that, you have to take into account what is the depth of the cement plug going to be?

A. Yes.

2:10PM **Q.** That's a factor in simulating what the well is going to be like when you temporarily abandon it?
2:10PM **A.** What you're really simulating is what the height of the column of seawater would be in the worst case.
2:10PM **Q.** Right.
2:10PM **A.** Which is related to it.
2:10PM **Q.** Because the other technique that's utilized, as you've described, is you shut in the annulars, you remove the hydrostatic head during the conduct of the test, you have seawater from the BOP down to, in this case, 8300 feet or so. And so you're simulating now what the condition is going to be once you complete the abandonment procedures on the BOP and leave?
2:10PM **A.** You're actually simulating the worst case just before you set the cement plug in.
2:10PM **Q.** But as you've described, it's a controlled test because you still have the weight of the mud and spacer in the -- in the BOP. And if you detect an issue, all you have to do is open the BOP and you return your well to an overbalanced situation?
2:11PM **A.** Yes, that's one option and there are others as well.
2:11PM **Q.** Sure.

Now, for this test, the test that was conducted, you have seen that consistently the well was telling the men on the rig that there was a problem on the drill pipe, pressure was

consistent for a long period of time in the 12- to 1400-psi range?

A. Yes, there was a problem.

Q. So do you agree that the test, as it was set up -- that is, as it was designed, as it was written and as it was performed -- answered the test -- it answered the question, there's communication with the well?

A. Yes, that test determined what it was supposed to determine, the test itself.

Q. The issue was with the interpretation of the test?

A. Yes, exactly.

Q. Now, you understand from your review of the materials that there was a lot of discussion about the meaning of the drill pipe pressure over a long period of time by lots of people on the rig?

A. I don't know exactly if I'd call it lots; but yes, there was a long -- there have been discussions, as I understand it.

Q. And you understand that it was folks from Transocean who were advancing the idea that the explanation was related to annular compression or a bladder effect?

MR. DOYEN: Your Honor, I object to that characterization of the evidence. No foundation for this witness.

THE COURT: Overrule the objection.

Can you answer that?

2:13PM 1 **THE WITNESS:** The question again.
2:13PM 2 **BY MR. BROCK:**
2:13PM 3 **Q.** Is it your understanding that in the course of
2:13PM 4 conversations that took place about the negative test, that it
2:13PM 5 was representatives of Transocean who were advancing the idea
2:13PM 6 that the explanation for the pressure was something called the
2:13PM 7 "bladder effect" or "annular compression"?
2:13PM 8 **A.** There's certainly information to that effect. I can't
2:13PM 9 pass judgment on whether it's correct or not.
2:13PM 10 **Q.** Have you looked at the deposition of Lee Lambert?
2:13PM 11 **A.** Yes, I have.
2:13PM 12 **Q.** And have you seen that he testified that he was present
2:13PM 13 and heard the Transocean representatives explaining the
2:13PM 14 pressure as annular compression or the bladder effect?
2:13PM 15 **MR. DOYEN:** Your Honor, I object again to the
2:13PM 16 mischaracterization. If he wants, put up the testimony.
2:13PM 17 **MR. BROCK:** I'm asking for his understanding.
2:13PM 18 **THE COURT:** Can you answer that?
2:13PM 19 **THE WITNESS:** Yes, I understand he said something to
2:13PM 20 that effect.
2:14PM 21 **BY MR. BROCK:**
2:14PM 22 **Q.** Do you agree that Don Vidrine believed that the negative
2:14PM 23 pressure test was successfully completed and that there were no
2:14PM 24 issues with the well on the evening of the 20th?
2:14PM 25 **A.** Yes, I believe he believed that. I don't think he would

2:14PM have proceeded as he did if he hadn't believe that.
Q. Consistent with that, you don't believe that Don Vidrine would have put his own life at risk, or the lives of the people that he was out there working with on that rig, if he believed that there was a problem with the negative test?
A. I don't believe he would have intentionally put his life or anyone else's in danger.
Q. And likewise, do you believe that the men of Transocean, who also thought that the test passed and who believed that there was an explanation for that -- do you believe that to their way of thinking, the test was a good test?
A. I believe that's what they thought.
Q. They would not have put their own lives at risk or the lives of their friends and other folks that they work with?
A. I wouldn't think they would, no.
Q. Just to summarize, we have identified here today, as well as in your report, numerous time periods where there were anomalies that should have been observed; correct?
A. Correct.
Q. And the anomalies that should have been observed in the period of time 9:01 to 9:38 were not related to the negative pressure test; they were independent items?
A. If we're speaking of the anomalies in terms of pressure increasing, pump shut off, those were not related; the other anomalies, of course, were.

2:16PM **Q.** When I say "related," the anomalies that were detected should have been -- strike that.

The anomalies that should have been detected from 9:01, let's say, up to 9:31 or 9:38 are separate and distinct events from the interpretation of the negative test?

A. They are separate events, but they obviously were caused by the faulty interpretation of the negative test.

Q. In this case a failed negative test does not equate to a blowout?

A. Not if that's the only thing that happens.

Q. Because you still have the opportunities that we've talked about for well control that were available to detect an anomaly, conduct a flow check, and get the well shut in before we have a blowout?

A. Yes. Those options were available at a certain time.

MR. BROCK: That's all I have. Thank you very much.

THE COURT: All right. Cameron?

MR. BECK: Your Honor, Cameron has no questions of this witness.

THE COURT: M-I SWACO?

MR. TANNER: We have no questions.

THE COURT: Any redirect, Mr. Underhill?

MR. UNDERHILL: No, Your Honor.

THE COURT: All right. You're finished, sir. Thank you, sir.

2:18PM **THE WITNESS:** Thank you.
2:18PM **THE COURT:** All right. Who's the next witness? It will be another expert?
2:18PM **MR. UNDERHILL:** Yes, sir. Mr. Glen Benge.
2:18PM **THE COURT:** Why don't we take about a 10- to 15-minute recess.
2:18PM **THE DEPUTY CLERK:** All rise.
2:28PM (WHEREUPON, the Court took a recess.)
2:33PM **THE DEPUTY CLERK:** All rise.
2:33PM **THE COURT:** Please be seated, everyone.
2:33PM (WHEREUPON, **GLEN BENGE**, having been duly sworn, testified as follows.)
2:33PM **THE DEPUTY CLERK:** Please state your full name and correct spelling for the record.
2:33PM **THE WITNESS:** My name is Glen Benge, G-L-E-N, B-E-N-G-E.
2:33PM **MR. REGAN:** Your Honor, Matt Regan on behalf of BP. Just a note for the record that we do have a pending motion. And as we've talked about, I believe, on Monday, we assume you'll take it up with the testimony as a whole.
2:33PM **THE COURT:** Yes, I will.
2:34PM **MR. REGAN:** Thank you, Your Honor.
2:34PM **MR. CERNICH:** May it please the Court, Scott Cernich on behalf of the United States of America.
2:34PM The United States calls Glen Benge. In

addition, the United States would like to offer into evidence the expert report of Mr. Benge, which is Exhibit 5990. Mr. Benge's CV is included with the report, along with a list of the materials he considered in forming his opinions.

THE COURT: All right. Subject to the pending objections, those will be admitted.

MR. CERNICH: Thank you, Your Honor.

DIRECT EXAMINATION

BY MR. CERNICH:

Q. Mr. Benge, I'd like to start with a discussion of your cementing experience. Would you please describe your experience for the Court.

A. Yes, sir. I've spent my entire career in oil field cementing. I've got about 36 years. I've worked rigs on land, offshore, shallow water, deepwater; worked on every aspect of cementing from design, execution, to evaluation.

I've been involved with foam cementing, as it's pertinent here, since its inception. I performed the first foam cement job offshore in Mobile Bay. We wrote a paper on that back in '95.

Q. This is Exhibit 31003.

A. And in that particular case, I designed, executed, and performed all of the functions for that particular well.

Q. Do you consider yourself to be one of the top oil field cementing experts in the world?

2:35PM 1 **A.** Yes, sir, I do.
2:35PM 2 **Q.** Mr. Benge, if you could give the Court some background on
2:35PM 3 your employment history.
2:35PM 4 **A.** Yes, sir. I actually -- starting at the bottom, I was
2:35PM 5 with a company called Dowell, a division of Dow Chemical
2:35PM 6 that -- ultimately it's been merged and is part of
2:35PM 7 Schlumberger.
2:35PM 8 Moved to Mobil Oil fluids team here in New Orleans.
2:36PM 9 From there went to Mobil Oil in Dallas as a global cementing
2:36PM 10 adviser and, with the merger of Exxon and Mobil in 2000, moved
2:36PM 11 to Houston and was the global cementing adviser for -- or the
2:36PM 12 senior technical adviser and global cementing adviser for
2:36PM 13 ExxonMobil in their drilling operations. And then in the last
2:36PM 14 two years, I served as the drilling training manager for the
2:36PM 15 global drilling organization for ExxonMobil.
2:36PM 16 **Q.** Would you please describe your job as the ExxonMobil
2:36PM 17 senior technical adviser for cementing.
2:36PM 18 **A.** As that senior technical adviser, you're the adviser to
2:36PM 19 senior management for the business of cementing. That includes
2:36PM 20 how you're applying technology on a global basis. You're
2:36PM 21 setting standards for internally.
2:36PM 22 I also served as an adviser to service companies to
2:36PM 23 help direct research. But it's the senior-most technical
2:37PM 24 position for cementing. You are the technical resource for the
2:37PM 25 drilling organization.

2:37PM 1 **Q.** Did you establish best practices for the drilling
2:37PM 2 organization?
2:37PM 3 **A.** Yes, sir, I did.
2:37PM 4 **Q.** And did you consult with well teams on cement jobs?
2:37PM 5 **A.** Yes, sir.
2:37PM 6 **Q.** Can you describe your position as the drilling training
2:37PM 7 manager?
2:37PM 8 **A.** Yes. For the last two years I transitioned into a
2:37PM 9 technical role of drilling training manager, where we would
2:37PM 10 look at the skill sets required for a drilling engineer coming
2:37PM 11 out of school, what those skill sets needed to be to make them
2:37PM 12 a productive employee. You would look at the training, the
2:37PM 13 courses, the requirements that they would need to be able to do
2:37PM 14 that. We'd also look throughout -- and that was not just the
2:37PM 15 drilling engineers but also operations personnel.
2:37PM 16 **Q.** Did you train drilling engineers in oil field cementing?
2:37PM 17 **A.** Yes, sir.
2:37PM 18 **Q.** And why?
2:37PM 19 **A.** Well, that's a critical skill set that we felt that all
2:38PM 20 the drilling engineers would need.
2:38PM 21 **Q.** How did you train them?
2:38PM 22 **A.** We would do both in-house schools as well as external
2:38PM 23 schools. I've sent, as training, my drilling engineers to the
2:38PM 24 DTA. It's Drilling Training Alliance. It's a school that's a
2:38PM 25 combination of -- Chevron and BP has that class, and they put

2:38PM 1 on a one-week school. I noticed Mr. Morel attended that class.
2:38PM 2 **Q.** Did you have any opportunity to assess those drilling
2:38PM 3 engineers' knowledge in cementing?
2:38PM 4 **A.** Yes, I did.
2:38PM 5 **Q.** And how did you do that?
2:38PM 6 **A.** We would assess competency in cementing through testing
2:38PM 7 during the classes, through looking at their work products,
2:38PM 8 through any number of -- any number of things of looking at
2:38PM 9 programs, how they were -- how they were interacting.
2:38PM 10 **Q.** Did you also have the opportunity to assess drilling
2:38PM 11 engineers' cementing knowledge when you consulted with them on
2:38PM 12 individual wells?
2:38PM 13 **A.** Most certainly, yes, sir.
2:39PM 14 **Q.** And how did you do that?
2:39PM 15 **A.** You would look at their degree of knowledge associated
2:39PM 16 with cement, how they would approach the problem. And if you
2:39PM 17 found -- if we found that -- from the questions they asked,
2:39PM 18 from their involvement with it. And if we found that to be
2:39PM 19 appropriate, that was fine; if not, we'd give them additional
2:39PM 20 training.
2:39PM 21 **Q.** Is cementing a skill set you expected drilling engineers
2:39PM 22 to have?
2:39PM 23 **A.** Yes, sir.
2:39PM 24 **Q.** Mr. Benge, if we could briefly discuss your professional
2:39PM 25 organizations that you've been involved with over the years.

2:39PM **A.** Yes, sir. I was the -- the AADE or American Association of Drilling Engineers actually started here in New Orleans. I served on its board of directors for several years and was the president of that organization for one year.

2:39PM **Q.** But you're not a drilling engineer?

2:39PM **A.** I've not held the title of drilling engineer; but we do a lot of drilling engineering, even being a cementer.

2:39PM **Q.** And then the American Petroleum Institute, can you describe your involvement with that.

2:40PM **A.** Yes. I've been a member of API for over 30 years. It was at one time Committee 10, now it's Subcommittee 10 on oil well cements. I've been a member of that since 1980. That's the -- I don't want to say "ruling body," but that's the group that sets the industry protocols of standards for testing, for cement evaluation, everything -- all of the API standards funnel through that organization.

I chaired that organization for three years, from 2002 to 2005. And I also have served on a number of work groups, task groups on everything from centralizers. I chaired the task group on foam cement. And work, actually, that came out of that group was the current document on foam cementing for API.

2:40PM **Q.** Were you also a member -- or are you also a member of the Society of Petroleum Engineers?

2:40PM **A.** Yes, sir. I've been a member of SPE for as long -- since

'97. I have served as program and session chairs for a number of conferences.

I'm also a technical editor. So when we talk about peer-reviewed journals, I'm one of those guys that peer-reviews those papers for publication. And fortunately, I've received a couple of Outstanding Technical Editor awards for that work.

Q. And just to cover the various aspects of oil field cementing, are you an expert in planning and designing cement jobs?

A. Yes, sir.

Q. Approximately how many cement jobs have you designed?

A. Designed from start to finish and everything in between, well over 100.

Q. And you consulted on the design of other jobs?

A. Yes, sir.

Q. On how many, would you say?

A. Well over 1,000. That was a core part of my job.

Q. Are you an expert in designing cement slurries?

A. Yes, sir.

Q. Including foam cement slurries?

A. Yes, sir.

Q. Approximately how many cement slurries have you designed?

A. Hundreds. More than 100, less than 10,000. It's been a lot.

Q. Of foam slurries?

2:42PM **A.** Well over 100.
2:42PM **Q.** Have you assisted or consulted on the design of additional slurries?
2:42PM **A.** Yes, sir, I have.
2:42PM **Q.** And that would be many more?
2:42PM **A.** Every time you consult on a well, there's at least two cement slurries for every cement job and there's several cement jobs on every well.
2:42PM **Q.** And did you generally review the slurry designs when you consulted on a well?
2:42PM **A.** Yes, sir.
2:42PM **Q.** Are you an expert in laboratory testing of oilfield cement?
2:42PM **A.** Yes, sir.
2:42PM **Q.** And you ran the cement lab when you worked for Schlumberger?
2:42PM **A.** Well, actually, when I was here in New Orleans, the laboratory reported to me. So I had the lab manager and a full set of technicians that reported to me.
2:42PM **Q.** Are you an expert in field equipment and field operations for cementing?
2:42PM **A.** Yes, sir. Now, I don't want to say I can go out and run the trucks; but I know what they're supposed to do.
2:43PM **Q.** You've been on rigs?
2:43PM **A.** Yes, sir, all over the world.

Q. Onshore and offshore?

A. Onshore, offshore, shallow water, deepwater, pretty much the whole gamut.

Q. Approximately how many cement jobs have you actually attended in person on the rig?

A. Well over 100.

Q. Are you an expert in cement evaluation?

A. Yes, sir.

Q. Can you describe cement evaluation for the Court?

A. Cement evaluation takes a lot of different things. It can be pressure evaluation; you can do temperature logs; you can do electronic logs where -- the CBLs. There's any number of those different types. So depending on what the objectives are, your evaluation criteria will change; but on all of those different types, I know how to do those.

Q. And that would include cement bond logs?

A. That would include cement bond logs in all their forms.

MR. CERNICH: Your Honor, I would like to proffer Mr. Benge as an expert in oil field cementing.

THE COURT: Other than the *Daubert* pending motion, any other questions at this time?

MR. REGAN: Not at this time, Your Honor.

THE COURT: Again, subject to that, I accept him and will allow him to testify in that field.

MR. CERNICH: Thank you.

2:44PM 1 **BY MR. CERNICH:**
2:44PM 2 **Q.** Mr. Benge, I'd like to talk a little bit about your
2:44PM 3 background on the Macondo well specifically.
2:44PM 4 Did you have any involvement in the Macondo well
2:44PM 5 before you began your expert work for the United States in this
2:44PM 6 case?
2:44PM 7 **A.** Yes, sir, I did.
2:44PM 8 **Q.** Can you describe that?
2:44PM 9 **A.** As part of the industry -- I worked with Secretary Chu and
2:44PM 10 his group as an industry adviser during the final cement job
2:44PM 11 that was on the Macondo well itself. So I advised with that
2:44PM 12 group under Secretary Chu.
2:44PM 13 **Q.** Have you ever served as an expert witness before?
2:44PM 14 **A.** No, sir, I have not.
2:44PM 15 **Q.** How did you come to serve as an expert in this case?
2:44PM 16 **A.** I was contacted by a member of NETL, National Energy
2:45PM 17 Technology Lab, and understood that they were looking for some
2:45PM 18 experts. At that time, I was still with ExxonMobil. When I
2:45PM 19 retired, I decided to help with this.
2:45PM 20 **Q.** Why did you agree to serve as an expert in this case?
2:45PM 21 **A.** The Macondo well was a major event for the entire
2:45PM 22 industry. I don't know the gentlemen who worked on that rig,
2:45PM 23 but I've been on those rigs and I know the type of folks they
2:45PM 24 were. And anything that I could do to understand this and keep
2:45PM 25 it from happening in whatever small way, I wanted to assist

with.
Q. And what was your task in this matter?
A. My task in this manner was to determine why the cement did not form a barrier in the Macondo well.
Q. And what types of information did you review or consider in forming your opinions?
A. The available information that I had was everything from laboratory tests, the on-location operations, design documents, communications. I looked at all of the pertinent testimony, depositions. I also looked at interview notes, anything I could find that would have -- that was relevant to this.

And I also went out and searched industry papers and all the stuff that would be available on cementing for that.
Q. Before we get into the details of the Macondo cement job, I thought we could cover some of the basics of cementing for the Court.
A. Sure.
Q. What is oil well cement?
A. Well, we've got a brief little animation, if we can, that will just look at the very bottom of the well.
Q. Before we get to that, can you just describe what -- what cement is? What is oil well cement?
A. Well, oil well cement is basically burnt dirt. You take limestone, grind it up, you add in clay and other minerals and you put it through a -- through a kiln. And then it comes out

and you grind it and it makes -- that's how you make cement. So it's not a pure material. It varies from manufacturer to manufacturer and from plant to plant.

Q. And what is oil well cementing?

A. Well, oil well cementing is taking that cement, putting it in with different materials, different blends, and much like you take flour and you add all different sorts of materials in it for a dry blend for it to make a cake.

Oil field cementing is coming up with that recipe. So you've got the solids, the liquids, and then also there's the physics of placing that. So there's slurry design; there's the job design, if you will. It's a combination of chemistry and physics.

Q. And why do you cement wells?

A. To provide isolation; to prevent the pipe from moving up, down, left, right, so you get pipe support or casing support. You also can cement the well for -- this well had a sidetrack, so you'll do what we call a kick-off plug. You get a firm foundation so the well's got something to kick off of. That's a cement kick-off plug.

Q. Would you like to go to the animation now?

A. Yes. That would be fine.

Before this starts, we're going to see a number of things that go on with it. One is you'll see several different colors of fluids that go on. This is a representation -- if I

2:48PM 1 can, this is the float collar, this is in the reamer shoe.
2:48PM 2 From here to where the bottom of that shoe is, that's the
2:48PM 3 18,000-plus feet. It says "not to scale." Between here and
2:48PM 4 here is the size of the building next door. It's a 17-,
2:48PM 5 18-story building.
2:48PM 6 And so what we'll see is the cement will begin --
2:48PM 7 will start pumping.
2:48PM 8 If we can start the animation.
2:48PM 9 This is just the bottom section of this well. What
2:49PM 10 we'll see is we're pumping fluids down. This would be the
2:49PM 11 drilling mud coming up and around. And if we can pause for
2:49PM 12 just a brief second, we'll see purple coming in as a base
2:49PM 13 oil -- that's the unweighted oil -- followed by a spacer,
2:49PM 14 followed by a cap or -- and tail cement. That cap and tail
2:49PM 15 cement are not foam. And then the light gray will be the foam
2:49PM 16 cement.
2:49PM 17 And so if we can continue on.
2:49PM 18 What we'll see here is the base oil coming ahead of
2:49PM 19 the spacer, and it's followed by the bottom plug. Now, that
2:49PM 20 bottom plug has a rupture disc in it. So it protects or it
2:49PM 21 keeps contamination, as that cement is being placed, from -- it
2:49PM 22 won't get contaminated with anything inside the pipe.
2:49PM 23 We see that -- the base oil followed by the spacer,
2:49PM 24 here comes our unfoamed cement and now our foam cement. That's
2:50PM 25 finally being followed by what we'll call the "tail cement."

2:50PM 1 And then behind it will be the top wiper plug. So we'll call
2:50PM 2 that "bumping the plug."
2:50PM 3 So what we have here is -- from the float collar down
2:50PM 4 to the reamer shoe has got a tail cement. It's the same
2:50PM 5 cement, it just doesn't have foam in it. And then we've got
2:50PM 6 foamed cement in that annulus from there on, and above that,
2:50PM 7 again, the cap and the spacer base oil.
2:50PM 8 **Q.** Before we move on, Mr. Benge, you mentioned -- you were
2:50PM 9 talking about the wiper plugs and separating the fluids. Do
2:50PM 10 the wiper plugs perfectly separate the fluids?
2:50PM 11 **A.** They do a pretty good job; but no, there's not -- you've
2:50PM 12 got a plug and it's going down the pipe, it doesn't -- it does
2:50PM 13 a pretty good job; but, no, it doesn't completely separate
2:50PM 14 them. You'll get some intermixing.
2:50PM 15 Also, artists are great. They can draw things that
2:51PM 16 are nice and level. You saw the fluids were very pristine as
2:51PM 17 they went up in the annulus. There's also intermixing of
2:51PM 18 those. That always happens.
2:51PM 19 **Q.** Can you provide the Court with any sort of indication of
2:51PM 20 the scale of a cement job and how it's done?
2:51PM 21 **A.** I can, and I'll thank my daughter for this because she
2:51PM 22 actually originally came up with it. I've brought a
2:51PM 23 demonstrative, and I don't mean to -- I didn't bring one for
2:51PM 24 everybody.
2:51PM 25 What this is is a 9-inch plastic plate that you can

buy down at the grocery store. And what I did, the black line on here, the outside of that is 7 inches. The inside of it is the ID of the pipe. And so you can tell -- I don't know if you can see it very well, but where you put your food on a 9-inch place is where -- that's the inside of the -- that's the inside of the pipe here. The annulus -- in this case, this is 9-inches -- the annulus, that's where the cement goes.

So go take this plate, set it down 3 miles away. You get to pump cement 3 miles down, through the center of this, back up the outside. And to get a seal in this well, you get one chance to do it right; and that seal area is the decoration on your plate.

So when you're at dinner tonight -- I'm sorry, that will mess you up. But at dinner tonight, where your food is is where the pipe is; the decoration on your plate is the size of the cement sheath, 3 miles away.

THE COURT: I don't think any of these folks use plastic plates, though.

THE WITNESS: The group I'm working with, their credit rating kind of went down lately, so I've got to use anything I can.

THE COURT: Well, these folks might -- they're about to be furloughed by the Government.

MR. CERNICH: We'll have to live with paper.

2:53PM **BY MR. CERNICH:**
2:53PM **Q.** It sounds like a difficult process.
2:53PM **A.** It is. It's a very difficult process.
2:53PM **Q.** All right. Does anyone ever get it right?
2:53PM **A.** We get it right all the time. But to get that right, little things matter a lot.
2:53PM **Q.** What if you don't get it right?
2:53PM **A.** Then you have to go back and repair. You have to repair that cement job.
2:53PM **Q.** Is repairing the cement job as good as getting it right the first time?
2:53PM **A.** Oh, it never is.
2:53PM **Q.** Can you tell the Court -- we've talked a little bit about foam cement. What is foam cement?
2:53PM **A.** Foam cement is a stable mixture of cement and in this case -- for our case, it's nitrogen. I understand you had a geologist that brings rocks, and so cementers have to bring cement.

And I don't want to represent this as being the Macondo slurry at all. This is not. This is just -- this is a standard cement system.

THE WITNESS: And, Your Honor, this weighs 16 -- excuse me. That is just a standard, normal, unfoamed cement system. I have the exact same one that's got about -- it says on there 13 percent gas. And here's one that's got 23 percent

gas. And you can tell that as you add gas, it gets lighter. You can see the -- and so you're -- it's a stable mixture of gas and cement; and as you add more gas to it, it weighs less.

THE COURT: So, in essence, you have gas bubbles, I would say, in the cement?

THE WITNESS: Right. And you've got -- the soap that's in there and the surfactants help to lock all of that in place, yes, sir.

THE COURT: All right.

BY MR. CERNICH:

Q. And so you mentioned a drive line earlier. What is that?

A. Well, that's the dry cement with its additives. If there's any dry additives in the cement, you'll blend those together at a bulk plant and you'll ship those to the rig. So that would be the cement with the additives that you're going to ultimately mix with the fluid in the cement unit, and then that will go down the hole.

Q. And there are also liquid additives?

A. Yes, sir. And that would be in the water phase. So you're adding the solids and you're adding the liquids together on location.

Q. And then once they're added together, the cement is pumped down the well?

A. Yes, sir.

Q. Do you have an opinion on whether --

2:55PM 1 **MR. CERNICH:** We're going to move on to the actual
2:55PM 2 Macondo cement job now, Your Honor.
2:55PM 3 **BY MR. CERNICH:**
2:55PM 4 **Q.** Do you have any opinion on whether the Macondo cement
2:55PM 5 actually formed a barrier in the well?
2:55PM 6 **A.** Yes, I do. And that's that the cement did not form a
2:55PM 7 barrier in the well.
2:55PM 8 **Q.** And can you tell the Court why it didn't form a barrier in
2:56PM 9 the well?
2:56PM 10 **A.** There's generally two reasons why any cement would not
2:56PM 11 form a barrier. One is it's not there. It's not present
2:56PM 12 across the formation to be able to form a barrier, or it's not
2:56PM 13 set and, yet, it's still acting as a liquid. So it's not set
2:56PM 14 or able to form a barrier, or a combination of the two.
2:56PM 15 **Q.** Does every cement job form a barrier?
2:56PM 16 **A.** No, sir.
2:56PM 17 **Q.** Are cement jobs that are intended to form a barrier
2:56PM 18 sometimes unsuccessful?
2:56PM 19 **A.** Yes, sir, they are.
2:56PM 20 **Q.** Do you consider an unsuccessful -- let me strike that.
2:56PM 21 Do you know whether such cement jobs result in
2:56PM 22 blowouts?
2:56PM 23 **A.** No, sir, they result in a squeeze job.
2:56PM 24 **Q.** What's a squeeze job?
2:56PM 25 **A.** A squeeze job is where you're going back and you're

repairing the cement job. You're forcing cement under pressure -- you're not circulating it in place; now you're forcing it under pressure into place. It's a repair job.

Q. How do you get it into place?

A. With pump pressure. You'll pump it in. You'll usually perforate the pipe and you'll force cement under pressure into -- in through that hole you created.

Q. How do you know that you have to do such a repair?

A. Depending on what your objectives of the well are -- or the cement, you've tested to those objectives and know that the cement has not met those objectives. So you've tested it, found it to be -- found it to not have performed as you wanted it to, so you go back and repair.

Q. How would you test it?

A. Again, any number of ways. Pressure testing is probably the most common, cement bond logs, temperature logs.

Q. Have you ever been involved in a cement job that has failed to form a barrier?

A. Yes, sir, I have.

Q. What happened on those jobs?

A. In those particular cases, it didn't meet the requirements of the job. We had to go back and remediate or squeeze the well.

Q. Is it common for cement jobs not to form a barrier?

A. Unfortunately -- well, it doesn't sound like a big number

unless you're a cementer. About 10 percent, 8 to 10 percent don't meet those objectives and have to be repaired.

When you start getting into deep water or into much more challenging environments, that failure rate tends to go up a little bit. But 10 to 20 percent of those won't form a barrier to start out with.

Q. You said that you've been involved in some cement jobs that failed to form a barrier in the well. Did any of those wells blow out?

A. No, sir.

Q. How did you know that the cement job failed to form a barrier?

A. Again, they failed the cement evaluation test that we did, be that a positive test, a negative test, a CBL, or what have you.

Q. Did you determine why the Macondo cement did not form a barrier?

A. Yes, sir.

Q. Go to the next slide, please.

A. I believe there were two things -- well, four things, really, that looked at the reason that it didn't form a barrier. One's what I call a failure of engineering design.

To design a cementing job, to design a cementing operation is really two parts: You've got chemistry, which is the design of the cement slurry itself; and physics, which is

2:59PM 1 the placement of the cement itself.
2:59PM 2 I found there was a failure in both of those. The
2:59PM 3 Macondo well used a leftover cement blend. It was not
2:59PM 4 originally intended -- originally designed as a foam cement.
2:59PM 5 And so because of that, it puts more onus on lab testing to
2:59PM 6 make sure that all of the testing was done and completed.
2:59PM 7 I also found that there was a failure to really
2:59PM 8 mitigate several acknowledged risks to the job itself.
3:00PM 9 And then, finally, there was a failure to evaluate
3:00PM 10 the cumulative risks that were acknowledged. So it wasn't just
3:00PM 11 one risk that happened, but the cumulative risks that caused
3:00PM 12 that failure.
3:00PM 13 **Q.** How does the cement design process work? What's the
3:00PM 14 relationship between the operator and the cement service
3:00PM 15 provider?
3:00PM 16 **A.** It's a very iterative process. The operator will -- they
3:00PM 17 set the boundary conditions, they set the limits, what's the
3:00PM 18 objectives of the well. So what do I want the cement job to
3:00PM 19 do?
3:00PM 20 And once I've set those goals and I understand those
3:00PM 21 goals, then what's my operating window? What's the well doing?
3:00PM 22 How deep is it? What's the size of everything? What's my pore
3:00PM 23 pressure, frac gradient, what have you? They give that to the
3:00PM 24 cementing service company.
3:00PM 25 And with their portfolio of materials, they go and,

within the limits or the constraints of that well, design the chemistry, if you will, the cement slurry itself.

Also involved with that and in concert with that are the design of the physics. What's the constraints? How fast can we pump? What are fluid densities? What's the well look like? So it's a very iterative technique.

And then, once all that's come together, you bring that back together and the operator then reviews that and then it's ultimately approved by the operator before it's used on the well.

Q. Is the operator ultimately responsible for cementing the well?

A. Yes.

Q. Who has the ultimate authority on the cement job? Is that also the operator?

A. Yes, sir. You can't pump anything in that well that the operator doesn't approve.

Q. I'd like you to talk about -- a bit more about the chemistry and the physics that you mentioned.

MR. CERNICH: If we could go to the next slide, please.

BY MR. CERNICH:

Q. Can you tell the Court a little bit more about the chemistry and physics?

A. Well, the chemistry is -- it's the cake mix. It's what's

in there. It's the dry blend with all of its additives. So the chemistry is basically the cement slurry itself, what additives it has in it, what those additives have the effect of. So that has to be designed within the constraints of the well. What's expected of it, I've got to get additives that will give me the properties that I want.

So the chemistry is really the cement slurry, and then the physics is the placement of that slurry. They have to work hand in hand. They're not separates but equals. They have to work together. I can have the best cement slurry design in the world; and if I don't get it on the plate right, you're not going to work. And if I can get it on the plate perfectly but it's not what I wanted, then you'll still have a failure. So it's really both.

Q. So is slurry design more important than cement placement?

A. No, sir.

MR. CERNICH: Can we go to Exhibit 3058.

BY MR. CERNICH:

Q. Do you recognize this document, Mr. Benge?

A. Yes, sir, I do.

Q. What is it?

A. That's a global deepwater design guideline that -- that's a BP document that actually Ashley Hibbert put together some years ago.

Q. Do you know Mr. Hibbert?

3:03PM **A.** Yes, sir. I've known Ashley for a number of years. He's a global -- he's since retired, but he was the global cementing specialist for BP out of the UK.

MR. CERNICH: Can you go to page 7, please.

BY MR. CERNICH:

Q. Do you recall reviewing this portion of the document?

A. Yes, sir, I do.

Q. And can you describe what this says?

A. Yes. I like the way Ashley put this, because this is a misconception that slurry design is more important than getting optimum wellbore conditions for cementing, good hole, good fluid or mud properties, good centralization and displacement; in other words, the physics.

And the common mistake is that I've got an additive or a 5-gallon bucket of something I can put in the cement that will overcome physics, and that doesn't exist.

Q. Is this consistent with your opinions?

A. Oh, yes.

Q. Can poor placement of cement affect stability?

A. Yes, it can.

Q. How does it do that?

A. Well, if you don't place it properly -- and we talked a little bit about the plugs keeping the cement separated -- it will contaminate it. You can get contamination with fluids that you don't intend.

3:04PM 1 So if you don't have it placed properly, those fluids
3:04PM 2 will intermix more and you'll get contamination and the cement
3:04PM 3 can't perform.
3:04PM 4 **Q.** What is stability?
3:04PM 5 **A.** Stability is where -- in the case of every slurry design
3:04PM 6 is -- it says together; it does what I said it was going to do.
3:04PM 7 So that doesn't necessarily have to be just foam. That can be
3:04PM 8 with a standard cement slurry.
3:04PM 9 You see that when you put in the foundation of your
3:05PM 10 house. If it wasn't stable, all of the gravel would be down at
3:05PM 11 the bottom. We don't pump gravel in oil field cement. All of
3:05PM 12 the gravel would be down at the bottom and you'd have cement at
3:05PM 13 the top. That would be unstable, and that means you're not
3:05PM 14 going to get the properties that you want.
3:05PM 15 **Q.** On page 2 of your report, you wrote: "BP engineers chose
3:05PM 16 to accept risks when designing the cement job based on their
3:05PM 17 awareness that remedial cementing work could be done at a later
3:05PM 18 date."
3:05PM 19 Do you recall writing that in your report?
3:05PM 20 **A.** Yes, sir, I do.
3:05PM 21 **Q.** And that's your opinion?
3:05PM 22 **A.** Yes, sir, it is.
3:05PM 23 **Q.** What did you mean by that?
3:05PM 24 **A.** There are a number of accepted risks that were identified
3:05PM 25 and noted by BP engineers that, you know, we are going to

compromise some of the practices associated with cementing and we can come back and squeeze it later.

And there's a number of -- or there's an e-mail that specifically states to that effect.

MR. CERNICH: Could we go to Exhibit 1367, please.

BY MR. CERNICH:

Q. Do you recognize this document, Mr. Benge?

A. Yes, sir, I do.

Q. Is this the e-mail to which you were referring?

A. Yes. This is one that -- it basically says that I would -- in this particular case, they're looking at --

Q. Can I stop you for a minute?

This is an e-mail dated April 16th, 2010, from Brett Cocales to Brian Morel; is that right?

A. Yes, sir, it is.

Q. Can you tell the Court who Mr. Cocales and Mr. Morel are?

A. Those are both BP drilling engineers that worked on the Macondo well.

Q. Thank you.

What does this e-mail say?

A. This e-mail is talking about the placement of centralizers, and I know the Court has seen this one before. But it says that there's a risk -- it says: "So Guide is right. Is the risk/reward" -- "Guide" is John Guide, the operations man for BP for Macondo.

So he says the risk -- the acknowledged risk is getting stuck in the wellhead. And so he would rather accept that risk and have to come back and squeeze than get stuck in the wellhead. So he's acknowledging that If we don't do this right, we'll come back and we'll have to squeeze the well later.

Q. While we're on this e-mail, Mr. Benge, is a hole ever perfectly straight?

A. Oh, no. The hole isn't perfectly straight. Anybody that's done woodworking and tried to drill a straight hole knows you can't. You'll have to use a drill press. If you can imagine trying to do that 3 miles away. The hole spirals. You're turning to the right and that bit, the drill string, tends to spiral. So it literally will spiral. It's never straight.

You can see that very easily just looking at the survey data. If it was very perfectly straight, all those numbers would be the same, and they're all over the board showing it spiraling.

Q. And Mr. Cocales writes: "But who cares? It's done. End of story, we'll probably be fine and we'll get a good cement job."

Did I read that correctly?

A. Yes, sir, you did.

Q. Did BP get a good cement job?

3:08PM **A.** No, sir, they did not.

MR. CERNICH: Could I go to Exhibit 4451, please.

BY MR. CERNICH:

Q. Can you identify this document, Mr. Benge?

A. Yes. These are the Bly interview notes for Mr. Mark Hafle, who is a senior engineer the Macondo well.

MR. CERNICH: Can we go to page 3, please.

BY MR. CERNICH:

Q. Do you recall reading this portion of the notes, Mr. Benge?

A. Yes, sir, I do.

Q. And could you please read the highlighted section for the Court?

A. Yes, sir. It says: Weekend RNG, running pipe. Brian call, says they are not running all centralizers, only the six across pay. Time issues. Glue, cent" -- for centralizers -- Don't know who made the final decision. Thought we were going to get a shitty cement job.

It goes on to say: 12 to 18 hours -- talking of the centralizers -- of downtime. Glue has to cure? Bryan Clawson. Communication plan, who makes decisions?

Q. And do you know what Mr. Hafle meant by "glue has to cure"?

MR. REGAN: Objection, Your Honor. The witness can give his interpretation, but -- with respect to Mr. Hafle's

state of mind as before today as to these notes.

THE COURT: Okay. With that understanding, I'll let him answer.

What is your interpretation then?

THE WITNESS: The glue has to cure. These are specialty centralizers that -- there's a glue that goes onto the stop collar, and those were ones that are --

THE COURT: These are the 15 extra collars; right?

THE WITNESS: Yes, sir.

THE COURT: The ones that -- actually, they're not collars. They're --

THE WITNESS: Well, they're centralizers.

THE COURT: -- centralizers that go around the drill pipe?

THE WITNESS: Right, they go around the casing, yes, sir.

THE COURT: Casing, I'm sorry. They snap on or attach somehow?

THE WITNESS: Well, you slide them on from the bottom and there's a stop collar, is what it's called. And those have Allen screws in them, but they also have to have glue. And that's what -- BP upped the design with Weatherford from the work off of *Thunder Horse*.

BY MR. CERNICH:

Q. What did you mean by that, Mr. Benge?

3:10PM **A.** Well, they improved the centralizer design based on some problems they'd had on the *Thunder Horse* well. So part of it ways changing that stop collar but also was applying a glue to those to keep those stop collars in place.

3:10PM **Q.** So based on your knowledge of these types of centralizers and this glueing process, would it have taken additional time to install those and allow them to cure?

3:10PM **A.** Yes, sir, it would have.

3:10PM **Q.** Would you agree with the sentiment expressed here by Mr. Hafle about the quality of the Macondo cement job?

3:11PM **A.** Yes, sir, I would.

3:11PM **Q.** How do the comments regarding the centralizers factor into your opinion?

3:11PM **A.** Well, I would agree that if they were only going to run six, that was a risk that was acknowledged and that was going to result in a suboptimal cement job.

3:11PM **Q.** Does your report identify risks that were taken on the Macondo cement job?

3:11PM **A.** Yes, sir, it does.

3:11PM **MR. CERNICH:** Can we go to the next slide, please.

3:11PM **BY MR. CERNICH:**

3:11PM **Q.** Does this list identify risks that you identified on the Macondo cement job?

3:11PM **A.** Yes, sir, it does. I've grouped them into nine separate categories.

3:11PM **Q.** And did you identify these risks in your expert report?
3:11PM **A.** Yes, sir, I did.
3:11PM **Q.** In your review, did you observe anything done to mitigate these risks?
3:11PM **A.** No sir, I did not.
3:11PM **Q.** Did you see any evidence that anyone assessed the cumulative effects of these risks?
3:11PM **A.** No, sir.
3:11PM **Q.** What was the cumulative effect, if you've considered that?
3:12PM **A.** Based on everything I saw with this, there was -- you were not going to get a successful cement job, and the cement would not form a barrier in this well.
3:12PM **Q.** And you testified earlier that BP accepted known risks. Which of these were known risks?
3:12PM **A.** Well, if we look through the list, there was an acknowledgment of using leftover cement. We know that BP did not have all of the lab data prior to the cement job. There is documented an acknowledged risk for foam cement and synthetic oil-based mud -- that's SOBM. As we've seen, it was understood there was inadequate centralization.

Not prior to the job -- I mean, not in a design phase, but prior to the job, we know there was problems with the float collar conversion: limited pre-job circulation and low cement volume and low pump rates. So those are the majority that were known.

3:13PM **Q.** Given these risks, in your opinion, should BP have pumped the cement job as designed?
3:13PM **A.** I would not have pumped that and expected it to be successful.
3:13PM **Q.** And that's consistent with Mr. Hafle's comments to Mr. Corser?
3:13PM **A.** Yes, sir.
3:13PM **Q.** I'd like to talk about the first risk you identified, no expressed job objectives. Did you see the Macondo cement job objectives documented anywhere?
3:13PM **A.** No, sir, I did not. And without -- if you don't know where you're going, you don't know how you're going to get there.
3:13PM **MR. CERNICH:** Could we go to page 36 of Mr. Benge's report.
3:13PM **THE WITNESS:** And without those total objectives -- now, the only objective I did find -- and this is a decision tree on what to do for the cement job, what's going to designate a successful cement job.
3:14PM And the only objective that you'll find on this is did we have full return? In other words, if you pumped a gallon in, a gallon came out. All of the cement went up the outside of that plate, nothing spilled out into the formation or broke the formation.
3:14PM So if you had full returns, consider it a

success, then that's the only documented goal that I saw.

BY MR. CERNICH:

Q. And was there a particular concern about full returns?

A. There was. This is a very fragile well. You didn't have a whole lot of room between pore pressure and frac gradient. And it was a very, very difficult and challenging cement job.

MR. CERNICH: Could we go to page 7 of Mr. Benge's report, Exhibit 5590. And if we could please focus in on this paragraph -- no, the one above it. Above that one.

BY MR. CERNICH:

Q. In here you write: "BP's engineering design for the production string cement job was driven by the singular desire to minimize equivalent circulation density, ECD."

Did I read that correctly?

A. Yes, sir, you did.

Q. What did you mean by that?

A. Well, in order to -- in that decision tree it was -- we have to have full circulation. We can't break that well. So ECD, or equivalent circulation, it's the pressure on that well.

And so all of the decisions and the documented decisions on that cement job were to reduce that down and to minimize the ECD from the selection of the base oil ahead of the cement, to foam cement, to low pump rates.

All of those are designed and are documented in an MOC. That's to minimize ECD.

3:16PM **Q.** Did you note any unexpressed job objectives?
3:16PM **A.** Well, there's also an unexpressed or an inherent job objective to get -- you want to get a barrier in the well, or a seal. And that's always an -- really, an unexpressed goal for a cement job.
3:16PM **Q.** A moment ago you mentioned top of cement in your discussion of the flow chart. Can you explain the concept of "top of the cement" to the Court.
3:16PM **A.** Top of cement is how high in the well that cement has got to be. So when we're done with the job, there's a sufficient volume of cement to put in that annulus up to some height. And so the top of the cement, once you define that's where I want top of cement, from a cementer's standpoint, that defines the volume of your job.

So I need cement. That will tell me how much cement I have to have. It will define -- in part, because that's your volume of cement, it will define a lot of the properties that you have to have for that cement.

3:17PM **Q.** And how was top of cement relevant specifically to the Macondo production casing cement job?
3:17PM **A.** In this particular well, the top of cement was chosen to be 500 feet above the hydrocarbon zone, and that's an MMS requirement.
3:17PM **Q.** So that was the minimum standard?
3:17PM **A.** That's the minimum standard, yes, sir.

3:17PM 1 **Q.** Did you observe the cementing knowledge of the BP
3:17PM 2 engineers working on the Macondo cement job?
3:17PM 3 **A.** Yes, sir, I did.
3:17PM 4 **Q.** And what did you observe?
3:17PM 5 **A.** I observed a good deal of knowledge of cementing from the
3:17PM 6 engineers as well as a great deal of control that BP had over
3:17PM 7 the cement and down to individual additives that were chosen
3:17PM 8 for the cement.
3:17PM 9 **MR. CERNICH:** Could we go to Exhibit 7717, please.
3:18PM 10 **BY MR. CERNICH:**
3:18PM 11 **Q.** Can you identify this document, Mr. Benge?
3:18PM 12 **A.** Yes, sir. If I -- we can move away from -- let's just
3:18PM 13 move away from the primary cement job or the production cement
3:18PM 14 job.
3:18PM 15 This is for the kickoff plug, or that sidetrack plug
3:18PM 16 that's way up the well. This is a series of e-mails back and
3:18PM 17 forth on how much spacer do you run.
3:18PM 18 Now, that spacer is the fluid you pump ahead to keep
3:18PM 19 the cement and the mud apart. So it's your preflusher, the
3:18PM 20 spacer that helps to clean that hole.
3:18PM 21 **Q.** Just for a moment here, to pause. This bottom e-mail here
3:18PM 22 is from Jesse Gagliano to Brian Morel and Mark Hafle, dated
3:18PM 23 March 15th, 2010; is that right?
3:18PM 24 **A.** Yes, sir.
3:18PM 25 **Q.** And is the subject "KOP Procedure"?

3:18PM **A.** Yes. And that stands for kick-off plug.
3:18PM **Q.** And do you know who Mr. Gagliano is?
3:19PM **A.** Mr. Gagliano is the desk engineer for Halliburton that was assigned to BP.
3:19PM **Q.** And could you go ahead and explain this to the Court.
3:19PM **A.** Yes, sir. What this is, you -- in order to clean the hole, to get it prepared for cementing, you've got to get the mud out. You have to replace mud with cement. And mud and cement don't like each other very much. When you get the two mixed together, you'll sacrifice those cementing properties.

So a spacer is designed to act as a fluid buffer between the two. Now, as the hole gets bigger and such, you need more spacer because the volumes -- because you have to have more volume.

In this particular case, Mr. Gagliano is noting that -- well, he said: The volume you want to run is 75 barrels. But best practices -- and he's quoting from best practices -- that you need a minimum of about 1,000 to 1,500 feet in order to be able to separate out the cement and the mud.

And he goes through the explanation of you need more because the hole's bigger.

Now, in that -- and then Mark Hafle sends this to Erick. Erick is Erick Cunningham. He's the BP Western Hemisphere cementing specialist.

3:20PM **Q.** Do you know Mr. Cunningham?
3:20PM **A.** I've known Erick for a lot of years. He used to be at Schlumberger and then moved over to BP in a position very similar to what I held at ExxonMobil.
3:20PM So Mark's asking him: Erick, well, can you comment or review, and what are your thoughts on this? So he's asking his cementing specialist to look at Mr. Gagliano's recommendation and say, you know, What do you think about it? Because our team's wanting to run 75 barrels."
3:20PM **MR. CERNICH:** Can we move to the next page, please. Can we go back to the prior exhibit, the next page?
3:20PM There we go.
3:20PM **THE WITNESS:** So this is a continuation of those e-mails. And the bottom portion of this, it says -- this is Erick Cunningham writing back to Mr. Hafle and Mr. Morel, so these are all BP folks.
3:21PM He says: "Mark, I haven't had a chance to look at it in detail, but I agree. We need more spacer to separate out the cement and the mud."
3:21PM So he's agreeing with Halliburton.
3:21PM And then we see up at the top --
3:21PM **MR. CERNICH:** Can we focus in on the top of that e-mail, please.
3:21PM **BY MR. CERNICH:**
3:21PM **Q.** And this is an e-mail from Mr. Hafle to Mr. Morel --

3:21PM **A.** Right.
3:21PM **Q.** -- dated March 16th?
3:21PM **A.** Yes. Now you have the BP engineers communicating back and forth with each other.
3:21PM And he's asking him -- Mr. Morel is asking: "Do you want to talk about spacer volume? If so, give me a call."
3:21PM "Guide" -- in this case was John Guide -- "wants to stay with the 75-barrels, and they've reduced the cement volume."
3:22PM If we go down to the very bottom of this, it says: "Well, we don't need to water-wet the hole because we don't care about it setting or stick to the walls. Just need a hard core to push off. I know some people think I'm crazy."
3:22PM What that tells you with respect to this, spacers have to clean the hole. And so there's an understanding from Mr. Morel of the function of a spacer, that it water-wets the hole; that in order for cement to stick to that hole, you have to clean the mud and to water-wet it. So that's an understanding of the fluid dynamics, the understanding of the cementing process that goes on with simply the selection of a spacer.
3:22PM **MR. REGAN:** Your Honor, if I might, just with respect to this line of questioning about e-mails, I understand the witness can give his understanding of what these e-mails mean; but for the record, beyond reading the words on the page, the

witness has not met Mr. Morel and doesn't have a basis as to what Mr. Morel believed or thought at the time he wrote the message.

THE COURT: All right. I understand.

MR. REGAN: All right. Thank you, Your Honor.

BY MR. CERNICH:

Q. And, Mr. Benge, do you know what volume of spacer was ultimately run on this kick-off plug?

A. Actually, ultimately, in reading a lot of the deposition testimony, they did go with -- "they," BP, went with the volume that was recommended by Halliburton and seconded by Mr. -- or by Erick.

MR. CERNICH: Okay. Can we go to Exhibit 31001, please.

BY MR. CERNICH:

Q. Can you identify this document?

A. Yes, sir, I can. That's a -- this is involving the selection process of an individual additive for loss circulation control. If I break that well down, I can put some fibers in that cement; and it will go up against the formation and help prevent loss circulation control.

So this is a selection of that -- of a material to put into the cement for the production string on the Macondo well.

These are some communications back and forth. In

this particular case, Erick Cunningham, in the middle here, has said that he's looking at both, and Erick is looking at both Halliburton, HAL, and Schlumberger products, sending that to Brian Morel.

And then in the top portion of this e-mail, Mr. Morel is asking his team -- he's saying: "I'm looking to find the most effective product for loss circulation during our production cement job."

So the reason that I brought this in and put this in with my report is this shows that, you know, you've got a drill team here that's very involved in cement to the point they're selecting individual additives to be used on the production -- on the production cement job for the Macondo well.

MR. CERNICH: Can we go to Exhibit 987, please.

BY MR. CERNICH:

Q. Can you identify this document, Mr. Benge?

A. Yes, sir, I can. This is where Mr. Gagliano has sent -- sent the results of laboratory testing for two different concentrations of retarder.

Q. And this is on April 17th, 2010?

A. Yes, sir, it is.

Q. And has he sent this e-mail to Mr. Morel, Mr. Hafle, Mr. Cocales, and Mr. Walz?

A. Yes, sir, he did.

And just so the Court understands, this has 8 gallons

and 9 gallons; that's per 100 sacks. We try to confuse everybody as much as possible. So it's 8 gallons or 9 gallons per 100 sacks, which you'll see also .108, and that's gallons per one sack of cement. They're the same number. It just whether it's per 100 sacks or per 1 sack.

And in this case Mr. Gagliano is saying, you know, the job placement time is about four hours. He's comfortable with the 5 1/2-hour pump time, or thickening time, how long the cement stays liquid.

And so he would recommend the 8 gallons, which gave him 5 1/2-hours.

Q. Why are they concerned about how long the cement stays liquid?

A. Well, you have to -- once you mix the solid and liquid at surface, you have to pump it into place. So it has to stay a fluid for that entire trip all the way down and as it goes into that annulus. So you don't want it setting early, so you retard the cement with, in this case, the SCR-100 is a cement retarder. And so it extends that liquid time or the fluid time.

Q. So what does Mr. Gagliano say to Mr. Morel?

A. He said that he feels comfortable with 8 gallons, which is the shorter thickening time.

And then Mr. Morel, in the top portion of this, said: "I would prefer the extra pump time, with the added risk of

having issues with the nitrogen."

He goes on to say: "What are your thoughts? There isn't compressive strength development yet, so it's hard to ensure we'll get what we need until it's done."

So he's acknowledging a risk. "In this particular case, I'd prefer the extra pump time." He's making a decision, and he's acknowledged the risk of that decision.

Q. And do you know what the issues with the nitrogen might be?

MR. REGAN: Objection, Your Honor. This is rank speculation with respect to what Mr. Morel meant in these words.

MR. CERNICH: Your Honor, Mr. Benge is an expert in oil field cementing. He clearly knows what effects retarders have on nitrogen.

THE COURT: Overrule the objection.

Before you do that, explain to me -- I know you talked about 8 gallons versus 9-gallons and this is retarder we're talking about.

THE WITNESS: Yes, sir.

THE COURT: So the more retarder, the slower the cement would set?

THE WITNESS: That's correct. Yeah, that's exactly right. It will stay liquid longer and it will take longer to set.

3:28PM **THE COURT:** So what was your understanding of what the trade-off here was? Why were they debating? Was there a big difference between 8 or 9 here?

3:28PM **THE WITNESS:** In this particular case --

3:28PM **THE COURT:** In the context here?

3:28PM **THE WITNESS:** -- we went from 5 1/2-hours to 7 1/2 hours, so almost a 50 percent increase in thickening time or liquid time. It stayed liquid longer.

3:29PM These are very powerful additives. So just that small amount --

3:29PM **THE COURT:** So they used the 9 instead of the 8?

3:29PM **THE WITNESS:** Right, they used the 9 instead of the 8. So that gave them -- it stayed liquid longer.

3:29PM **THE COURT:** And your understanding is to note -- you can't get into his mind; but your understanding, from looking at all of this, why is it that he wanted to do that? Why would he want to do that?

3:29PM **THE WITNESS:** Right. It gets back to that ECD control, that pressure control. He's going to have to pump this job slower. It you pump it slower, it's going to take longer. And so he wants that additional -- that additional safety factor in there to make sure he gets it in place.

3:29PM **THE COURT:** Okay.

3:29PM **BY MR. CERNICH:**

3:29PM **Q.** Mr. Benge, a moment ago I was asking about the effect of

retarder on the nitrogen.
A. Yes, sir.
Q. Can you explain that concept?
A. Well, as it stays -- as you can imagine, the -- as it stays liquid longer, there's more chance for instability. The foam is a stable mixture of gas and cement slurry; but the longer it says liquid, the more chance there is of something bad to happen. You can get some destabilization, you can get gas movement. If you leave it liquid longer, bad things can happen.
Q. And do you know what retarder concentration BP ultimately used on the Macondo well?
A. It was 9 gallons per 100, or .09 gallons per sack.
Q. Do you know whether BP provided its engineers with any training in cement?
A. Yes, sir, I do.
Q. How do you know that?
A. Well, I've looked at job performance reports that the folks filled out; but I also have looked at the work from Dr. Robert Beirute.
Q. Did you look at any job performance reports for any of the engineers on the Macondo well?
A. Yes, sir, I did.
Q. Do you recall whose you reviewed?
A. Boy, you've lost -- I can't remember off the top of my

3:31PM head. I know I've looked at Mr. Morel's. I've looked at John
3:31PM Guide's, but he's not in engineering. I'll apologize. I just
3:31PM can't remember right now all of them that I looked at. I
3:31PM looked at as many as I had available.
3:31PM **Q.** Did any of those job performance reviews have anything
3:31PM about training?
3:31PM **A.** Yes. They identified a lot of the training schools that
3:31PM people went to. One was Brian Morel -- and I'll apologize.
3:31PM That's where we identified that Mr. Morel had attended the DTA,
3:31PM Drilling Training Alliance, the same one-week class that I
3:31PM would send ExxonMobil engineers to.
3:31PM **Q.** You mentioned Dr. Beirute?
3:31PM **A.** Oh, I'm sorry, I've known Robert forever also.
3:32PM Dr. Beirute is, in my opinion, a world-class cementing expert.
3:32PM He also has served as past chairman of the API. He's written a
3:32PM number of papers. He actually started with Western, worked for
3:32PM Amoco and retired during the BP merger. He's now -- he teaches
3:32PM classes. Like I say, he's an excellent -- he's a world-class
3:32PM cementer.
3:32PM **Q.** Is Dr. Beirute serving as a testifying expert for BP in
3:32PM this matter?
3:32PM **A.** No, sir. That's rather curious.
3:32PM **Q.** Before we move on from the express job objectives, is it
3:32PM the operator's responsibility to set the job objectives?
3:32PM **A.** Yes, it is.

3:32PM **Q.** You also identified the use of leftover cement as a risk.
3:32PM **MR. CERNICH:** Can we go to the next slide, please.
3:32PM **THE WITNESS:** Yes, I did. That's an additional risk.
3:32PM The cement -- the dry blend, if you will, that mix that's out
3:33PM on the rig, was not originally designed as a foam cement
3:33PM system. It was designed for a different purpose. So it's
3:33PM being repurposed. And so you've got to use it as the foam
3:33PM cement.
3:33PM It was not originally intended to be foamed; and
3:33PM because of that, there's additives that are already blended in
3:33PM there that you wouldn't normally put into a foam cement design.
3:33PM **BY MR. CERNICH:**
3:33PM **Q.** Okay. I'd like to look briefly at the actual slurry
3:33PM design.
3:33PM **MR. CERNICH:** If we could go to Exhibit 3020, please.
3:33PM **BY MR. CERNICH:**
3:33PM **Q.** Do you recognize this document, Mr. Benge?
3:33PM **A.** Yes, sir, I do.
3:33PM **Q.** Okay. And this is an e-mail from Jesse Gagliano, dated
3:33PM April 15th, 2010, to -- I'm sorry, Brett Cocales and John Guide
3:33PM and Greg Walz, among others; is that right?
3:34PM **A.** Yes, sir, a whole gaggle of folks from both BP and
3:34PM Halliburton.
3:34PM **Q.** And there are a couple of attachments.
3:34PM **MR. CERNICH:** If we could go to the next page,

please.
BY MR. CERNICH:
Q. Do you recognize this document?
A. Yes, sir, I do.
Q. And what is this?
A. This is one of the design reports that was attached to that e-mail.
MR. CERNICH: If we could go to the next page, please.
BY MR. CERNICH:
Q. Do you know what this page is?
A. Yes, sir. That's the first -- that's the canned page you always get with these types of reports. That's marketing speak. It doesn't -- I never pay attention to it. It doesn't mean anything to me.
Q. It says: "Enclosed is our recommended procedure."
Did you consider that to be a recommended procedure when you received it?
A. No, sir. I've worked with these reports and OptiCem for years. You always get that. We use OptiCem and the design as a what-if. So you have to get the printout for it, and that always comes with every printout.
So if I ask Halliburton, for example, to run three different scenarios for me, well, I'll get the same thing on each one. I know they're not the recommendation because we're

playing what-if. We don't know our recommendation yet until we see the results of output.

Q. Were there additional reports like this from Halliburton that were provided to BP before the cementing of the well?

A. Yes, sir. This is one of several.

MR. CERNICH: Could we go to the next page, please.

BY MR. CERNICH:

Q. Can you identify this page to the Court?

A. Yes, sir. This is the -- this is a page showing some of the fluids that would be pumped on the Macondo well.

Q. Does this include the --

MR. CERNICH: If we could move down the page a bit.

BY MR. CERNICH:

Q. That's the spacer that's up at the top; is that right?

A. Right. There will be the spacer. You'll have the lead cement or the -- the only difference in the unfoamed and the foamed cement, turn the nitrogen truck on or off. It's all one blend. We talk about in this case a lead or a tail. It's either unfoamed or it's foamed, but the constituents are all the same.

MR. CERNICH: Could we focus in on the constituents, please. Right there in the middle of the page, please. Thank you.

BY MR. CERNICH:

Q. And is this the formula for the Macondo slurry?

3:36PM **A.** Yes, sir, it is.
3:36PM **Q.** And is this the formula that was actually pumped down the well?
3:36PM **A.** Yes, sir, it is. That has the .09, or 9 gallons per 100 of the SDR. So that is the cement system that was pumped on the Macondo well.
3:37PM **Q.** And do you see the third constituent down there, something called D-Air 3000?
3:37PM **A.** Yes, sir. That's a defoamer.
3:37PM **Q.** And it says "defoamer" right there in the document?
3:37PM **A.** Yes, it does. And the name's pretty self explanatory: D-Air and defoamer.
3:37PM **Q.** And this is the document that was sent to BP engineers on April 15th?
3:37PM **A.** Yes, sir.
3:37PM **Q.** Do you know why someone would use leftover cement for a cement job?
3:37PM **A.** There can be logistics. It's also a cost saving. You try to optimize. As an operator, once that cement's on my rig, I own it. So if I can optimize it and use it somewhere else, that's good business sense. You're trying to make the best of your inventory.
3:37PM **Q.** What's the role of the operator in slurry design?
3:37PM **A.** The operator has to set the objectives. They have to understand -- and if -- by the objectives and what the well --

what the operating envelope is, that's going to drive the slurry design.

But in the end, the operator still has to look and see, is that slurry design appropriate for that well, and does it meet the requirements?

MR. CERNICH: Could we go to Exhibit 569, please.

BY MR. CERNICH:

Q. Can you identify this document, Mr. Benge?

A. Yes, sir. That's a BP document on cementing responsibilities for various personnel in their organization.

Q. Did you have similar documents at ExxonMobil?

A. Yes, sir, we did.

MR. CERNICH: All right. Could we go to the next page, please. If we could focus in on the top of that page.

BY MR. CERNICH:

Q. Do you see this item in the checklist?

A. Yes, sir, I do.

Q. This says: "Verify that the final slurry recommendation meets the job requirements, including DWOP and ETP compliance."

Did I read that correctly?

A. Yes, sir. That's in concert with the documents that I've prepared throughout my career.

Q. And this particular item in the checklist is listed as a responsibility of whom?

A. That's for the well site leaders and for the engineers.

3:39PM **Q.** Who are operator employees?
3:39PM **A.** That's correct, yes. This is a BP document.
3:39PM **MR. CERNICH:** Could we go to Exhibit 6233.
3:39PM **BY MR. CERNICH:**
3:39PM **Q.** Do you recognize this document, Mr. Benge?
3:39PM **A.** Yes, sir, I do. This is an SRP, or a segment-recommended practice, for cement laboratory testing.
3:39PM **MR. CERNICH:** If you could focus in on the center of that, please.
3:39PM **BY MR. CERNICH:**
3:39PM **Q.** Do you see the author of this document?
3:39PM **A.** Yes. The technical authority, that is Daryl Kellingray. He worked with Ashley a whole lot. Daryl is over in the UK. He's one of the global cement specialists for BP.
3:39PM **Q.** You know Mr. Kellingray as well?
3:39PM **A.** I know Daryl as well.
3:39PM **Q.** Did you have similar documents to this at ExxonMobil?
3:40PM **A.** Yes, sir, we did.
3:40PM **Q.** Why did you have those documents?
3:40PM **A.** Well, again, if you've got a particular way that you want tests run, if there are risks that you want to identify, you would have that available to your engineers to use.
3:40PM **Q.** Did you provide these types of documents to your cement service providers?
3:40PM **A.** Yes, sir. If I've got something I want them to do

special, if I don't tell them, I can't expect them to do it. So we would absolutely -- as a matter of fact, some of ours would be in the contracts. I would do training with the service providers to make sure that, yes, they're complying with whatever requirements we had. And we'd double-check on that. I'd go to the lab and see if they're doing it.

MR. CERNICH: Could we go to the next slide, please.

BY MR. CERNICH:

Q. You identified "started job without lab testing as a risk"; is that right?

A. Yes, I did. Again, these start to become additive. Because I used the leftover cement that wasn't originally designed for foaming, it puts more onus on lab testing. I need to make sure I've got all those lab tests. Because if I'm using a make-do slurry, if you will, I've got to make sure that I've got all my testing done. And this job we started without what I consider critical lab tests.

Q. Did you have some criticisms of lab tests in here?

A. Yes, I did, and that's in my report.

Q. And who was responsible for testing the slurry?

A. That's Halliburton who's responsible for testing the slurry.

Q. Could you summarize for the Court your criticisms of the lab testing?

A. Once again, this is a leftover cement, and because of

that, it puts more onus on the testing. I didn't see any -- API, in the testing document that we prepared, has both testing for set and unset cement. None of the unset testing was run. That gives you a real quick screening. You don't have to wait for it to set to do that. That wasn't done in this case. So you're missing out on an opportunity to get some additional data.

And, again, it's because it's a leftover cement. All the data you can get from it is very important.

Q. Did BP have any responsibility with regard to lab testing?

A. No. They don't have a lab.

Q. Did you review the lab testing that was available before this cement job was pumped?

A. Yes, sir, I did.

Q. What was available?

A. Prior to starting this cement job, what was available were some compressive strength tests; thickening time tests; rheology, how thick is the slurry; and a mixability test, I believe. But there were no -- there were no foam -- there was no successful foam stability test prior to pumping this job.

Q. So did BP start this job without a successful foam stability test?

A. Yes, sir.

Q. Should BP have started this job without a successful foam stability test?

3:43PM **A.** In my opinion, no, sir.
3:43PM **Q.** Is it prudent to start a foam cement job without a successful foam stability test?
3:43PM **A.** It's not.
3:43PM **Q.** And as the operator, was it BP's decision to proceed with the cement job with incomplete lab testing?
3:43PM **A.** Yes, sir, it was.
3:43PM **MR. CERNICH:** If we could go to Exhibit 1396, please.
3:43PM **BY MR. CERNICH:**
3:43PM **Q.** Can you identify this document, Mr. Benge?
3:43PM **MR. CERNICH:** Actually, if we could go to the next page of this e-mail.
3:43PM **BY MR. CERNICH:**
3:43PM **Q.** Do you recall this document?
3:43PM **A.** Yes, sir, I do.
3:43PM **Q.** This is an e-mail from Mr. Morel to Mr. Hafle dated April 17th, 2010; is that right?
3:43PM **A.** Yes, sir, it is.
3:43PM **Q.** With the subject "lab tests"?
3:43PM **A.** Yes, sir.
3:43PM **Q.** And Mr. Morel writes to Mr. Hafle: "I'm about to send this to John and Greg but wanted to send it past you first to make sure I'm not being out of line. Jesse isn't cutting it anymore."
3:44PM Did I read that correctly?

3:44PM **A.** Yes, sir, you did.

3:44PM **MR. CERNICH:** Can we move down to the next section of the e-mail, please.

3:44PM **BY MR. CERNICH:**

3:44PM **Q.** Mr. Morel goes on: "John and Greg, I need help next week dealing with Jesse. I asked for these lab tests to be completed multiple times early last week and Jesse still waited until the last minute, as he has done throughout this well. This doesn't give us enough time to tweak the slurry to meet our needs. As a team, we requested that he run another test with 9 gallons on Wednesday. I know the first test had issues, but I do not understand what took so long to get it underway and why a new one can't be put on right away. There is no excuse for this as the cement and chemicals we are running has been on location for weeks."

3:44PM Did I read that correctly?

3:45PM **A.** Yes, sir, you did.

3:45PM **Q.** What does this indicate to you?

3:45PM **A.** Well, BP was having difficulties with getting timely test results from Jesse and was aware of that and were prepared to send this up to their management.

3:45PM **Q.** Yet, BP still proceeded with the cement job without a successful foam stability test?

3:45PM **A.** Yes, sir.

3:45PM **Q.** And did BP save time by not waiting on a foam stability

test?
A. Yes, sir.
Q. Can we go to the next risk you identified, foam cement in SOBM? And that's synthetic oil-based mud?
A. Yes.
THE WITNESS: As I stated, Your Honor, foam cement's got surfactants in it that allow it to be foam. So -- and soap and oil love each other, I guess, for lack of a better word.
Synthetic oil-based mud and contamination will destabilize that foam. It will -- any time you've done -- well, any time some people have done dishes in a sink, you always wash your greasy pan last because -- and if you do that, the foam disappears and it's because that surfactant goes in and grabs ahold of that oil. That's the love of its life.
The same thing happens with foam cement; if you get synthetic oil-based mud into a foam cement, it will destabilize it, the gas will come out. That's an acknowledgment and that's a very common risk and it's acknowledged.
BY MR. CERNICH::
Q. Is it uncommon to use foam cement with oil-based mud?
A. No, there's a lot of folks that do it. But because it's in a synthetic oil-based environment, it adds a risk; you've got to be more careful with everything else.
Q. Do you personally do it?

3:46PM **A.** I don't. I don't find that to be an acceptable risk and I have not ever recommended a foam in a synthetic mud environment, but it is done.

3:47PM **Q.** Did you see any evidence that BP was aware of that risk?

3:47PM **A.** Yes, sir, from both their internal -- Erick Cunningham, their internal expert, as well as Halliburton informed them of that risk.

3:47PM **MR. CERNICH:** Could we go to Exhibit 625, please.

3:47PM **BY MR. CERNICH:**

3:47PM **Q.** Can you identify this document?

3:47PM **A.** Yes. This is an e-mail from Mr. Cunningham to Mr. Morel about the foam -- or a nitrogen production job, foam cement job. And within this, in the second paragraph down, where we can really quickly see it, it says: Foaming cement after swapping to SOBM, synthetic oil-based mud, presents some significant stability challenges for the foam as the base oil in the mud destabilizes most foaming surfactants and will result in nitrogen breakout if contamination occurs, which is exactly what we just discussed.

So this is Mr. Cunningham, who is the BP Western Hemisphere's cement expert, back in March sending to Brian Morel, who's on the drill team, if you do this, there's a danger of the foam destabilizing in a synthetic oil mud environment.

3:48PM **Q.** Did Mr. Cunningham suggest a way to mitigate this?

3:48PM **A.** There is. You've got to spend a lot of attention -- like I said, little things matter. So you've got to spend a lot of attention to spacer programs. You also have to run a non-foamed cap to try to separate, to keep those fluids apart. Because you get them together and they will destabilize.

Q. Did you see any evidence that Mr. Cunningham agreed with the Macondo cement design?

A. Actually, I saw quite the opposite.

MR. CERNICH: Could we go to Exhibit 16, please.

BY MR. CERNICH:

Q. Can you identify this document, Mr. Benge?

A. Yes, sir. These are interview notes of Erick Cunningham.

Q. Okay.

MR. CERNICH: Could we go to the next page, please? And I think we have a fly-out there. Yes.

BY MR. CERNICH:

Q. Do you know, are these Bly report interview notes?

A. Yes, sir.

Q. Can you explain the portion -- the relevant portions of these e-mails to the Court?

A. Sure. These are from Erick Cunningham, and he's challenging the foam application usage and the complexity of the job. As we've been talking, this is a synthetic oil mud environment. It adds additional complexity.

He's also saying that, during the meeting, unfoamed

3:49PM 1 cement was feasible and was a better option in his opinion. So
3:49PM 2 this well did not require the use of foam cement.
3:49PM 3 **Q.** Was unfoamed cement feasible here?
3:49PM 4 **A.** Yes, sir, it was.
3:49PM 5 **Q.** What would have been required to use unfoamed cement?
3:49PM 6 **A.** You would have designed a 14.5 pound per gallon standard
3:49PM 7 cement system. Pretty generic. You would have had to have
3:49PM 8 designed it, blended it, sent it out to the rig. You would
3:50PM 9 have not used the leftover cement. You would have had a new
3:50PM 10 cement plan.
3:50PM 11 **Q.** And in the next section from the April 14th, 8:30 a.m.
3:50PM 12 meeting, it says: Concerns about frac gradients and pore
3:50PM 13 pressure and what was the most representative scenario.
3:50PM 14 So does this indicate that the team was concerned
3:50PM 15 about the frac gradients and pore pressure at this meeting?
3:50PM 16 **A.** Well, again, this echos what we've seen throughout the
3:50PM 17 design of the cement job, the ECD control was driven by pore
3:50PM 18 pressure and frac gradient and that remained a concern
3:50PM 19 throughout the design process.
3:50PM 20 **Q.** Okay. Thank you.
3:50PM 21 Was it ultimately BP's decision to use foam cement?
3:50PM 22 **A.** I don't know. I think it was a shared -- it was
3:50PM 23 recommended it was done; but in order to put it in the well, BP
3:50PM 24 had to approve it.
3:50PM 25 **Q.** And that was despite a challenge from Mr. Cunningham, BP's

in-house cement expert?

A. Despite a challenge from Mr. Cunningham.

MR. REGAN: Your Honor, I'm just going to object to his last question because they're using a document that appears to be an interview note of a meeting of what appears to be six people, plus Mr. Cunningham. There's no indication in the notes that are being used as to who is saying what and who is expressing concerns.

I understand as an expert he can read it and give his interpretation; but for the record, I don't think it's fair to attribute specific sentences in this memo to an intent or a state of mind or belief of one person amongst the multiple people that were there.

MR. CERNICH: Your Honor, we have the deposition of Mr. Cunningham where he was questioned about these notes and confirmed that he made these statements. I also have the --

THE COURT: Did you read that deposition, sir?

THE WITNESS: Yes, sir, I did.

THE COURT: Okay. Overrule the objection.

MR. CERNICH: Thank you, Your Honor.

If we could go to the next slide, please.

Mr. Benge -- slide 17, please.

BY MR. CERNICH:

Q. You identify inadequate centralization as another risk?

A. Yes, sir, that's an additional risk that I've identified.

3:52PM 1 **Q.** What is centralization?
3:52PM 2 **A.** Centralization, I've got a brief little graphic on that or
3:52PM 3 a video, if we can. But it's basically putting that
3:52PM 4 centralizer on the pipe to move it toward the middle of the
3:52PM 5 wellbore.
3:52PM 6 **MR. CERNICH:** Could we have the animation pulled up
3:52PM 7 on centralizers, please? And this is D-3528. This is a
3:52PM 8 demonstrative.
3:52PM 9 **THE WITNESS:** And this is a -- if we can, I'll ask if
3:52PM 10 we can pause the video for just a moment.
3:52PM 11 The red -- the red thing here is a bow spring
3:53PM 12 centralizer. So those bows on the outside are made to move in
3:53PM 13 and out. They're a spring, basically.
3:53PM 14 The small -- the second thing that's in there in
3:53PM 15 the middle, that's the stop collar. So that has the screws in
3:53PM 16 it and the -- so that's slipped onto the pipe.
3:53PM 17 So this is a bow spring centralizer -- and we
3:53PM 18 can move forward with the video real quick -- showing in a very
3:53PM 19 stylized -- artists are always real good at stylizing things
3:53PM 20 and making them nice and straight -- of a centralized hole on
3:53PM 21 the left where you've got complete coverage all the way around.
3:53PM 22 There's no --
3:53PM 23 **MR. CERNICH:** Can we pause this, please?
3:53PM 24 **THE WITNESS:** Yeah. There's no preferential flow
3:53PM 25 path, if you will. And on the right-hand side, that pipe is

off to the side, it's X-centered. So it's easier to flow on the wide side of that annulus.

We always talk about percent standoff. Percent standoff, if you're perfectly in the middle, that's 100 percent. If that pipe is touching that formation, you're at zero percent. So what percent are you, how far are you away from being right smack dab in the middle?

MR. CERNICH: Can we continue with the animation, please.

THE WITNESS: And this portion of the animation will show as fluids are being pumped, the gray's coming up as cement. And you can see because the pipe is over to one side, you get a preferential flow path. It's easier to flow where there's more room. So you get a preferential flow path where -- on the casing on the right-hand side that's X-centered, you're leaving behind a channel, a fluid filled -- that will be a mud channel. There won't be any cement there. You can't -- that won't form a barrier. It will leave you a flow path in the well.

BY MR. CERNICH:

Q. And a flow path for what?

A. The flow path for formation fluids up or down.

Q. And that could be hydrocarbons?

A. Yes, that could be hydrocarbons.

Q. Or water?

3:55PM **A.** Or water or anything that's down there.
3:55PM **Q.** Why is centralization important?
3:55PM **A.** Well, that goes to the physics. Again, I have to marry
3:55PM chemistry and physics. And the physics, there's not an
3:55PM additive that will overcome physics in this case. So you've
3:55PM got to move that pipe away to be able to put -- to be able to
3:55PM put cement all the way around to effect a -- to give you a
3:55PM barrier.
3:55PM **MR. CERNICH:** Can we go to Exhibit 6230, please.
3:55PM **BY MR. CERNICH:**
3:55PM **Q.** Do you recognize this document, Mr. Benge?
3:55PM **A.** Yes, sir, I do.
3:55PM **Q.** Okay. And this is an e-mail from Mr. Cunningham, who
3:55PM you've discussed already today?
3:55PM **A.** Yes, sir, that's from Erick.
3:55PM **MR. CERNICH:** And can we go to the attachment,
3:55PM please.
3:55PM **BY MR. CERNICH:**
3:55PM **Q.** Can you identify this document?
3:55PM **A.** Yes, sir. This is a BP SRP document on cement placement.
3:56PM **Q.** And is on the author Daryl Kellingray?
3:56PM **A.** Again, yes, that's Daryl.
3:56PM **MR. CERNICH:** Could we go to the next page, please.
3:56PM I'm sorry. Can we go to page 3 of that report?

3:56PM **BY MR. CERNICH:**
3:56PM **Q.** This is the introduction to that, and it says: "The following document is a summary of BP and industry best practices that are proven to maximize the chance of first-time success."
3:56PM Did I read that correctly?
3:56PM **A.** Yes, sir, you did.
3:56PM **Q.** And is this, like some of the other documents we've talked about, similar to the types of best practices you had at ExxonMobil?
3:56PM **A.** Yes, sir, all those best practices are in concert with each other.
3:56PM **Q.** That you developed?
3:56PM **A.** That I developed, yes, sir.
3:56PM **Q.** And it reads: The primary cause of poor zonal isolation is due to poor mud placement [verbatim].
3:56PM Did I read that correctly?
3:56PM **A.** No. I believe you said "mud placement" and it's "mud displacement."
3:57PM **Q.** Thank you. Thank you.
3:57PM And then the second bullet point there says: "Not executing the agreed design effectively, incorrect installation of centralizers, mud not conditioned, unable to move pipe, reduced pump rates, incorrect spacer preparation."
3:57PM Did I read that correctly?

3:57PM **A.** Yes, sir, you did.
3:57PM **Q.** And in your opinion, are those causes of poor zonal isolation?
3:57PM **A.** Yes, sir. As the document said, those are leading reasons for poor zone isolation.
3:57PM **Q.** And did you identify some of these specific reasons in your report?
3:57PM **A.** Yes, sir, I did. I identified centralizers, mud conditioning, and reduced pump rates as risks in the Macondo well.
3:57PM **MR. CERNICH:** And if we could go to page 5 of that document, please.
3:57PM I'm sorry. Could we go back one page there? No, go to that file, please. I'm sorry.
3:58PM **BY MR. CERNICH:**
3:58PM **Q.** And it also identifies "an overreliance on the slurry design to mitigate problems, believing the cement slurry can mitigate any risks."
3:58PM Did I read that correctly?
3:58PM **A.** Yes, sir, you did. Again, this is echoing chemistry can't overcome physics; you have to have both. There's not an additive that will let that cement move over into that non-flowing area.
3:58PM **MR. CERNICH:** Can we go to the next page of this document?

3:58PM 1 **BY MR. CERNICH:**
3:58PM 2 **Q.** Okay. And at the top of this page, do you see where it
3:58PM 3 says "Fundamental Principles"?
3:58PM 4 **A.** Yes, sir, I do.
3:58PM 5 **Q.** And we've highlighted here "casing centralization." Do
3:58PM 6 you see that?
3:58PM 7 **A.** Yes, sir.
3:58PM 8 **Q.** And it says: "Pipe eccentricity in the wellbore creates
3:58PM 9 differential fluid velocities on the wide and narrow side of
3:59PM 10 the eccentric pipe. This results in channeling and compromises
3:59PM 11 the quality of cement placement. Use of casing centralizers to
3:59PM 12 provide standoff is critical in achieving cement placement to
3:59PM 13 provide zonal isolation."
3:59PM 14 Did I read that correctly?
3:59PM 15 **A.** Yes, sir, you did.
3:59PM 16 **Q.** And is that consistent with the opinions in your report?
3:59PM 17 **A.** Yes, sir.
3:59PM 18 **MR. CERNICH:** If we could go down to the bottom of
3:59PM 19 that page. If we could pull the fly-out back.
3:59PM 20 **BY MR. CERNICH:**
3:59PM 21 **Q.** And down at the bottom of that page, it says: "Annular
3:59PM 22 velocity."
3:59PM 23 What does this mean, Mr. Benge?
3:59PM 24 **A.** Well, annular velocity is energy, how fast are those
3:59PM 25 fluids flowing in that annulus. And so as annular velocity

increases -- as you put energy into the well, you can clean it better and you can get things moving.

If you've got oil on your hand and you just stick it in a bucket of water, it's not going to become very clean. The more energy you put into it, if you can swish it around, you're adding energy.

The way we do that in cementing is through pump rates. So if I can pump faster, if I can get better annular velocity, I can clean and I can displace that mud bank.

Q. We will get to that a little bit further in your presentation; but while we're on this document, I just wanted to look at that quickly.

MR. CERNICH: Could we go to page 6 of the document?

BY MR. CERNICH:

Q. This section is Section 3, and it's entitled "Risks." Do you see that?

A. Yes, sir, I do.

Q. Are the risks identified here consistent with the risks you identify in your report?

A. Yes, they are.

Q. And can you tell the Court a little bit about these risks?

A. Well, these risks are, you know -- and if I look up at the very top right before this, it says "hole conditions." Do I have a washed-out hole? Is it nice and straight the way those artists always draw it, or is it washed out? And I think in

this case we know that it was washed out based on caliper data.

Failure to achieve zonal isolation is a risk. And it has mitigation factors, you know, centralization, optimization of rheologies.

Density profiles, in other words, how do I design my fluids, how do I put them into the well? Do I have thicker fluid, thinner fluid? Do they weigh more or less?

In this case we have a subsea wellhead system, and so pipe movement is off the table. That's one of the limiting factors. We would not be able to -- because of the design of all subsea wells, nobody can move pipe. So that's not even a consideration in this case.

Q. Can you use centralizer in subsea wells?

A. Yes, you can. I've used that. BP has used those in this well.

MR. CERNICH: Could we go to page 17 of this document? Just one last item here.

BY MR. CERNICH:

Q. And this section refers to centralization. Do you see that?

A. Yes, sir, I do.

Q. And this says: "Good pipe centralization is critical to achieving reliable cement placement and zonal isolation."

Did I read that correctly?

A. Yes, sir, you did.

4:02PM 1 **Q.** Do you agree with that statement?
4:02PM 2 **A.** Yes, sir, I do.
4:02PM 3 **Q.** And then at the bottom it says: "Centralizers themselves
4:02PM 4 may not always deliver the performance desired, but the
4:02PM 5 benefits of centralization for zonal isolation are
4:02PM 6 unquestionable."
4:02PM 7 Would you agree with that statement?
4:02PM 8 **A.** Yes, sir, I do. That's -- this is an important statement
4:02PM 9 in this case because centralizers just -- those are bow
4:02PM 10 springs. So they are springs. And so -- and I don't want to
4:03PM 11 misrepresent. I put that up as a centralizer getting that pipe
4:03PM 12 perfectly in the middle. That has no lateral force, or no
4:03PM 13 pushing force on the side of it that would force that spring to
4:03PM 14 collapse. That's what they're designed to do.
4:03PM 15 This well spirals and so there's a -- because of
4:03PM 16 gravity, as it pulls it down, it forces that pipe over to the
4:03PM 17 side. So I don't wish to represent in any way that that
4:03PM 18 picture -- just because there's a centralizer there, you have
4:03PM 19 to run the program to calculate what that force is because it
4:03PM 20 may not be right in the middle. We'll draw it that way; but
4:03PM 21 without running the program to know what those forces are, we
4:03PM 22 don't know how far in that spring moves.
4:03PM 23 So I just want to make sure -- I didn't want to just
4:03PM 24 miss -- misidentify that.
4:03PM 25 **THE COURT:** In other words, the pipe or casing is not

always perfectly in the middle?

THE WITNESS: It's not always --

THE COURT: Even with the centralizer?

THE WITNESS: Even with the centralizer because it's going to squish that spring so much. That's why we've got all those programs.

THE COURT: All right.

BY MR. CERNICH:

Q. And I believe we talked earlier. The hole isn't straight either?

A. No, sir, it's -- it spirals. And you can tell that from the survey data.

Q. And how are centralizers installed?

A. Two or three different ways. In this particular case, there were two types of centralizers. One was an integral that is basically a piece of pipe with threads on either end so they come out preassembled.

MR. CERNICH: Could we go to page 16 of Exhibit 5990 of Mr. Benge's report?

We have a couple photos, Your Honor.

BY MR. CERNICH:

Q. Well, we'll just -- okay. I'm sorry. It's going to be -- well, we'll just move on.

A. I can describe it. The integral centralizers are pre-installed. They're in a small piece of casing --

4:05PM 1 **THE COURT:** You have a picture of them in your
4:05PM 2 report.
4:05PM 3 **THE WITNESS:** I've got a picture of them in my
4:05PM 4 report.
4:05PM 5 **THE COURT:** I've seen them. They're pictures that
4:05PM 6 are pretty good --
4:05PM 7 **THE WITNESS:** Yeah. They're there. You screw it
4:05PM 8 together, works great. The other one is a bow spring, like was
4:05PM 9 in the video.
4:05PM 10 **THE COURT:** The integral one is basically a sub, a
4:05PM 11 piece of pipe threaded on each end and you just thread it on to
4:05PM 12 the pipe, on to the casing?
4:05PM 13 **THE WITNESS:** Yeah. You run it just like a pup
4:05PM 14 joint, a little bitty pup joint. But they're about 3, 4 feet
4:05PM 15 long.
4:05PM 16 **THE COURT:** And it has the centralizer built on it?
4:05PM 17 **THE WITNESS:** Right. It's pre-installed. It's
4:05PM 18 manufactured that way. And then you've also got the ones, like
4:06PM 19 we saw in the video, that slide on the bottom of the pipe and
4:06PM 20 then you attach them that way.
4:06PM 21 **THE COURT:** Okay.
4:06PM 22 **BY MR. CERNICH:**
4:06PM 23 **Q.** Mr. Benge, how do you determine what is adequate
4:06PM 24 centralization?
4:06PM 25 **A.** It will depend on the actual job itself. So you have to

look at -- you have to look at what are your objectives and also the programs. Weatherford has programs, Halliburton, everybody does, on how -- what's the effect of centralization on the success or the potential success of that job.

Q. Was a program used for the Macondo well?

A. Yes, sir. That would have been Halliburton's OptiCem, has a module in it that looks at centralization.

Q. All right. Did you review the OptiCem modeling in this case?

A. Yes, sir, I did.

Q. What did you take away from that modeling?

A. In each case, as you increased the number of centralizers, you improved the cementing results. As you're centralizing that pipe, your ECD, your pressures, actually go down with improved centralization because you're not getting the channeling involved.

Q. So are you saying that centralization actually reduces ECDs?

A. Yes. And that was acknowledged -- that was acknowledged by BP in some communications as well.

Q. And how many centralizers were ultimately used on the Macondo production spring?

A. There were six integral centralizers running.

Q. Is that how many were planned?

A. No, originally there were 21 to be run.

4:07PM 1 **Q.** And what kind of centralizers were those?
4:07PM 2 **A.** Well, you'll have the original six integral centralizers
4:07PM 3 at the top of this picture; and then you'll have an additional
4:07PM 4 15 of the bow spring centralizers with a stop collar.
4:07PM 5 **Q.** And were all of these centralizers bow spring
4:07PM 6 centralizers?
4:07PM 7 **A.** Yes. All of these are bow spring, it's just how they're
4:07PM 8 attached to the pipe. They're all those springs.
4:08PM 9 **Q.** Do you know why BP decided not to run the additional
4:08PM 10 centralizers?
4:08PM 11 **A.** Yes. I think that's identified in some e-mails, due to
4:08PM 12 fear of getting stuck in the wellhead.
4:08PM 13 **MR. CERNICH:** Can we go to Exhibit 137.
4:08PM 14 **BY MR. CERNICH:**
4:08PM 15 **Q.** Do you recognize this document, Mr. Benge?
4:08PM 16 **A.** Yes, sir, I do.
4:08PM 17 **MR. CERNICH:** If you could pull out the bottom half
4:08PM 18 of that.
4:08PM 19 **BY MR. CERNICH:**
4:08PM 20 **Q.** And the bottom e-mail is an e-mail from Greg Walz to John
4:08PM 21 Guide, dated April 16th, 2010; is that right?
4:08PM 22 **A.** Yes, sir.
4:08PM 23 **Q.** Do you know who Mr. Walz was?
4:08PM 24 **A.** Yes, he's the engineering leader for the drill team.
4:08PM 25 **Q.** So did Mr. Morel and Mr. Hafle and Mr. Cocales report to

Mr. Walz?

A. Yes. He was the engineering -- engineering lead.

Q. And who was Mr. Guide?

A. Mr. Guide's the operations superintendent or supervisor, I guess, for this -- I'm not sure of the -- I know what it is in ExxonMobil. I can't remember what it is in BP.

Q. Okay. And what did Mr. Walz have to say to Mr. Guide about centralizers?

A. Well, again, this echos what I just got through saying; and without going through all of this, it says that the model with -- up at the top, the model with six centralizers, the ECD was up above 15.06 pounds per gallon.

When you ran more centralizers, the ECD was actually reduced, in this case to 14.65 pounds per gallon, which is consistent. You're placing cement all the way around, you don't have the channeling, your pressures will come down.

So centralization actually reduced the ECD on the well, which is what was the goal to make sure that lost circulation didn't occur.

MR. REGAN: Your Honor, if I just might impose an objection for clarity here? The witness has not run any models himself. He's reading about models run by others. But I just don't want -- and I think it's clear --

THE COURT: What he just said he was essentially reading or summarizing what he construed this e-mail to say?

4:10PM **MR. REGAN:** From other people's models, not from -- his opinions on centralization, he has done nothing independent other than looking at other models.

So I object if we go beyond the scope. I thought we might have got a little over -- across the line there, but perhaps we didn't.

MR. CERNICH: Your Honor, I can ask Mr. Benge what he's reviewed, if that would help you.

THE COURT: Well, let's just clarify. He didn't run any of these models himself; right?

MR. CERNICH: That's correct, Your Honor.

BY MR. CERNICH:

Q. Mr. Benge, did you run any modeling yourself?

A. No, sir.

THE WITNESS: As you've noted, Your Honor, I was noting, as he said, when he ran more centralizers, as it's printed there on the e-mail. I did not run any models.

BY MR. CERNICH:

Q. Did you review the modeling that was done prior to the Macondo production casing --

A. Yes, sir, I did.

Q. And did you review any modeling that was performed after the Macondo production casing?

A. Yes, sir, I did.

Q. And did that modeling include modeling that was performed

by a company called CSI related to the Bly report?
A. Yes, sir.
Q. And you cite that in your --
A. Yes, sir, I do.
Q. -- in your report?
Okay. And all of that modeling you've reviewed, what did you take away from it?
A. Well, all that modeling shows the same thing, that as you increase the number of centralizers, that the quality of the cement job improved, ECD goes down, as it says in this -- as it says in this e-mail.
Q. And is that consistent with your 36 years of experience in the oil field?
A. Yes, it's completely consistent with -- the physics is the physics; it doesn't change.
Q. Thank you.
And so we were talking about this. And Mr. Walz writes: "David was still here in the office, and I discussed this with him, and he agreed that we needed to be consistent with honoring the model."
Do you see that?
A. Yes, sir.
Q. And do you believe that BP should have honored the modeling that they had in front of them?
A. Yes, sir. And thus the reason I identified it as a risk

that there was inadequate centralization.
Q. How many centralizers did BP ultimately run?
A. Six.
Q. And did BP ever ask Halliburton to run an OptiCem model with six centralizers?
A. No, sir.
Q. And did BP ever ask Halliburton to run an OptiCem model with the six centralizers placed in the locations where BP placed those centralizers?
A. No, sir.

And to be perfectly clear, that was before the job; is that correct?
Q. That's correct.
A. Yes.
Q. That's what I'm talking about, before the job.

In your opinion, should BP have looked at an OptiCem with the six centralizers placed where BP ultimately chose to place those centralizers before pumping the cement job?
A. Yes, sir. Because without running that model, you don't know how much that spring has squished in, so you don't know what the effectiveness of your centralizer placement is without running that model.
Q. The Court heard some testimony yesterday regarding guidance from wellhead manufacturers regarding centralizers. In your years of experience in cementing, have you ever looked

4:13PM 1 at any of the recommendations by wellhead manufacturers
4:13PM 2 regarding centralizers?
4:13PM 3 **A.** Yes, I have.
4:14PM 4 **Q.** Okay. And do you recall what any of that -- what any of
4:14PM 5 those recommendations or guidelines say?
4:14PM 6 **A.** Pretty much all of them say, "We don't want to run
4:14PM 7 centralizers through our wellhead."
4:14PM 8 **Q.** Is that guidance or advice largely disregarded?
4:14PM 9 **A.** It's routinely ignored, yes, sir.
4:14PM 10 **Q.** Because operators actually do run centralizers through
4:14PM 11 subsea wellheads?
4:14PM 12 **A.** Well, yes. And in the case of the -- well, in the Macondo
4:14PM 13 well, on the production stream there were six centralizers run
4:14PM 14 through the wellhead.
4:14PM 15 **Q.** And those six centralizers were bow spring centralizers?
4:14PM 16 **A.** Yes, sir. Those are all bow spring centralizers, yes.
4:14PM 17 sir.
4:14PM 18 **Q.** Do you know where BP actually placed the centralizers on
4:14PM 19 the Macondo casing?
4:14PM 20 **A.** I know where the proposal was, and that's in my report.
4:14PM 21 **MR. CERNICH:** Could we go to -- I believe it's
4:14PM 22 page 24 of Mr. Benge's report. If we could blow up that
4:15PM 23 figure.
4:15PM 24 **BY MR. CERNICH:**
4:15PM 25 **Q.** Can you tell the Court what this is?

4:15PM 1 **A.** That's the caliper log from the Macondo well. And as
4:15PM 2 people will show -- and I will apologize, first of all, for the
4:15PM 3 scale on this. The X axis -- those are 200 feet apart. So
4:15PM 4 between the major divisions there is the distance of the
4:15PM 5 building next door.
4:15PM 6 The Y axis going to the right is inches. So it's
4:15PM 7 the -- the decoration on the plates, if you will. So as it
4:15PM 8 gets larger -- so the scale on this is very difficult.
4:15PM 9 But this is -- this is what we call a washed-out
4:15PM 10 hole. And it's a symbol of a -- of a very fragile wellbore.
4:15PM 11 And we see this quite often in cementing, where you've got very
4:16PM 12 close pore pressures and frac gradients. And wellbore
4:16PM 13 instability will cause this.
4:16PM 14 But the Xs on here, the red Xs, there's still one
4:16PM 15 further down at the float -- at the reamer shoe -- sorry. But
4:16PM 16 those Xs will designate where those centralizers were placed.
4:16PM 17 **Q.** Does the placement of these centralizers change your
4:16PM 18 opinion on the adequacy of the centralization on the Macondo
4:16PM 19 casing?
4:16PM 20 **A.** No. These centralizers -- and to the engineers' credit,
4:16PM 21 they tried to -- they had centralizers that we were going to
4:16PM 22 try to put them somewhere. But there's not any modeling work.
4:16PM 23 This is just kind of "I guess we'll try to put them here and
4:16PM 24 hope for the best."
4:16PM 25 **THE COURT:** So am I reading that right? All the six

centralizers that were used were placed between 17,880 feet and 18,200 -- almost 280 feet?

THE WITNESS: Yes, sir. There's one more that's not shown. It's at the very bottom. It's right at the reamer shoe. So it would be a TD.

THE COURT: But this only shows five?

THE WITNESS: Right, that only shows five. But that pretty much shows where they were placed in there.

THE COURT: Okay.

THE WITNESS: And those are all about -- again, the scale's bad because the X is a whole lot bigger than what the centralizer is. It's only about 3-foot long.

THE COURT: I see.

BY MR. CERNICH:

Q. And would you expect the pipe to rest against the sides of hole between those centralizers?

A. Oh, yes, sir. Pipe's pretty flexible. That hole is spiraling. So, again -- yeah, between those centralizers, that pipe will be up against the wall.

Q. And can you describe what this caliper log told you about the -- about the bottom of the hole?

A. Well, I see this in cementing all the time. That's a symbol of a washed out -- or hole instability. It doesn't really wash out. That's a poor oilfield term, and I'll apologize for it. It gives you the impression that it's

washing because of the mud flowing back in behind there. That's actually instability. The hole's actually falling. Some material's coming in on you.

It's just hole instability. And that's what that -- this is very typical of a fragile, unstable situation.

Q. And so the hole is bigger in some places and smaller in other places?

A. Yes, sir.

Q. Did BP acknowledge the risk of the inadequate centralization?

A. Yes, sir, they did.

Q. Do you recall where, specifically?

A. Well, there's an e-mail that has been seen of "I hope we'll get a good cement job." There's a series of e-mails associated with that where that's an acknowledged risk of "We'll see how this works versus the model."

MR. CERNICH: Could we go to Exhibit 1367.

BY MR. CERNICH:

Q. And we looked at this, so I won't spend additional time on it. But is this the document to which you're referring, Mr. Benge?

A. Yes, sir.

Q. What's the result of inadequate centralization?

A. Well, you won't get cement placement all the way around the pipe, and you'll leave a channel. So you'll have a flow

4:19PM path in the well. And that was shown in the video that we had.
4:19PM **Q.** What's the effect of having a channel in the well?
4:19PM **A.** Well, you don't have a barrier in the well. You've -- you have a flow path for hydrocarbons or fluids either up or down in the well.
4:19PM **MR. CERNICH:** Could we go to Exhibit 1, the Bly report. I'd like to go to page 65 of that document.
4:20PM Could I go to the next page, please. Can I go back two pages.
4:20PM My apologies, Your Honor. We'll try to come back to that later on.
4:20PM **BY MR. CERNICH:**
4:20PM **Q.** Have you ever designed a cement job with poor centralization?
4:20PM **A.** Yes, sir, I have.
4:20PM **Q.** Can you describe those circumstances?
4:20PM **A.** Again, we start with what's the operating envelope for that well. And in some cases, because of limitations, those bow springs, they go both ways. They push -- you can push them in, but they also are pushing back. And so that gives a drag force. That's described in API as well, in the technical report on centralizers, that sometimes you can't run as many because that bow spring's trying to come out. You just can't push them in the well.
4:21PM So sometimes you have to sacrifice that just to get

4:21PM 1 the pipe to bottom.
4:21PM 2 **Q.** Can slurry design overcome a lack of centralization?
4:21PM 3 **A.** No. There's not a 5-gallon bucket for that.
4:21PM 4 **Q.** And this is from the Bly report. I'm reading from the
4:21PM 5 trial transcript the other day.
4:21PM 6 "The decision to not use 21 centralizers increased
4:21PM 7 the possibility of channeling above the main hydrocarbon zones,
4:21PM 8 but it likely did not contribute to the cement's failure to
4:21PM 9 isolate the main hydrocarbon zones or to the failure of the
4:22PM 10 shoe track cement."
4:22PM 11 And that was trial transcript 1203, line 7 to 11.
4:22PM 12 Do you agree with that statement, Mr. Benge?
4:22PM 13 **A.** No, I do not.
4:22PM 14 **Q.** Why not?
4:22PM 15 **A.** Well, I -- I'm going to design the cement job for
4:22PM 16 isolation. And the lack of centralization down in the bottom
4:22PM 17 part of this well, just because I have a centralizer there,
4:22PM 18 again, doesn't mean it's centralized. I haven't looked at the
4:22PM 19 model work on it to know -- you can't make that statement
4:22PM 20 without running the model work.
4:22PM 21 And the hole is spiraling. We see that, again, from
4:22PM 22 the survey data.
4:22PM 23 **Q.** And I think you testified earlier there was no -- BP had
4:22PM 24 no modeling of that scenario before the cement job was --
4:22PM 25 **A.** Prior to the cement job, no, that's correct.

MR. REGAN: Your Honor, I'm going to object to further opinions from the witness on centralization. His opinion is there was no model run that could tell how much centralization took place. And now he's taking that and saying, "Therefore, I've concluded there was inadequate centralization."

I'm happy to have him describe the models that existed.

THE COURT: That sounds like a good question for cross-examination.

MR. REGAN: Fair enough, Your Honor.

THE COURT: Okay.

MR. REGAN: Tomorrow.

THE WITNESS: Oh, really?

BY MR. CERNICH:

Q. Mr. Benge, do you need a model to know whether there was adequate centralization at the bottom of the well?

A. I need a model to know what degree of centralization; but in looking at this, there was not adequate centralization.

Q. And that's based on?

A. That's based on 36 years of looking at wells like this.

Q. Thank you.

MR. CERNICH: All right. Could we go to the next slide, please. Slide 18, please.

4:23PM **BY MR. CERNICH:**

4:23PM **Q.** You identified problems with the float collar conversion as a risk?

4:23PM **A.** Yes, sir, I did. That was an additional risk on the well.

4:24PM **MR. CERNICH:** Your Honor, I know you've heard a lot about float collars. Tell me to refrain if we're re-covering old ground.

4:24PM Can we go to that image from the Bly report that was just up a moment ago.

4:24PM **BY MR. CERNICH:**

4:24PM **Q.** What is a float collar, Mr. Benge?

4:24PM **A.** Well, that's a check valve in the well that prevents flow back. Once it's activated, that check valve comes in, and you can no longer flow for reverse flow in the well.

4:24PM **Q.** Why do you use a float collar?

4:24PM **A.** The fluids -- when you're through with cementing, the fluids on the annulus, on the outside of that plate, are going to weigh more than what's on the inside.

4:24PM We call it "U-tubing." Those tend to try to come back up into the well. The design of those check valves, that flapper comes up and keeps that from flowing.

4:24PM **Q.** And as you're running that casing into the hole, have those valves opened?

4:25PM **A.** Well, in this particular case, this was an auto-fill. You have a plastic tube that's in there -- I'm not sure it's

4:25PM plastic. You have a tube that's in there that holds those valves in the open position, and then that's -- the design for that is to eject that and let those valves slump.

Q. Why do you have that tube in there?

A. It allows fluid to flow inside the pipe. It lowers what we call the surge pressure. It lowers the pressure on the well as you're running casing in the well.

Q. Did BP attempt to convert the float collar on the Macondo production casing?

A. Yes, sir. It took nine attempts to establish circulation on this well, each attempt at a higher pressure.

Q. And you said "establish circulation." What do you mean by that?

A. Where you're beginning to pump into the well and come back out, that you can circulate. It allows you to pump into the well. You can actually circulate fluids down to the bottom and back up.

Q. Did that process concern you in any way?

A. Yes, it did because that -- the fact that it took over 3,000 psi for the -- for them to establish -- for the well to establish circulation shows me that the hole wasn't clean; there was debris in the well. And it was plugging -- as shown here and has been shown, that either the reamer shoe or the collar, somewhere in there had a lot of debris, and it was causing a problem.

4:26PM **Q.** Do you know whether the float collar converted?
4:26PM **A.** No, I don't, and I state so in my report.
4:26PM **Q.** And why don't you know?
4:26PM **A.** Because there was no tests to demonstrate whether it converted or not.
4:26PM **Q.** Why are float collar conversion problems -- why do you identify them as a risk?
4:26PM **A.** Well, I identify it as a risk -- and this is one of the bigger risks. And it was acknowledged that whenever that 3,100-odd psi -- when it suddenly released, that's a big concern -- that's a big risk because at that point you do not know where in the well you're circulating. You've got a sudden pressure surge, and pressures were much lower, showing that some restriction that you used to have isn't there anymore.
4:27PM **MR. CERNICH:** Could we go to Exhibit 2586, please.
4:27PM **BY MR. CERNICH:**
4:27PM **Q.** Can you identify this document?
4:27PM **A.** Yes, sir. That's some communication between Bryan Clawson, who's with Weatherford, and Brian Morel with BP.
4:27PM **Q.** Okay. We'll focus on the bottom of this for just a moment. So that's an e-mail from Brian Morel to Bryan Clawson on April 19th, 2010?
4:27PM **A.** Yes, sir.
4:27PM **Q.** With the subject "Circulation"?
4:27PM **A.** Yes, sir.

Q. If we could go to the e-mail itself.

At the bottom there, Mr. Clawson wrote an e-mail to Mr. Morel on April 19th, at 5:30 p.m., "Subject: Circulation."

He writes: "Brian. Any progress, Brian?"

And Mr. Morel replied: "Yeah, we blew it at 3140, still not sure what we blew yet."

Was this the e-mail you were referring to?

A. Yes, sir, it is.

Q. Do you know whether BP ever determined what it blew?

A. No, sir, I do not. The whole issue of what was blown, the lower circulation pressures following the job was never resolved prior to the job.

Q. Was there any way to investigate whether the float collar had, in fact, converted?

A. Yes, sir. You could have attempted to reverse, circulate the pump down the annulus and back -- you could have tried to do that. If you couldn't pump, then it's an indication that those valves are working.

Q. And would that have taken additional time?

A. Yes, sir.

Q. Okay. And was it BP's decision to move forward after the attempted float collar conversion?

A. Yes, sir, it was.

Q. Would you have moved forward -- or would a prudent operator have moved forward with the cement job without further

4:29PM investigation?
4:29PM **A.** This -- and I identify a number of risks. This one was
4:29PM pretty risky for me. Because if you broke something and the
4:29PM circulating pressure is lower, you're not really sure of where
4:29PM you're circulating.
4:29PM Now, in this case BP got lucky because the positive
4:29PM pressure test after the job showed that you didn't have a
4:29PM broach from at least the float collar up.
4:29PM But this one was a pretty big risk. Operationally
4:29PM you could have had a break in that well somewhere, and you're
4:29PM circulating at a much higher point.
4:29PM **Q.** At what point would you have figured that out?
4:29PM **A.** Well, you could run fluid calipers. You could run -- put
4:29PM something in there and say, I've got a volume. I'm going to
4:29PM pump all the way around and check if that volume matches what
4:29PM it should, if you're circulating at the bottom. And that's one
4:29PM way to make sure you're circulating the entire hole. If that
4:30PM caliper comes back way early, it means you're circulating from
4:30PM a different point.
4:30PM **Q.** Once you went to pump the cement job, would you have found
4:30PM out in any way?
4:30PM **A.** Yeah. You would have found out when you tried to do your
4:30PM positive test. You may have found out -- and again, depending
4:30PM on where that broach was, you would have found out through lift
4:30PM pressures and such.

4:30PM 1 **Q.** But you didn't offer any opinion as to whether or not
4:30PM 2 there was --
4:30PM 3 **A.** Oh, no. No, sir, not at all.
4:30PM 4 **MR. CERNICH:** Okay. Can we go to the next slide,
4:30PM 5 please.
4:30PM 6 **BY MR. CERNICH:**
4:30PM 7 **Q.** You also identified limited pre-job circulation as a risk.
4:30PM 8 What is "pre-job circulation"?
4:30PM 9 **A.** That's circulating the well prior to -- prior to the
4:30PM 10 cement job. And that's an additive risk, along with the other.
4:30PM 11 You had -- one of the functions of pre-job circulation is to
4:30PM 12 clean debris out of the well and to break up the gels in the
4:30PM 13 mud. Mud tends to gel up a little bit. And so you put
4:31PM 14 energy -- you get that fluid circulating in the well.
4:31PM 15 The other thing the pre-job circulation does, it
4:31PM 16 allows you to see what condition that mud is that's been
4:31PM 17 sitting static at the bottom of the well for several days.
4:31PM 18 So getting -- the industry and BP in their documents
4:31PM 19 recommend two bottoms-up, but that's taking the mud that's at
4:31PM 20 the very bottom the well, bringing it all the way to surface so
4:31PM 21 you can look at it and you can check it for "Is it the same
4:31PM 22 mud? Has it deteriorated? Is there hydrocarbon influx? Is
4:31PM 23 there debris?"
4:31PM 24 Pre-job circulation does a lot of things for that
4:31PM 25 well.

4:31PM 1 **Q.** Was a full bottoms-up run on the Macondo well?
4:31PM 2 **A.** No, sir, not at all.
4:31PM 3 **Q.** And is a full bottoms-up a best practice?
4:31PM 4 **A.** Yes, sir, and that's identified throughout the industry.
4:31PM 5 **Q.** Have you run a full bottoms-up on every well you've
4:31PM 6 cemented?
4:31PM 7 **A.** No, sir, I have not.
4:32PM 8 **Q.** What are some reasons why you wouldn't run a full
4:32PM 9 bottoms-up?
4:32PM 10 **A.** One of the things is if you're losing circulation, you're
4:32PM 11 pumping fluid in and you're not getting full returns out, if
4:32PM 12 you try to run a full bottoms-up, you'll run out of fluid,
4:32PM 13 because that fluid, instead of coming up the annulus, is
4:32PM 14 spilling off the plate; it's going out into the formation. So
4:32PM 15 if you don't have full returns, you can't run a full
4:32PM 16 bottoms-up.
4:32PM 17 **Q.** Did you see any reason not to run a full bottoms-up on the
4:32PM 18 Macondo well?
4:32PM 19 **A.** I didn't. There were no indications of problems prior to
4:32PM 20 the cement job that would have limited that. And, in fact,
4:32PM 21 because of the debris in the well that was seen with the float
4:32PM 22 collar, that's an added risk and that's a -- I would have
4:32PM 23 wanted to circulate that out.
4:32PM 24 **Q.** While BP was conducting its pre-job circulation, did it
4:32PM 25 lose any returns?

A. No, sir.
Q. Would a full bottoms-up have taken additional time?
A. Yes. A full bottoms-up on this well was about 2400 barrels. So it would have taken -- at 4 barrels a minute, that's about 10 hours.

MR. CERNICH: If we could go to the next slide, please.

BY MR. CERNICH:
Q. You identified low cement volume as a risk?
A. Yes. Again, it's a risk, but it's one of the limitations of the well. We said top of cement at a particular level, and so you're not going to have -- you don't have a lot of cement to deal with. So because of that, it's one of those additional risks that you've got to be very careful with everything else.

By itself, a low cement volume, you can do that. But a low cement volume in this particular case carries with it two risks. One, you have to get everything else exactly right. But also, this was a foam cement job, and foam cement jobs with a very low cement volume are even more complex and more difficult.

MR. CERNICH: Could we go to Exhibit 225, please. And this is Exhibit 225.

BY MR. CERNICH:
Q. Do you recognize this document, Mr. Benge?
A. Yes, sir, I do.

4:34PM 1 **Q.** This is some e-mail correspondence that includes
4:34PM 2 Mr. Kellingray, dated June 26th, 2010. So this is after the
4:34PM 3 incident?
4:34PM 4 **A.** Yes, sir.
4:34PM 5 **Q.** And he's writing an e-mail to Erick Cunningham, who we've
4:34PM 6 talked about earlier today, and Mr. Corser and Mr. Winters. Do
4:34PM 7 you see that?
4:34PM 8 **A.** Yes, sir, I do.
4:34PM 9 **MR. CERNICH:** Okay. If we could go to the next
4:34PM 10 portion of this e-mail. And if we could focus in on this
4:34PM 11 portion right here.
4:34PM 12 **BY MR. CERNICH:**
4:34PM 13 **Q.** Have you seen this e-mail before, Mr. Benge?
4:34PM 14 **A.** Yes, sir, I have.
4:34PM 15 **Q.** And Mr. Kellingray here writes: "I am amazed that there
4:35PM 16 was no fluid loss in the cap slurry and, with the total job
4:35PM 17 volume being so small, surprised we foamed the cement, as I
4:35PM 18 assume the cap was 16.4 ppg. Was this really a cap or a volume
4:35PM 19 of cement pumped until the density reached and nitrogen
4:35PM 20 introduced?"
4:35PM 21 Did I read that correctly?
4:35PM 22 **A.** Yes, sir, you did.
4:35PM 23 **Q.** And did you read Mr. Kellingray's deposition in this case?
4:35PM 24 **A.** Yes, sir, I did.
4:35PM 25 **Q.** Do you understand what Mr. Kellingray is saying there?

4:35PM **A.** Yes, sir, I do. In a foam cement operation, when you're doing the job, you have to bring the cement -- you have to start pumping the cement first; then you turn on the nitrogen.

So the question here is: Is that a cap slurry? Is that a plan volume or is that just a volume of the cement that I bring up to weight and start moving it before I bring on the nitrogen?

So is it planned, or is it just -- every foam cement job, you have to have some cement ahead because you don't start pumping nitrogen until that line's full of cement. You don't want raw nitrogen going in there.

Q. And was it BP's decision to use a low cement volume?

A. Yes, sir. It was driven by the top of cement.

Q. Is there a relationship between low cement volume and the other components of a cement job?

A. Well, again, because there's not a lot of cement volume, it puts more onus on the overall risk. In and of itself, you have jobs with low cement volume, but it has an additive effect.

Q. So does it mean you have to be more careful?

A. Right. You have to be more careful with the other things on the job.

MR. CERNICH: If we could go to the next slide.

BY MR. CERNICH:

Q. Did you identify low pump rates as a risk?

4:36PM **A.** Yes, sir, I did.
4:36PM **Q.** How are they a risk?
4:36PM **A.** Again, putting energy into the well. This was a very
4:37PM fragile formation, a very fragile well. And so you -- BP was
4:37PM limited in the pump rates because of ECD constraints or the
4:37PM fracture gradient constraints.
4:37PM Again, in and of itself, low pump -- you can do a
4:37PM cement job with low pump rates. But you have to plan for that,
4:37PM and it's an added risk, coupled with all of the other things
4:37PM that low pump rates will give you. You're just not putting
4:37PM energy into that well.
4:37PM **MR. CERNICH:** If we could go to the next slide,
4:37PM please.
4:37PM **BY MR. CERNICH:**
4:37PM **Q.** So these are nine risks that you identified?
4:37PM **A.** Yes, sir, they are.
4:37PM **Q.** And are there ways to mitigate those risks?
4:37PM **A.** Yes, sir, there are, and those are found in a number of
4:37PM places.
4:37PM **MR. CERNICH:** Could we go to slide 23, please.
4:37PM **THE WITNESS:** There's mitigating risks found both --
4:37PM industry best practices, you know, limited volume of pre-job
4:38PM circulation. And industry and BP best practices and
4:38PM Halliburton best practices show that, you know, circulate
4:38PM bottoms-up, that eliminates that risk.

4:38PM 1 So there's a lot of the best practices in there
4:38PM 2 that directly address the risks.
4:38PM 3 **BY MR. CERNICH:**
4:38PM 4 **Q.** And we've looked at some of BP's best practices earlier
4:38PM 5 today?
4:38PM 6 **A.** Yes, sir, we did. We looked at a few of those.
4:38PM 7 **Q.** Or "recommended practices," I think was the title.
4:38PM 8 **A.** Okay, yes. I believe that is. And I believe the industry
4:38PM 9 will say "industry-recommended practices," as well.
4:38PM 10 **Q.** And what are some of the industry best practices?
4:38PM 11 **A.** Industry best practices are circulate prior to cementing,
4:38PM 12 design properly, have goals. But all of those are found in the
4:38PM 13 API documents.
4:38PM 14 **Q.** And it's some of the documents that you prepared?
4:38PM 15 **A.** Right, in some of the documents of all of us that are on
4:38PM 16 the API subcommittee that's -- that's the work of that
4:38PM 17 committee -- or subcommittee, I'm sorry.
4:39PM 18 **Q.** Did you observe whether BP followed best practices on the
4:39PM 19 Macondo well?
4:39PM 20 **A.** Yes -- well, I did observe that a lot of best practices
4:39PM 21 were not followed.
4:39PM 22 **Q.** And then I'd like to move on -- we're nearing the end
4:39PM 23 here -- to the cement job execution.
4:39PM 24 So now the cement job is designed and planned, and
4:39PM 25 then you move to the execution stage?

4:39PM **A.** Yes, sir.
4:39PM **Q.** Did you consider the execution of the cement job?
4:39PM **A.** Yes, sir, I did. I looked at all of the available -- all of the data from the actual pumping of the cement job that came from location.
4:39PM **Q.** And did you have any opinions on the cement job?
4:39PM **A.** Yes, sir, I did. I thought the crew, in the job that was pumped, the cement was mixed properly. I found no issues with the pumping of the cement job.
4:40PM **Q.** And then we looked at the animation earlier, and we saw the cement job -- the idealized cement job pumped.

And then there were two plugs. There was a bottom plug and then a top plug. And the top plug hit the bottom plug. That's the plug was bumped?
4:40PM **A.** Yes. That's what we call "bumping the plug." That's the end of the cement job.
4:40PM **Q.** And then what happened immediately after the plug was bumped?
4:40PM **A.** Immediately after that -- and I've got a stick drawing in my report -- there's a float check.

MR. CERNICH: Can we go to page 27 of Exhibit 5990, Mr. Benge's report.

THE WITNESS: And you can tell that the artist here was me because it's -- my artist renditions are a little simpler.

During the cement job, on the section here of A, you're pumping the cement job. The yellow square there signifies the top plug.

So at the end of the job, that bumps up on the -- excuse me, it bumps on top. It bumps on the float collar. And your float check, because the fluids in the annulus weigh more than what's inside, they'll tend to try to push back. That's the -- that's the U-tube effect.

And if the valves are closed and everything's working fine, then you won't get any flow back.

If you do get flow back, it's an indication that the floats aren't holding, is what we call that. Now, in the Macondo production cement job, the float check was inconclusive because there's -- that yellow square, that top plug is a forced fit; you have to push it in place. It's a big rubber plug that to push it back up takes -- takes over 100 psi.

Q. So it's wedged --

A. It's wedged in there.

And the pressure available -- the pressure available to push that back up, that U-tube pressure at the end of this job was more in the range of 50 to 60 psi. So that float check is inconclusive. You don't know the difference in my diagram between B and C, whether or not that -- those flow valves are holding or not. That test is inconclusive.

Q. So based on this test, you wouldn't have known whether the

valves in the float collar were closed?
A. That's correct. And I stated that in my report, that I don't know what the condition of the float equipment was at the end of this job.
Q. After this cement job, did BP run a cement bond log?
A. No, sir, they did not.
Q. And then there was a positive pressure test?
A. Yes, sir. Later on, there was a 5,000-psi positive pressure test where you're attempting to pressure up that inner pipe. So you'll pressure up against that plug, and that will test from that plug all the way back up to the rig floor. It doesn't test anything below the plug or in the annulus.
Q. So it tells you whether the casing's intact?
A. It tells you if the casing's intact. That's where you know that you have casing integrity from that float equipment back up, but nothing below it and nothing in the annulus.
Q. And then did BP conduct a negative pressure test at some point after the positive pressure test?
A. Yes, sir, they did.
Q. And the Court's heard a great deal of testimony over the actual conduct of that negative pressure test. But from a cementing perspective, what does a negative pressure test test?
A. It tests the entire system. So if it -- if, for example, the negative pressure test passes, you don't know if it passes because the valves are closed or holding or if it's the cement.

If it fails, you know you don't have a barrier in the well, that the total system has failed; but it doesn't test individual components. It tests everything that's there.

Q. So the -- all right. I'll move on.

In this case, do you know whether the negative pressure test actually tested the cement?

A. Yes, it did because it showed that the cement did not form a barrier in the well.

Q. And so did the system fail?

A. The system failed, yes.

Q. And where was the cement during the negative pressure test?

A. I'm sorry. I didn't quite hear you.

Q. During the negative pressure test, where was the cement?

A. Well, the cement --

Q. Was there cement in the shoe track?

A. Yes, there was cement in the shoe track and in the annulus up some distance.

Q. And did you ultimately reach an opinion as to whether or not the cement was actually set at the time of the negative pressure test?

A. Yes, sir. In my opinion, the cement was not set at the time of the negative test.

Q. And what is the basis of that opinion?

A. The basis of that opinion was looking at what data was

available to BP prior to the cement job as well as subsequent laboratory testing by Chevron and by OT&C. And I looked at the sensitivity of that system, if you will, to temperature.

MR. CERNICH: Can we go to Exhibit 5937?

BY MR. CERNICH:

Q. Is this the OT&C testing to which you referred?

A. Yes, sir, it is.

MR. CERNICH: And if we can go to the next page, please.

BY MR. CERNICH:

Q. And is this specifically the data to which you refer?

A. Yes, sir, it is. And in particular, UCA2 and UCA2-B are tests that are performed during this series on the -- on a cement system that had the same components as what was pumped in the Macondo well.

MR. CERNICH: Could we go to page 35 of Mr. Benge's report, please? If we could pull out the top half of that page.

BY MR. CERNICH:

Q. Does this summarize some of the data that you reviewed?

A. It does, yes, sir. All I've done is I've pulled those two lines out of that table and have reproduced them in my report. This is a fairly important point, in particular, here because cement -- the way cement sets, it's a chemical reaction and chemical reactions are governed by temperature. And so how

quickly you get to temperature, how fast that occurs will let you know how fast the cement can set.

There's a reason that Betty Crocker makes you preheat your oven, because they know that if you put it in a hot oven, it will make the cake in a certain period of time. If you put it in and that oven heats very slowly, then they can't tell you when the cake is done. The same thing we're seeing happening here.

How quickly does that cement heat up? How quickly do those reactions occur? And that will determine how fast that cement can set. And that's a risk that's identified by BP in their SRP.

MR. CERNICH: Could we go to Exhibit 6233, please?

BY MR. CERNICH:

Q. Is this the SRP to which you were referring to?

A. Yes, that's the cement testing laboratory section of the SRP 4.1.

MR. CERNICH: Can we go to page 5, please?

BY MR. CERNICH:

Q. Is this the portion of this SRP to which you refer?

A. Yes, sir. And this is in my report. It's a table that's in the SRP that shows risks and, basically, consequences -- or mitigations steps. And the risk that's identified on the left is "Testing at the wrong temperature (and/or pressure) has resulted in cementing failures" is basically what that says and

that you have to come back and do a remedial operation.

The mitigating steps for that and its particular application in selection for deviated wells, HTHP, and deepwater wells, and the mitigating step says don't use the API ramping schedule, use a ramping schedule that's simulating what's happening in the well.

Now, the API ramping schedule takes it from bottom hole circulating temperature, the temperature when I'm pumping everything, to static -- so I'm not pumping and that well heats up -- in four hours. The simulation work shows -- and the well cap simulation that was run by Halliburton shows it takes considerably longer than four hours to get up to 210 degrees.

MR. CERNICH: Could we go to Exhibit 7882, please?

BY MR. CERNICH:

Q. Can you identify this document, Mr. Benge?

A. Yes, sir. That is a Halliburton laboratory report.

MR. CERNICH: And for the record, this is the same exhibit as Exhibit 1709 but this one is -- that one wasn't in color. So we're going to use this one.

And if we could go to page 4 of that.

BY MR. CERNICH:

Q. Can you tell the Court what this is?

A. Yes, sir. This is the output from what's called a UCA, ultrasonic cement analyzer. The way that works is there's an ultrasonic signal sent through a known volume -- it measures

4:50PM 1 the speed. So as cement sets, the time it takes for that
4:50PM 2 signal to travel changes, and that's then converted into
4:50PM 3 strength.
4:50PM 4 And what we see here is this curve that comes down,
4:50PM 5 that's how fast that signal goes. So as it sets, here's your
4:50PM 6 compressive strength curve that comes up. So you can see that
4:50PM 7 as time changes, you start gaining strength.
4:50PM 8 This line shows you your temperature. So going
4:50PM 9 from -- and it's hard to see on this graph, I apologize. But
4:50PM 10 going over to the left, it's going from bottom hole circulating
4:50PM 11 temperature up to the test temperature in a period of four
4:50PM 12 hours.
4:50PM 13 So that's the standard that's used in API 10B-2.
4:51PM 14 That's the standard API ramping schedule is four hours.
4:51PM 15 **Q.** And did the OT&C testing use a ramp that was different
4:51PM 16 from this one?
4:51PM 17 **A.** Yes, sir, it did. It used a ramp that was developed from
4:51PM 18 the well cap temperature simulator that was recommended by --
4:51PM 19 that would be recommended by the -- in BP's SRP. Used a
4:51PM 20 simulator to change that ramp.
4:51PM 21 And I've discussed that ramp in my report. It was
4:51PM 22 considerably different than what a four-hour heat up rate is.
4:51PM 23 And actually, the one that was used by OT&C was more aggressive
4:51PM 24 than what the -- what the well cap run shows.
4:51PM 25 **Q.** Was the OT&C -- I'm sorry. What pressure was the OT&C

testing conducted at?
A. That testing was conducted at 3,000 psi. This particular testing was done at 14 -- 14,000 and change.
Q. And what difference would that make?
A. Pressure will have an impact on cement. It will tend to make the cement set faster. This cement slurry had SCR, synthetic cement retarder. That's a very high-tech -- that's why just a little bit makes that difference. It's a high-tech additive. That's actually less sensitive to pressure changes, but there will be some difference because of pressure.
Q. Is the effect -- how does the effect of pressure compare to the effect of temperature?
A. Temperature is, by far, the most important -- it's a chemical reaction. It's, by far, more important than pressure. Temperature is -- will control cement reactions.
Q. And is temperature of critical importance?
A. Yes. We always say the number one thing that will affect cement setting is temperature.
Q. Do other experts agree with you on that?
A. That's a well known -- yes, that's a well known fact.
Q. Did any of the other experts in this case agree with you that the cement was not set at the time of the negative pressure test?
A. Yes, sir.
Q. And who was that?

4:53PM **A.** That would be Jerry Calvert -- it will say "David Calvert," but he goes by "Jerry."
4:53PM **Q.** And you know Mr. Calvert?
4:53PM **A.** I know Mr. Calvert very well. He's a -- again, great respect. He's a world-class man.
4:53PM **Q.** Did you work with him for a number of years?
4:53PM **A.** I've worked with him my entire career.
4:53PM **MR. CERNICH:** Can we go to Exhibit 7836.
4:53PM **BY MR. CERNICH:**
4:53PM **Q.** Is this the report of Mr. Calvert?
4:53PM **A.** Yes, that's Jerry's expert report.
4:53PM **MR. CERNICH:** Could we go to page 6 of that report?
4:54PM We have a page with a -- do you have the rest of the pages of the report? There we go.
4:54PM **BY MR. CERNICH:**
4:54PM **Q.** Mr. Calvert writes: "The negative pressure test was conducted before the cement reached compressive strength."
4:54PM Does that mean the cement wasn't set?
4:54PM **A.** Yes, that's another way of saying the cement wasn't set.
4:54PM **Q.** And Mr. Calvert cited to Footnote 41 there, Oilfield Testing & Consulting report dated August 1st, 2011; is that right?
4:54PM **A.** Yes, sir.
4:54PM **Q.** And is that some of the same data that you relied upon to form your opinion that the cement wasn't set?

A. That's the same report, yes, sir.
Q. And did you look at additional data to that as well?
A. Yes, I did because I'm never satisfied with looking at only one data set. So I tried to look at what was available to the engineers at the time of the -- at the time of Macondo cement job. Because this is all after the fact, everything else. What was available to those engineers?

So if we can go back to the Halliburton laboratory report for the rig samples of the cement that was pumped on the well.

MR. CERNICH: All right. Could we go to Exhibit 7882, please?

THE WITNESS: Again, there is the -- this is the laboratory report. And on the next page, it will show some -- some compressive strength data.

Now, in this particular case, this is the crushed compressive strength for the foam cement system. I've got to caution, this isn't the -- this is run at atmospheric pressure because you can't test foam at pressure. We know that has an effect.

But it also shows two things: One, that prior to the cement job, it shows that -- the compressive strength of -- at 24 hours of the foam cement was zero.

Now, this is run at 180 degrees. Again, how quickly does that well heat up? But also at atmospheric

pressure. It shows the system is very sensitive to temperature and that, at the time of the negative test, this is showing that that cement was not set.

BY MR. CERNICH:

Q. And where specifically is it showing that?

A. It's showing: "Time, 24 hours. Strength, 0."

MR. CERNICH: Thank you, Your Honor. That's all we have.

THE COURT: All right. Do the private plaintiffs have any questions of this witness?

MR. STERBCOW: Yes, Your Honor.

THE COURT: Okay.

Are you okay, or do you need a break?

THE WITNESS: I'm doing fine.

THE COURT: Okay.

THE WITNESS: Getting tired of hearing myself talk, but that's all right.

CROSS-EXAMINATION

BY MR. STERBCOW:

Q. Good afternoon, Mr. Benge. Paul Sterbcow, representing the Plaintiffs Steering Committee.

MR. STERBCOW: Your Honor, our interests and the U.S. are not exactly aligned on this issue. It's the one issue that we're not because the U.S. didn't sue Halliburton and, of course, we did. So against that background -- and I won't be

long.

THE COURT: Okay.

BY MR. STERBCOW:

Q. In reviewing your CV, Mr. Benge, I notice that you authored, I think, in July of 2001, an article with Ron Crook and Ronnie Faul; is that correct?

A. That is correct.

Is that the "Eight Ways" article?

Q. Yes.

A. Yes, sir.

Q. So you've known Mr. Faul for a long time?

A. Oh, yes. I've known -- the cementing group's a pretty small organization. We know each other.

Q. That's what it appears to be.

Are you aware that Mr. Faul works for Halliburton and has for some time?

A. Yes, sir, I do.

Q. And do you know that four days before the blowout, he became Jesse Gagliano's supervisor at Halliburton?

A. I was aware of that, yes, sir.

Q. Did you have any discussions with Mr. Faul in your work in preparing your report?

A. No, sir, none at all.

Q. And none with Mr. Gagliano either?

A. No, sir.

4:58PM **Q.** And let me point something out while we're on that.

Your report's dated August 26th, 2011, and your deposition was given on November 17th, 2011. So during the time you did your extensive work, prepared your report, and then gave your sworn testimony, you did not have the benefit of a deposition for Mr. Gagliano, did you?

A. No, sir, I did not.

Q. At that time, he was taking the Fifth Amendment; correct?

A. Yes, sir.

Q. Are you aware of the fact that he subsequently changed his mind and gave a deposition on December 7th of 2012?

A. Yes, sir.

Q. Did you read that deposition?

A. Yes, sir, I did.

Q. Did you amend your report based on anything in that deposition?

A. No, sir, I did not.

Q. So the information that you gleaned from him had no effect whatsoever on what you've said today and the work you've done up until now?

A. No, sir, I did not change anything.

Q. Let me point out a few things.

You were critical of the use of the leftover Kodiak 2 blend?

A. Yes, sir.

4:59PM 1 **Q.** One of your criticisms?
4:59PM 2 **A.** Yes, sir.
4:59PM 3 **Q.** Do you recall seeing where it was actually Mr. Gagliano
4:59PM 4 who recommended that blend to BP?
4:59PM 5 **A.** I don't recall seeing who selected that cement blend.
5:00PM 6 **Q.** And he'll testify eventually. But if I were to represent
5:00PM 7 to you that he's testified that he did, you have no reason to
5:00PM 8 disagree?
5:00PM 9 **A.** I have no reason to argue with him, no, sir.
5:00PM 10 **Q.** And also that Mr. Gagliano was actually the one that
5:00PM 11 designed the Kodiak 2 blend for use at the Kodiak well, do you
5:00PM 12 have any idea?
5:00PM 13 **A.** I didn't have any idea.
5:00PM 14 **Q.** Having said that, though, your criticism, if I understand
5:00PM 15 it correctly, is based on the fact that there is a defoamer in
5:00PM 16 that blend that is incompatible with the Macondo job; is that
5:00PM 17 fair?
5:00PM 18 **A.** Well, it's fair from the standpoint this is a leftover
5:00PM 19 slurry that wasn't originally intended to be foam. And because
5:00PM 20 of that, you've got materials in there that you wouldn't put in
5:00PM 21 a foam cement job.
5:00PM 22 **Q.** And if I recall from your report, you actually cited
5:00PM 23 Halliburton's own foam cement operations manuals, Table 2.1,
5:00PM 24 that specifically says a defoamed cement should not be used in
5:00PM 25 a foamed job -- or a cement with a defoaming agent should not

5:00PM 1 be used at a cement job?
5:00PM 2 **A.** You don't want to use a defoamer in with a foamer, right.
5:01PM 3 **Q.** Would you agree with me that the choice of foam cement --
5:01PM 4 use of foam cement at Macondo complicated the job?
5:01PM 5 **A.** Yes, sir, it did.
5:01PM 6 **Q.** And you note that the risks associated with the use of
5:01PM 7 foam cement went unrecognized by both BP and Halliburton;
5:01PM 8 correct?
5:01PM 9 **A.** Yes, sir. I believe it did.
5:01PM 10 **Q.** Again, do you recall reading in Mr. Gagliano's deposition
5:01PM 11 where he actually recommended foam cement to BP in this
5:01PM 12 situation?
5:01PM 13 **A.** Yes, sir, I remember that in his deposition.
5:01PM 14 **Q.** So he played a significant role in using a cement that you
5:01PM 15 feel unnecessarily complicated this job?
5:01PM 16 **A.** Yes.
5:01PM 17 **Q.** And when we say "complication," are we really saying that
5:01PM 18 that choice -- both the choice of using the Kodiak 2 blend and
5:01PM 19 the choice of using a foam cement in Macondo conditions -- both
5:01PM 20 created and increased risks inherent in this job?
5:02PM 21 **A.** Well, I think that's in concert with what I've reported.
5:02PM 22 Those are added risks. Each one is a risk. They're not
5:02PM 23 stand-alone. They complicate each other.
5:02PM 24 **Q.** Right. It's cumulative?
5:02PM 25 **A.** There you go. I knew there would be a good word for that.

5:02PM 1 **Q.** In that respect and given Mr. Gagliano, in particular, his
5:02PM 2 intimate involvement in this decision-making and his
5:02PM 3 recommendations, wouldn't it be incumbent upon him and
5:02PM 4 Halliburton, just as it is on BP, to recognize, address, and
5:02PM 5 mitigate the risks as much as they could prior to execution of
5:02PM 6 this job?
5:02PM 7 **A.** And that's in concert with what's in my report, yes, sir.
5:02PM 8 **Q.** All right. Also, you were critical of using foam cement
5:02PM 9 in a well containing synthetic oil-based mud for the reasons
5:02PM 10 you've talked about?
5:02PM 11 **A.** Yes, sir.
5:02PM 12 **Q.** Are you aware that -- or have you looked into the fact
5:02PM 13 that Halliburton has used -- recommended and used foam cement
5:02PM 14 in synthetic oil-based mud jobs before Macondo?
5:03PM 15 **A.** Oh, yes, sir. And I testified to that earlier. It is
5:03PM 16 done in the industry, not just Halliburton, but Baker,
5:03PM 17 Schlumberger, all use it in oil-based mud.
5:03PM 18 **Q.** And you just don't think that that's a good idea for the
5:03PM 19 reasons you articulated?
5:03PM 20 **A.** It's an added risk, and if you can not use that, why take
5:03PM 21 the risk?
5:03PM 22 **Q.** Again, like using Kodiak 2 and recommending Kodiak 2, like
5:03PM 23 recommending and then using foam -- using foam in synthetic
5:03PM 24 oil-based mud wells increases risks, complicates the job, and
5:03PM 25 both companies -- BP and Halliburton -- have a duty to mitigate

5:03PM 1 that?
5:03PM 2 **A.** Yes, and that was a recognized risk, as noted.
5:03PM 3 **Q.** You also recognize -- and I think this is specific to
5:03PM 4 Halliburton -- that there were no standard suite of tests or
5:03PM 5 minimum testing requirements that you could find. Do you
5:03PM 6 recall that?
5:03PM 7 **A.** That's correct.
5:03PM 8 **Q.** And testing of the slurry is a Halliburton function;
5:03PM 9 correct?
5:03PM 10 **A.** Yes. But, Counselor, I also want to note, within the
5:03PM 11 contract, there are certain -- there's a table for minimum
5:04PM 12 requirements of testing in BP. So there's really -- I didn't
5:04PM 13 want to misspeak.
5:04PM 14 There's some minimum testing requirements within that
5:04PM 15 contract. But also, within the Halliburton lab, there's not
5:04PM 16 a -- there's not a likewise set. If you're going to have a
5:04PM 17 foam cement slurry, for example, we'll always run these tests.
5:04PM 18 **Q.** There's no manual that a Halliburton lab worker or manager
5:04PM 19 could go to, published by Halliburton, that says: If we're
5:04PM 20 going to try to -- if you're going to test a foam cement in
5:04PM 21 this particular situation, you need to make sure you follow
5:04PM 22 these rules?
5:04PM 23 **A.** That's correct. There's not a -- there's not, "Every
5:04PM 24 time, we're going to do X, Y and Z."
5:04PM 25 **Q.** And the Halliburton/BP contract specifies tests that BP

requires Halliburton to run; is that fair?
A. That's fair.
Q. Did Halliburton run all of those tests?
A. And as noted in my report, there was one test that was not run. I believe that was the free fluid or free water test.
Q. And do you consider, in this job, that to be an important test?
A. Yes. I always want to check the stability; and that checks really the stability of the unfoamed that --
Q. That's what I was going to ask you.
A. Yeah, it's the unfoamed slurry that you're looking at in that particular respect.
Q. And in this case, that particular test required by the contract that wasn't run would have tested the stability of shoe track cement, the unfoamed cement that was in the shoe track?
A. Well, it would give you an indication of -- I don't want to say that a free water test is the only thing you would run for stability, but that would give you an indication of that, yes.
Q. And if you have an influx of hydrocarbons -- if your foam cement does not achieve zonal isolation and your hydrocarbons get into the annulus and if, in fact, the theory is correct that there was a U-tube and the hydrocarbons came up through the cases, would that -- from a cement standpoint, would that

shoe track cement then give you your last line of defense to the hydrocarbons fouling up the well?

A. Yes, the shoe track cement did have the potential -- and I've stated that in my report, it had the potential to form a barrier.

Q. And that's the cement that would pertain to this free fluid test that was not done?

A. That's correct.

Q. Okay. You also noted that the testing reports themselves from Halliburton -- I think you used the terms "inconsistent" and "confusing"?

A. Yes, sir.

Q. All right. So if you had your say, you would revise the format in which they report what they're doing and how they do it?

A. Yes, sir, I would.

Q. And why is that?

A. Well, there's a couple of things. One, when you -- without having -- I want to be able to grab a report, look at it and not have to talk to anybody. I want to be able to say, "Yes, this has the information in there."

And within the report, within just the last report that we looked the at, there's actually two slurries that are reported there. You note that -- I found that out because there's a slash and a number in there that tells you that it's

a different test series.

But also -- and I'm quasi bilingual when it comes to metric or U.S. or normal units; but reporting things in specific gravity where everything else is in pounds per gallon, it just -- you know, I sit there and I always go, "Dang it," and I got to go get my calculator and convert for myself and then I write out to the side what it is.

So it's inconsistent in the units that are used and it just adds confusion. There's not a -- you can fix that very easily.

Q. And it's confusing to the point that even somebody with the extent of expertise, one of the leading cement exerts in the world needed to take time to digest those reports. You couldn't just, like you said, pick them up, read them, and know what they say?

A. No, sir, I had to -- I had to look around.

Q. All right. In your experience in this industry -- well, let me back up and say I think I understood what you said.

You relied on post-accident testing of OT&C to conclude that the cement didn't set?

A. In part. And I looked at what data was available to BP prior to pumping the job. And then the OT&C data told me that that cement system is very sensitive to temperature. And so it's a combination; but, yes, I did rely on that data.

Q. Did you see any effort by Halliburton to actually test

slurry that was pumped into the Macondo well following the accident?

A. No, sir, I didn't consider that in my report.

Q. You saw no evidence that that occurred, did you?

A. No, sir.

Q. From your standpoint, would the most accurate forensic test of the foam slurry or the slurry -- cement slurry pumped into this well, wouldn't it have to come from a direct sample of the slurry pumped into the well? That gives you your best -- your best --

A. That's going to give you your best data, yes, sir.

Q. And nobody, nothing you read, nothing you were told indicated to you that there was any effort whatsoever on the part of the company that designed and tested the cement to see post-accident whether anything was wrong with their design or their tests; correct?

A. There weren't any tests performed, no, sir.

Q. And I think you mentioned you know David Calvert. You would agree that he's a foremost expert on the well cement?

A. Yes, I know Jerry very well.

Q. I'm sorry, Jerry. David Jerry Calvert.

And you would agree to his qualifications?

A. Yes, sir. None of us cementers go by our first names.

Q. All right. And finally, would you know of any reason that a cement contractor would conduct tests, cement tests, either

for a job or after a job to evaluate it and not release those test results to the public?

A. No, sir.

Q. And the point of all of this, like you testified at the beginning, the reason you got involved in this case was to look into what happened from the cement standpoint to try to do what you could to make sure this never happens again; correct?

A. That's the reason I'm here, sir.

Q. And if post-accident testing is done to try to determine if the cement slurry itself ever had a chance of working, if we're going to accomplish the goal of making sure this never happens again, wouldn't you agree with me that the results of those tests should at least be published to your industry?

A. Yes, sir.

MR. STERBCOW: No further questions.

THE COURT: Alabama?

MR. MAZE: No questions.

THE COURT: Louisiana?

MR. KANNER: No questions, Your Honor.

THE COURT: Are you still doing all right?

THE WITNESS: I'm still doing all right. Are you doing all right?

THE COURT: I'm okay.

THE WITNESS: You get to be the boss, so I'm going to defer to you.

5:10PM 1 **THE COURT:** Well, I don't know about all these
5:10PM 2 lawyers out here.
5:10PM 3 **THE WITNESS:** Well, if they don't use plastic plates,
5:10PM 4 I don't really care.
5:10PM 5 **THE COURT:** Let's see. Transocean's up next.
5:11PM 6 **CROSS-EXAMINATION**
5:11PM 7 **BY MR. MILLER:**
5:11PM 8 **Q.** Good afternoon, Mr. Benge.
5:11PM 9 **A.** Good afternoon.
5:11PM 10 **Q.** I'm Kerry Miller. It's nice to meet you.
5:11PM 11 **A.** Nice to meet you.
5:11PM 12 **Q.** I have you on cross-examination.
5:11PM 13 Mr. Benge, I have a lot of material to cover with
5:11PM 14 you, so I'm going to bounce around a little bit. I'm going to
5:11PM 15 try not to ask you redundant questions.
5:11PM 16 **MR. MILLER:** Pull up page 7 of his report.
5:11PM 17 **BY MR. MILLER:**
5:11PM 18 **Q.** You talked about, with Mr. Cernich, the role of the
5:12PM 19 operator in the cement job. Do you recall that testimony,
5:12PM 20 Mr. Benge?
5:12PM 21 **A.** Yes, sir, I do.
5:12PM 22 **Q.** And at page 7, I'm going to go ahead and highlight some
5:12PM 23 language and ask you a quick question and move on.
5:12PM 24 You state that "they," meaning BP, "were the final
5:12PM 25 decision makers and were empowered to accept or reject the

advice of both BP's internal cementing expert and Halliburton."
A. Yes, sir.
Q. And when you say "they," you are talking about BP; correct?
A. Yes.
Q. Specifically you're talking about the wells team at BP?
A. Right, the BP drilling wells team.
Q. And then we saw some references in your report and in some of the e-mails that Mr. Cernich covered with you, specifically the individuals that would be within that wells team and were the final decision makers. Were they Mr. Hafle?
A. Yes, sir.
Q. Mr. Morel?
A. Yes, sir.
Q. Mr. Greg Walz?
A. Yes, sir.
Q. Mr. Brett Cocales?
A. Yes, sir.
Q. And Mr. John Guide?
A. Yes, sir.
Q. Okay. Let's move on to the design of the cement slurry.
MR. MILLER: Before we do that, pull up TREX-45036.
BY MR. MILLER:
Q. And in terms of the objectives on the cement job, you mentioned the term "zonal isolation."

5:13PM **A.** Yes, sir.
5:13PM **Q.** Is that one of the ultimate objectives of the cement job?
5:13PM **A.** For a primary cement job, yes, sir, it is.
5:13PM **MR. MILLER:** Let's go ahead and put that back up.
5:13PM **BY MR. MILLER:**
5:13PM **Q.** That document on the screen, it goes back to 2009. Do you see that, Mr. Benge?
5:13PM **A.** Yes, sir, I do.
5:13PM **Q.** And that's a BP risk register document? It's actually dated June 20th, 2009. Do you see that?
5:14PM **A.** Yes, sir, it is -- oh, thank you. You're pointing to it. Yes, sir.
5:14PM **Q.** Right here.
5:14PM And does this BP risk register identify the risk of a good cement job on the production string as a risk that BP faced with Macondo?
5:14PM **A.** Yes, sir.
5:14PM **Q.** Again, that's June 20th, 2009; correct?
5:14PM **A.** Yes, sir.
5:14PM **Q.** Okay. Let's talk about the design a little bit, what you called the "leftover Kodiak slurry"; correct, sir?
5:14PM **A.** Yes, sir.
5:14PM **Q.** As I understood your testimony earlier, it's basically setting forth two reasons why BP uses a particular slurry design. As I understand your testimony and your report, one

5:14PM reason why was because of economic reasons; that is, they had
5:14PM the Kodiak slurry on board the *Deepwater Horizon*. And I think
5:15PM you testimony was it made good business sense to try to use it
5:15PM again. Correct?
5:15PM **A.** Yes, sir. Any time you can use up inventory, it makes
5:15PM sense.
5:15PM **Q.** The second reason -- I want to make sure I understand your
5:15PM testimony -- is it relates to margin and frac gradient issues,
5:15PM as I appreciate it.
5:15PM You weren't in court last week when Dr. Huffman
5:15PM testified, were you, Mr. Benge?
5:15PM **A.** No, sir, not last week, no. I'm trying to think where I
5:15PM was.
5:15PM **Q.** If you had still been living in New Orleans, maybe you
5:15PM would have been here, huh?
5:15PM **A.** That's true.
5:15PM **Q.** But Dr. Huffman was a geophysicist who testified last week
5:15PM about pore pressure, frac gradient, margins, and ECD issues.
5:15PM **A.** Yes, sir.
5:15PM **Q.** And as I understand it -- and I want to ask if you agree
5:15PM with me -- there is a strong relationship between those margin
5:15PM issues that an operator faces and the cement design?
5:15PM **A.** Oh, yes, sir. That drives the cement design.
5:15PM **Q.** And so as I understand it, the second reason for BP
5:16PM choosing this particular design, in addition to economic

reasons, was that this particular design accomplished the margin issues that BP faced, the tight margin issues that BP faced.

Do you agree with that, Mr. Benge?

A. Yes, sir.

Q. I saw somewhere -- I think it was in your testimony -- you said that the leftover Kodiak blend, when hit with the nitrogen gas -- and so basically when I think of a cement job -- I'm a landlubber -- I think of the premixed cement and mixing it with water and coming out of the chute.

But, in essence, the way it's being pumped offshore is you have a premix, there's water, and then it's hit with nitrogen gas; correct?

A. Well, when you say "premix," I'm going to mix that -- I'm going to mix that slurry and so that slurry is then being pumped and the nitrogen's injected downstream of that cement pump.

Q. And it's the injection of the nitrogen that made this particular leftover slurry from Kodiak lighter; correct?

A. Yes, sir.

Q. As I understand it, the Kodiak cement hadn't been used as a conventional cement, and it could have been used as a conventional cement. Correct?

A. Yes, sir.

Q. As a conventional cement, it would have had a density of

5:17PM 1 the 16.5 ppg; correct?
5:17PM 2 **A.** That was the original design density for that slurry, yes,
5:17PM 3 sir.
5:17PM 4 **Q.** And the effect of injecting nitrogen in it reduced the ppg
5:17PM 5 from 16.5 to approximately 14.5; correct?
5:17PM 6 **A.** Yes, sir.
5:17PM 7 **Q.** And that is an ECD that BP needed to maintain; correct?
5:17PM 8 **A.** That's correct.
5:17PM 9 **MR. MILLER:** Let's pull up a document that you
5:17PM 10 referred to in your testimony with Mr. Cernich, that MOC memo,
5:17PM 11 51165.
5:17PM 12 **BY MR. MILLER:**
5:17PM 13 **Q.** This is a document dated April 15th, 2010. Do you see
5:17PM 14 that, Mr. Benge?
5:17PM 15 **A.** Barely.
5:18PM 16 **Q.** Yeah, it's a pretty tough document to read. Let's go
5:18PM 17 ahead and pull this part up.
5:18PM 18 Mr. Benge, this is a document I think you were
5:18PM 19 referring to. What this document sets forth is -- again, this
5:18PM 20 is a BP MOC memo; correct?
5:18PM 21 **A.** Yes, sir, it is.
5:18PM 22 **Q.** Management of change; correct?
5:18PM 23 **A.** That's correct.
5:18PM 24 **Q.** This is during BP's implementation of the cement job at
5:18PM 25 Macondo; correct?

5:18PM **A.** Yes, sir.
5:18PM **Q.** And the verifier is Mark Hafle; correct?
5:18PM **A.** Yes, sir.
5:18PM **Q.** He's one of the members of the BP wells team; right?
5:18PM **A.** That's correct. He's the senior engineer on the wells team.
5:18PM **Q.** One of the guys calling the slots on the cement job; correct?
5:18PM **A.** Yes, sir.
5:18PM **Q.** And it states here that "the cement job has been designed to minimize the ECD as low as practical." Do you see that?
5:18PM **A.** Yes, sir.
5:18PM **Q.** "Foam cement, lightweight spacer, and a small base oil spacer, along with low pump rates, will be used together to keep ECD below an acceptable level."
5:19PM Is that correct?
5:19PM **A.** Yes, sir.
5:19PM **Q.** And that level they are trying to keep this below was this 14.5 arbitrary frac gradient; correct?
5:19PM **A.** Yes, sir.
5:19PM **Q.** So BP could not have used the leftover Kodiak blend as a conventional cement because it would have been above the frac gradient; right?
5:19PM **A.** That's right. It was too heavy to have been used.
5:19PM **Q.** And it could have fractured the formation had they used

the 16.5 ppg conventional cement; correct?
A. Yes, sir.
Q. Sir, I saw in -- right when Mr. Cernich began, the article you wrote when you first used foam cement in Mobile Bay. This was actually when you were living in New Orleans; correct?
A. Yes, sir, it was.
Q. And there was a reference to a Halliburton facility on that document from Houma, Louisiana; correct?
A. Yes, sir.
Q. Sir, as I appreciate it, Halliburton has a facility in Houma, Louisiana where they actually do the premixes, they manufacture the premix material for use offshore. Are you aware of that, sir?
A. The bulk blending plant?
Q. Yes.
A. That's where they put the dry powder -- the dry part together, yes, sir.
Q. Sir, I'm from the area, as you might have picked up from my accent. Houma's real close to Fourchon, isn't it, Mr. Benge?
A. Yes, sir.
Q. It's about an hour's drive away?
A. It's right around the corner.
Q. You get on Highway 90 and you turn right on LA 1, don't you?

5:20PM 1 **A.** Yes, sir, you do.
5:20PM 2 **Q.** And you drive till there's no road; correct?
5:20PM 3 **A.** You drive until you get there and you can't go no further.
5:20PM 4 **Q.** So that cement would have been on a truck; correct,
5:20PM 5 Mr. Benge?
5:20PM 6 **A.** Yes, sir, it was.
5:20PM 7 **Q.** And that truck would have put cement on a boat in
5:20PM 8 Fourchon; correct?
5:20PM 9 **A.** Yes, sir.
5:20PM 10 **Q.** And that boat would have taken that cement from Fourchon
5:20PM 11 to Macondo; correct?
5:20PM 12 **A.** Yes, sir.
5:20PM 13 **Q.** And the cement that I'm talking about, that could have
5:20PM 14 gotten on that truck and on that boat, could have been a
5:20PM 15 conventional cement with an ECD of 14.35 or below; correct?
5:20PM 16 **A.** Yes, sir. I think that's as noted even by Erick
5:20PM 17 Cunningham.
5:20PM 18 **Q.** So you didn't have to use a foam cement to get it to an
5:20PM 19 ECD of 14.5 or below; correct?
5:20PM 20 **A.** No, sir, you did not.
5:20PM 21 **Q.** But in order for BP to have used a conventional cement
5:20PM 22 which would have had an ECD of 14.5 or below, they would have
5:20PM 23 had to have bought new cement; correct?
5:21PM 24 **A.** That's correct.
5:21PM 25 **Q.** But in this case BP opted not to buy new cement; correct?

5:21PM 1 **A.** That's correct. They chose to use the leftover cement.
5:21PM 2 **Q.** They chose to use the leftover cement, which was free to
5:21PM 3 them, from Macondo; right?
5:21PM 4 **A.** Yes. They had already bought it.
5:21PM 5 **Q.** They had already spent the money?
5:21PM 6 **A.** Yes, sir.
5:21PM 7 **Q.** So it didn't go in the ledger for Macondo; correct?
5:21PM 8 **A.** No, sir.
5:21PM 9 **Q.** It was on the Kodiak ledger?
5:21PM 10 **A.** Well, I don't know how they were accounting for it.
5:21PM 11 **Q.** And nitrogen gas is real cheap, isn't it?
5:21PM 12 **A.** Yes, sir, the gas is.
5:21PM 13 **Q.** So what they were doing to get the ECD of the Kodiak
5:21PM 14 cement from 16.5 down to 14.5 was just to inject cheap nitrogen
5:21PM 15 gas; correct?
5:21PM 16 **A.** The gas itself is cheap. But, sir, the equipment that
5:21PM 17 comes out to the location -- the pumps, the tanks and
5:21PM 18 everything else -- you've got more people and more equipment,
5:21PM 19 so the gas and the service is pretty expensive.
5:21PM 20 **Q.** But surely BP could have used a conventional cement with
5:21PM 21 an acceptable ppg simply by calling Halliburton up and getting
5:21PM 22 that product made in Houma, getting it tested, and getting it
5:22PM 23 sent to the *Deepwater Horizon* at Macondo; correct?
5:22PM 24 **A.** Yes, sir. Foam cement was not required for this job.
5:22PM 25 **Q.** That's not a difficult arrangement in this particular

industry, is it?
A. No, sir.
Q. You talked with Mr. Cernich about this notion about the premix containing the D-Air.
MR. MILLER: Let's look TREX-01703.
BY MR. MILLER:
Q. I'm going to ask you some questions while they're pulling up.
There we go. Do you recognize that document, the foam cementing operations manual?
A. Yes, sir, I do.
MR. MILLER: Let's go to the fly-out, please.
BY MR. MILLER:
Q. Do you see this information, Table 2.1, "Additives Incompatible with Foam Cement"?
A. Yes, sir.
Q. What does it say there?
A. It says "defoamers and D-Air."
Q. I know you said the cement community is a relatively small one, but the drilling engineers and operators around the world who are familiar with cement are numerous; correct?
A. Yes, sir.
Q. Sir, is it well known that you should not use or you shouldn't inject into a premix nitrogen gas that contained a defoamer?

5:23PM **A.** Those would be counter. You'd know that D-Air wouldn't normally be designed in a foam job.
5:23PM **Q.** Was that prudent, to use leftover cement that contained as an additive -- as one of the ingredients of the mix D-Air and then inject it with nitrogen on the rig?
5:23PM **A.** Well, that definitely adds a risk.
5:23PM **Q.** And that's a risk -- the decision to do that was BP's decision; correct?
5:24PM **A.** The decision to ultimately use the foam on this well, yes, sir.
5:24PM **Q.** To inject foam into a premix that had a defoamer in it was BP's; correct?
5:24PM **A.** Yes. They were aware of that. Yes, sir.
5:24PM **Q.** I'm jumping around a little bit. As Mr. Brock said yesterday, it's a good sound when you hear a lawyer flipping pages.

Let's talk a little bit about the testing.

I'll tell you what, before we do that, let's talk about -- briefly on the centralizers.

5:24PM **MR. MILLER:** Let's pull up TREX-04575.
5:24PM **BY MR. MILLER:**
5:24PM **Q.** As I understood your testimony, Mr. Benge, what you said, in response to Mr. Cernich's questions, was Halliburton never ran an OptiCem model with the six centralizers in the locations where BP ultimately placed them. Correct?

5:25PM 1 **A.** That's correct. Prior -- it hasn't been in an as-run
5:25PM 2 situation.
5:25PM 3 **Q.** As-run situation.
5:25PM 4 But before it was decided where to put the six
5:25PM 5 centralizers, Halliburton did do an OptiCem model for the
5:25PM 6 Macondo slurry, did it not?
5:25PM 7 **A.** Yes, sir.
5:25PM 8 **Q.** And are you familiar with this document?
5:25PM 9 **A.** Yes, sir, I am.
5:25PM 10 **MR. MILLER:** Let's go to the fly-out.
5:25PM 11 **BY MR. MILLER:**
5:25PM 12 **Q.** And this is a document dated -- the date is April 18th,
5:25PM 13 2010. Maybe it's up here. And the cement job was run on
5:25PM 14 April 19th, 2010; correct, Mr. Benge?
5:25PM 15 **A.** Yes, sir.
5:25PM 16 **Q.** So this particular document was generated only one day
5:25PM 17 before the cement was pumped; correct?
5:26PM 18 **A.** That's correct.
5:26PM 19 **Q.** And Halliburton, the service contractor, was telling BP,
5:26PM 20 "This well" -- and we're talking about Macondo in this
5:26PM 21 document; correct, Mr. Benge?
5:26PM 22 **A.** Yes, sir, they are.
5:26PM 23 **Q.** -- "is considered to have a severe gas flow problem."
5:26PM 24 Do you see that?
5:26PM 25 **A.** Yes, sir.

Q. And this particular model was run on seven or less centralizers; correct?

A. I believe this one was run on seven centralizers, yes, sir.

Q. Seven centralizers.

So BP had an OptiCem report with seven centralizers in its hands the day before it ran the job, which said this well is considered to have a severe gas flow potential and the very next day ran the cement job with six centralizers?

A. Yes, sir.

THE COURT: Mr. Miller, I don't think you identified the fly-out number.

MR. MILLER: It's TREX-04575 at 18.

THE COURT: 18, yes, okay.

MR. WITTMANN: At 18.

THE COURT: Thank you.

BY MR. MILLER:

Q. Moving right along, as they say. Let's talk a little bit about testing and what the BP internal documents say about BP's obligation to test cement. Let me get to the right page here.

MR. MILLER: Okay. Let's pull up -- I think this is one of the documents that Scott showed you -- TREX-00634.

And this is -- let's go to the fly-out at page 10 of this document -- hold on, let's take a look at it. It's Gulf of Mexico SPU.

5:27PM 1 **BY MR. MILLER:**
5:27PM 2 **Q.** This is BP's recommended practices for cement design and
5:28PM 3 operations in the Gulf of Mexico; correct?
5:28PM 4 **A.** Yes. That would be the deepwater Gulf of Mexico.
5:28PM 5 **Q.** Deepwater Gulf of Mexico. And we know this was a
5:28PM 6 deepwater project, if nothing else, after a week and a half.
5:28PM 7 You know that; right?
5:28PM 8 **A.** I bet you all do.
5:28PM 9 **Q.** Let's go to page 10 of that document. Let's see what BP's
5:28PM 10 internal document says about testing cement.
5:28PM 11 It says: "The purpose of this manual is to guide
5:28PM 12 drilling personnel through the cement" -- "drilling personnel"
5:28PM 13 meaning the BP drilling engineers who were on this project;
5:28PM 14 correct?
5:28PM 15 **A.** That would be my interpretation, yes, sir.
5:28PM 16 **Q.** -- "through the cement design process and to identify
5:28PM 17 minimal requirements and standards of cement design and
5:28PM 18 operations. It is imperative" -- that's a pretty strong word,
5:28PM 19 is it not, Mr. Benge?
5:28PM 20 **A.** Yes, sir.
5:28PM 21 **Q.** -- "that all the requirements are met."
5:28PM 22 And let's look at this. "Responsible parties for
5:28PM 23 cement slurries and spacer tests." Now, we're talking about
5:29PM 24 tests on a cement slurry used at Macondo; correct?
5:29PM 25 **A.** Yes, sir.

5:29PM **Q.** And it says: "Drilling engineers" -- again, it's Mr. Morel, Mr. Hafle, Mr. Cocales, and Mr. Guide -- "are responsible for overseeing the implementation and required specifications of all tests."

Do you see that, Mr. Benge?

A. Yes, sir, I do.

Q. And do you agree that that is a good practice on the part of an operator?

A. Yes, sir.

Q. Let's look at another BP internal document about testing slurries before they're actually implemented.

MR. MILLER: Pull up TREX-03773.

Let's look at this document -- I'm sorry, 03773. Is that it? Let's go to page 6.

BY MR. MILLER:

Q. Sir, this document is the "BP Exploration Production Segment-Recommended Practice." And it states: "Laboratory testing is a critical element in successful well cementing."

Do you see that?

A. Yes, sir.

Q. Do you agree with that statement, Mr. Benge?

A. Yes, sir, I do.

Q. "Cement chemical additives and well conditions are never entirely consistent or predictable." Do you see that?

A. Yes, sir.

Q. Do you agree with that, Mr. Benge?
A. Yes, sir. Mother Nature's never kind to us.
Q. "Therefore, the testing of field-representative samples is critical to ensure the slurry has the properties to meet the cementing objectives."

Do you see that, Mr. Benge?

A. Yes, sir.
Q. Now, who -- or isn't it the case -- isn't it your opinion, Mr. Benge, that ultimately the BP drilling engineers are responsible to make sure this gets done before that slurry gets implemented?
A. Yes, sir.

MR. MILLER: Let's pull up TREX-5801.

BY MR. MILLER:
Q. Sir, this is an e-mail from Brian Morel to Jesse Gagliano. Do you see that, sir?
A. Yes, sir, I do.
Q. And copied on the e-mail are two of Mr. Morel's cohorts, Mark Hafle and Brett Cocales. Do you see that?
A. Yes, sir.
Q. And the date is April 1, 2010. Do you see that, sir?
A. Yes, sir.
Q. And so this would have been 19 days before the tragic accident; correct?
A. That's correct.

5:31PM **Q.** And Brian is writing to Jesse. Jesse works as a Halliburton service provider; correct?
5:31PM **A.** Yes, sir.
5:31PM **Q.** "Can you start running some tests on the nitrogen job? This is an important job, and we need to have the data well in advance to make the correct decisions on this job."
Do you see that, Mr. Benge?
5:31PM **A.** Yes, sir, I do.
5:31PM **Q.** Okay. Do you agree that the Macondo job was an important cement job?
5:31PM **A.** Yes, sir, it was.
5:31PM **Q.** And do you also agree that BP should have had test data well in advance to make correct decisions on this job?
5:32PM **A.** Yes, sir.
5:32PM **Q.** Sir, did BP, in fact, have adequate industry-standard testing data on the Macondo slurry before it pumped that cement into the well?
5:32PM **A.** I don't believe that they had adequate data to pump the job on the well.
5:32PM **Q.** Let's fast-forward to another e-mail involving the same individuals. That's TREX-1390.
Sir, this is an e-mail from Mr. Morel to Mr. Hafle, talking about Mr. Gagliano. Okay?
5:32PM **MR. REGAN:** Your Honor, I think we already had this e-mail presented in globo.

5:32PM 1 **MR. MILLER:** Let me just ask this question.
5:32PM 2 **BY MR. MILLER:**
5:32PM 3 **Q.** Does this e-mail indicate to you that BP had --
5:32PM 4 **MR. MILLER:** Oh, finish your objection.
5:32PM 5 **MR. REGAN:** My objection is that the document, even
5:33PM 6 the highlight is cumulative in terms of what's happened on the
5:33PM 7 direct exam. This is just another direct exam.
5:33PM 8 **THE COURT:** Well, there have been a lot of documents
5:33PM 9 that have been used more than once. It depends what he's going
5:33PM 10 to use it for.
5:33PM 11 **MR. REGAN:** Fair enough.
5:33PM 12 **BY MR. MILLER:**
5:33PM 13 **Q.** I'm harkening back to the April 1st e-mail where they're
5:33PM 14 asking for test data well in advance, Mr. Benge, just to
5:33PM 15 reorient you. Okay?
5:33PM 16 **A.** Yes, sir.
5:33PM 17 **Q.** Is this document, this e-mail, where Mr. Morel is talking
5:33PM 18 to Mr. Hafle, indicate to you that two days before the cement
5:33PM 19 was pumped -- this e-mail is April 17th, 2010 -- that BP had
5:33PM 20 discharged its responsibilities to make sure it had adequate
5:33PM 21 test data on the slurry that was used in Macondo?
5:33PM 22 **A.** That's correct. That's what that says.
5:33PM 23 **Q.** This e-mail looks like they're still scratching their
5:33PM 24 heads. Do you agree with that?
5:33PM 25 **A.** They're not getting the test results in a timely fashion.

5:33PM **Q.** Let's look at TREX-1395. Again, the same guys. This is an e-mail from Jesse Gagliano to Morel, Hafle, Walz, and Cocales.

And it says -- let's look at this. It's dated April 18th at 6:50. Okay. But when it's sent, that's roughly 24 hours before the cement job began; correct?

A. That's correct.

Q. And it says, "Brian" -- Jesse Gagliano at Halliburton is writing to Brian Morel at BP; correct?

A. Yes, sir.

Q. And it says: "Has a decision been made yet if you are going with the 8-gallons or 9-gallons of retarder?"

A. Yes, sir.

Q. Does this e-mail indicate to you, 24 hours before they pump the cement, that BP had test data in advance that justified and showed that this cement was going to work?

A. No, sir, they did not.

Q. They just decided -- they just decided what slurry they were going to use; correct?

A. This was a last-minute decision, yes, sir.

Q. A last-minute decision. So they're making this last-minute decision. After this decision was made -- it appears that the decision was made when? At midnight at April 18th; correct?

A. Yes, sir.

5:35PM **Q.** That's 16 hours before the cement job began; correct?
5:35PM **A.** Yes, sir.
5:35PM **Q.** So now's the time to run tests; correct?
5:35PM **A.** No, sir. They should have already had these run.
5:35PM **Q.** But did they have tests in on the actual slurry?
5:35PM **A.** On the actual slurry, no, sir.
5:35PM **Q.** No tests on the actual slurry?
5:35PM **A.** No. That's not entirely correct, sir. They did have the thickening time test. Because in the previous part of this, they had that, and had some compressive strength data that was ongoing.
5:35PM **Q.** We'll cover that in a second.

But in your opinion did they have the suite of tests that you would have expected to have seen from a prudent operator in the industry before proceeding with the cement job on the night of April 19th?
5:35PM **A.** No, sir.
5:36PM **Q.** Let's talk about the suite of tests that BP usually requires.

MR. MILLER: Let's look at TREX-634. TREX-634.

BY MR. MILLER:
5:36PM **Q.** And this, again, is a Gulf of Mexico SPU. This is BP's "Recommended Practices for Cement Design and Operations in the Deepwater Gulf of Mexico." So this is the document at BP with respect to what to do here; right?

5:36PM 1 **A.** Yes, sir.
5:36PM 2 **MR. MILLER:** Let's go to page 39.
5:36PM 3 **BY MR. MILLER:**
5:36PM 4 **Q.** It says "Foam cement systems" -- that's what we're dealing
5:36PM 5 with here, right, foam cement systems?
5:36PM 6 **A.** Yes, sir.
5:36PM 7 **Q.** -- "shall be mixed and tested in the laboratory according
5:36PM 8 to the most recent version of ISO 10426-4. According to that
5:36PM 9 document, the following tests shall be conducted on the
5:36PM 10 unfoamed base cement slurry."
5:37PM 11 Okay. This is the leftover cement that they must
5:37PM 12 test; correct?
5:37PM 13 **A.** Yes.
5:37PM 14 **Q.** Thickening time?
5:37PM 15 **A.** Yes, sir.
5:37PM 16 **Q.** Rheology?
5:37PM 17 **A.** Yes, sir.
5:37PM 18 **Q.** Fluid loss?
5:37PM 19 **A.** Yes, sir.
5:37PM 20 **Q.** Free fluid.
5:37PM 21 **A.** And free fluid, yes, sir.
5:37PM 22 **Q.** "In addition," it says, "the following test shall" --
5:37PM 23 that's a nice lawyer word there, isn't it?
5:37PM 24 **A.** Yes, sir, it is.
5:37PM 25 **Q.** It means you've got to do it, though, even in engineering;

right?
A. Yes, sir.
Q. -- "be conducted on the foam cement slurry." Okay?
A. Yes, sir.
Q. That's the actual stuff that went down the hole; right?
A. That's the foam cement, yes, sir.
Q. And they must have done compressive strength and foam stability; correct?
A. Yes, sir.
Q. Let's look at another source document that talks about what the required testing is.
MR. MILLER: Let's pull up TREX-640. I'm pulling up the Halliburton/BP contract that was in effect.
BY MR. MILLER:
Q. I think that's a document that you reviewed in connection with your report?
A. I reviewed the cement portion of it. I did not review the entire document, sir.
Q. We're going to go right to the cement portion. Let's go to the fly-out.
A. Thank you, sir.
Q. Again, this sets forth the minimum testing for cementing operations. Is that a portion of the report that you reviewed, Mr. Benge?
A. Yes, sir, it is.

5:38PM 1 **Q.** And it sets forth that: All testing is required on rig
5:38PM 2 samples and to be submitted to company wells team 24 hours
5:38PM 3 prior to the cement operations commence.
5:38PM 4 The company wells team, that's the BP wells team;
5:38PM 5 correct?
5:38PM 6 **A.** Yes, sir, it is.
5:38PM 7 **Q.** And we know, from the review of e-mails, they didn't get
5:38PM 8 this full suite of testing 24 hours before the cement job
5:38PM 9 commenced; correct?
5:38PM 10 **A.** No, sir, they did not.
5:38PM 11 **Q.** They never got some of these tests; right?
5:38PM 12 **A.** That's correct.
5:38PM 13 **Q.** And some of the additional testing that must be done
5:38PM 14 particularly for slurries placed for control of shallow flows
5:38PM 15 or where gas migration risk is high -- we knew that was high at
5:38PM 16 Macondo; right?
5:38PM 17 **A.** Yes, sir.
5:38PM 18 **Q.** You talked about the OptiCem report that came out on
5:38PM 19 April 18th; correct?
5:38PM 20 **A.** Yes, sir.
5:38PM 21 **Q.** -- "must have static gel strength" -- that's a test;
5:39PM 22 correct?
5:39PM 23 **A.** Yes, sir.
5:39PM 24 **Q.** -- "transition time" -- that's a test; right?
5:39PM 25 **A.** Yes, sir.

5:39PM 1 **Q.** -- "zero gel time" -- that's another test; right?
5:39PM 2 **A.** Yes, sir.
5:39PM 3 **Q.** "In addition, company settlement tests must be run in
5:39PM 4 these situations," and it sets forth specific requirements.
5:39PM 5 That is a little chart which tried to combine the
5:39PM 6 tests required under the Halliburton/BP contract and under the
5:39PM 7 BP deepwater Gulf of Mexico cementing operations. I just want
5:39PM 8 to go over it with you.
5:39PM 9 **A.** Okay.
5:39PM 10 **MR. MILLER:** Let's pull that up. This is
5:39PM 11 Demonstrative 6630.
5:39PM 12 **BY MR. MILLER:**
5:39PM 13 **Q.** In this column, sir, what I have is the various types of
5:39PM 14 tests that were identified in the BP/HESI contract we just
5:39PM 15 looked at?
5:39PM 16 **A.** Yes, sir.
5:39PM 17 **Q.** What I have in this column is the various types of tests
5:39PM 18 that were identified in the BP recommended practice document we
5:39PM 19 looked at a minute ago?
5:39PM 20 **A.** Yes, sir.
5:39PM 21 **Q.** And what I have here is whether or not those particular
5:39PM 22 tests that were required by these two documents were done on
5:40PM 23 the actual slurry used in Macondo. Are you with me, sir?
5:40PM 24 **A.** Yes, I sure am.
5:40PM 25 **Q.** Foam stability, that was actually required by the BP

recommended practice?
A. Yes, sir.
Q. Was that done on Macondo?
A. Not on the .09 gallons per sack, sir.
Q. And that's the actually slurry. That's the one you have to test; right?
A. Yes.
Q. What about the compressive strength? That was required by both the BP/HESI contract and the BP recommended practices document; correct?
A. Yes, sir.
Q. Was that done on the actual -- you got to do that one on the foam; right? Do you remember the BP document, compressive strength?
A. Yes. For the foam it was not done; it was for the base slurry.
Q. But you've got to that on the foam, so --
A. But it says in that for the foam.
Q. Both of these documents make clear you've got to do it on the foam, you've got to do it in the right condition. That was your testimony earlier; correct?
A. Yes, sir. I know the recommended practice requires it for the foam. I don't believe that the contract really addresses foam.
Q. I'll take a pass on that one.

Fluid loss, that's not in the contract, but it is in the BP recommended practice; correct?

A. Yes, sir.

Q. If you know. We can go back and look.

A. I have to think a minute because I know that it also said that fluid loss will be run for systems that have a fluid loss additive in there. While I took one checkmark away from you, I may give you a check back on that one.

Q. Was fluid loss done on the actual slurry pumped into Macondo?

A. No, sir.

Q. Rheology, that was required by both documents; correct?

A. Yes, sir.

Q. Was that done on the Macondo slurry?

A. No, sir, not as pumped.

Q. Sir, you've never seen this chart before; correct?

A. No, sir.

Q. Free fluid, that was a test required by both the contract and the BP recommended practice document; correct?

A. Yes, sir.

Q. Was that done on Macondo?

A. No, it was not.

Q. Static gel strength transition time, I have it as only being under the contract and not in the recommended best practices?

A. That's correct.
Q. Okay. But was it done on the actual slurry?
A. No, it was not.
Q. Okay. Zero gel time, I have that as being required under the contract but not in the recommended practice. Was it done on the actual slurry?
A. No, it was not.
Q. Company settlement test, that's required under the contract. Was it done on the actual slurry?
A. No, sir, it was not.
Q. Finally, thickening time, we got checks in all boxes for that one; right?
A. Yes, sir.
Q. And you agree it was done on the Macondo slurry?
A. Yes, sir, it was.
Q. And this is generally called in the industry a "suite" of tests. Would you call it that?
A. Yes, sir.
Q. And that's because you have one, two, three, four, five, six, seven, eight -- nine of them; correct?
A. Yes, sir.
Q. Is it true, sir, that eight of the nine tests in the suite of tests that come from either the contract or the BP recommended practices weren't done on the Macondo slurry?
A. Not on the .09-gallons, yes, sir.

5:43PM **Q.** And the decision not to run those tests on the Macondo slurry were made by the BP wells team; correct? The ultimate decision --

5:43PM **A.** The ultimate decision, yes, sir.

Well, that's a bit difficult because those tests are requested by the engineer, by Mr. Gagliano, as well. So it's -- again, I started out that this is an iterative technique or iterative response where both parties would be involved.

5:43PM **Q.** But you're not saying that BP was not obligated under its own internal documents, under industry best practices, to make sure those tests were run; correct?

5:43PM **A.** That's not what I'm saying, no, sir.

5:43PM **Q.** BP was required to make sure those tests were run; correct?

5:43PM **A.** Yes, sir.

5:43PM **Q.** And now what you're saying is perhaps Halliburton was also obligated, but that wasn't the question I asked you.

5:43PM **A.** I apologize. Thank you, sir.

5:43PM **UNIDENTIFIED SPEAKER:** You can ask him.

5:43PM **MR. MILLER:** I'll let Mr. Godwin ask you that question.

5:43PM **THE WITNESS:** Yeah.

5:43PM **MR. MILLER:** He's dying to ask you that.

5:44PM 1 **BY MR. MILLER:**
5:44PM 2 **Q.** Okay. We covered responsibility. We covered slurry
5:44PM 3 design. We covered testing. Let's talk about the
5:44PM 4 implementation of the cement job.
5:44PM 5 **MR. MILLER:** Scott had some nifty -- Mr. Cernich had
5:44PM 6 some nifty demonstratives. I don't have anything so fancy.
5:44PM 7 **THE WITNESS:** I can loan you my plate.
5:44PM 8 **MR. MILLER:** Yeah. I'm a little bit better than
5:44PM 9 that. I hope, anyway.
5:44PM 10 **BY MR. MILLER:**
5:44PM 11 **Q.** In terms of the implementation, the method by which the
5:44PM 12 cement was pumped --
5:44PM 13 **A.** Yes, sir.
5:44PM 14 **Q.** -- the methods that BP ultimately utilized, do you agree
5:44PM 15 with me, sir, that those methods were also driven by the
5:44PM 16 margin, pore pressure and frac gradient issues BP was dealing
5:44PM 17 with downhole at Macondo?
5:45PM 18 **A.** Yes, sir.
5:45PM 19 **Q.** And we know that by the time that they were cementing that
5:45PM 20 production casing, BP had minimal, if any, drilling margin to
5:45PM 21 deal with; correct?
5:45PM 22 **A.** Yes, sir.
5:45PM 23 **Q.** Base oil, I think that was the orange stuff?
5:45PM 24 **A.** That was the purple stuff.
5:45PM 25 **Q.** Purple stuff?

A. I am in Louisiana, sir.

Q. Well, that's good.

Let's switch to the ELMO real quick.

I knew mine wasn't as good. I even took these from Mr. Bly's report, so . . .

Can you see that, sir?

A. Yes, sir.

Q. Okay. And on the left-hand --

THE COURT: Try to adjust your microphone because I think it's rubbing against your shirt or something. Something's causing the scratching sound.

MR. MILLER: Okay. Hopefully that's better.

THE COURT: Thank you.

BY MR. MILLER:

Q. Sir, this is a demonstrative we've seen a couple of times in this trial for different purposes. This is TREX-1. I think it's page 63, figure 3.

And what this was was an attempt by Mr. Bly, BP's investigator -- lead investigator, to create some demonstratives. So I just wanted to use it for this purpose.

And on this side was basically a snapshot of your nice animation, the cementing fluids being pumped down the drill pipe. And on the right side is what happened once it got back up. Can you see that, Mr. Benge?

A. Yes, sir.

5:46PM **Q.** Okay. And you touched upon this, but -- these pictures are great.

But do you get this nice fluid column where everything is separate in the real world?

A. Oh, no, sir, you don't ever get that.

Q. So the various fluid materials, the mud, the spacer, the tail, the foam cement, the cap cement, the spacer, the base oil, and the mud, I think the word you used is they get "intermixed" to some degree.

A. Yes, sir, they do.

Q. And, sir, isn't it true that the reason why BP used base oil in this particular mix or gumbo or whatever you want to call it is because a base oil has very light properties; correct?

A. Yes, sir, it will reduce the ECD.

Q. And it reduces the ECD because, again, BP had these tight margin issues. They couldn't go above 14.5 ppg; correct?

A. Yes, sir.

Q. And the base oil of ECD was -- I think I saw from Mr. Cernich's examination -- 6.7 ppg?

A. I don't know that we covered it, but that is what base oil weighs.

Q. So the point of using the base oil in this mixture was to lower the ECD; correct?

A. Yes, sir.

5:47PM 1 **Q.** Lower the ECD such that it didn't fracture the well;
5:47PM 2 correct?
5:47PM 3 **A.** Yes, sir.
5:47PM 4 **Q.** But the problem with base oil is it really doesn't mix
5:48PM 5 well with cap cement, and it really doesn't mix well with the
5:48PM 6 foam cement; correct?
5:48PM 7 **A.** No, sir, those are incompatible.
5:48PM 8 **Q.** It literally is oil and water, is it not?
5:48PM 9 **A.** Yes, sir.
5:48PM 10 **Q.** And so what can happen here is that the base oil can leech
5:48PM 11 out. And as it leaches out, both when it is pumped down and
5:48PM 12 when it settles, that leaching out could cause what I think you
5:48PM 13 call contamination of the foam cement; correct?
5:48PM 14 **A.** Well, yes, sir. But the weight -- you do have on the --
5:48PM 15 on the one on the left-hand side there, you do have that rubber
5:48PM 16 plug there.
5:48PM 17 **Q.** Correct.
5:48PM 18 **A.** So while it's being pumped, to that point, the chance of
5:48PM 19 contamination's pretty low.
5:48PM 20 **Q.** Okay.
5:48PM 21 **A.** But on the right-hand side, after it goes past that plug,
5:48PM 22 then's when the -- then's when the contamination can definitely
5:48PM 23 occur.
5:48PM 24 **Q.** And so contamination can be depicted, in my crude way, if
5:48PM 25 base oil were to get down here, what it would do is it would

create pockets, if you will, of base oil in the foam cement; correct?

A. It's got that possibility or -- it would probably mix in with it. It's pretty -- it will mix in pretty easily. I -- contamination will take a lot of different forms.

Q. In any event, the base oil, when it mixes in with the foam cement, can damage the stability and strength properties of foam cement; correct?

A. That's well documented, yes, sir.

Q. Okay. On to the pre-job bottoms-up, mud circulation.

And I think your expert report says that best practices calls for circulating at least a full bottoms-up -- one full bottoms-up prior to starting the cement job; correct?

A. Yes, sir.

Q. BP didn't do that in this case, did it?

MR. REGAN: Your Honor, we -- I'm going to object. We covered this bottoms-up topic directly.

MR. MILLER: Pull the chart up. I'll cut right to the chase.

THE COURT: Yeah, we did cover this already.

MR. MILLER: I just want to show the amounts on the graph.

BY MR. MILLER:

Q. D-6632.

Sir, are you aware that the actual amount of

bottoms-up circulation material that BP circulated in the pre-cement job was 111 barrels?

MR. REGAN: Your Honor, I object to that demonstrative as being inaccurate. I don't know what our process is but --

MR. MILLER: Sir, as of last night, it wasn't objected to. I'm asking him.

BY MR. MILLER:

Q. Do you know what the actual amount was?

A. Well, sir, I do.

There was 111 barrels pumped at 4 barrels per minute. But prior to that, there was an amount that was pumped. I want to say that the -- I apologize, I'm going to get this number wrong. I want to say it was around 300 or somewhere in that rate, 250. There was an additional hundred -- I want to say there was 150 barrels added to that. So your total -- for the purpose of this, total would be about 260.

Q. About 260.

And a full bottoms-up -- my calculation was the way to calculate a full bottoms-up is the volumetric capacity of the riser and all of the casing down to the bottom of the hole; correct?

A. That's right. Get the fluid from the bottom of the well all the way to the rig.

Q. So the full bottoms-up would have been -- you said

2400 barrels; I calculated it at 2750.
A. Yeah, I rounded.
Q. Okay. So best practices -- or at least a full bottoms-up would have been 2400 barrels versus the 250 that BP actually used?
A. Yes, sir.
Q. So BP was 10 -- left uncirculated 10 times less volume than they were supposed to?
A. About 10 percent, yes, sir.
Q. 10 percent of what they were supposed to do?
A. Yes, sir.
Q. You were aware -- bear with me for a second.

Let's go to that recommended practice document again, 634. One more question on the bottoms-up, and then I'll move off of it. This was not covered by Scott -- Mr. Cernich.

Let's go to 634, that's the recommended practice by BP, Gulf of Mexico. Let's go to page 19.

You're familiar with this document, aren't you, sir?
A. Yes, sir.
Q. Page 19.

Sir, I'll ask you and we'll see if it pops up.

Were you aware, sir, that this document states, quote, "It is best to circulate a minimum of two bottoms-up before starting to pump the cement job or a minimum of 5 hours, whichever is greater"?

5:53PM **A.** Yes, sir, I have read that in this document.
5:53PM **Q.** Do you agree that that is an industry best practice?
5:53PM **A.** Circulating bottoms-up is an industry best practice. Two bottoms-up is even better.
5:53PM **Q.** Here we go.
"It is best to circulate a minimum of two bottoms-up before starting to pump the cement job or a minimum of 5 hours."
5:53PM **A.** Yes, sir.
5:53PM **Q.** Did BP follow either of this criteria at Macondo?
5:53PM **A.** No.
5:53PM **Q.** And two bottoms-up would have been about 5,000-barrels; correct?
5:54PM **A.** Yes, sir.
5:54PM **Q.** And they were at 250 barrels, approximately?
5:54PM **A.** Yes, sir.
5:54PM **Q.** And they didn't pump five hours, did they?
5:54PM **A.** No, sir.
5:54PM **Q.** Do you know what time it was, the duration?
5:54PM **A.** No, sir, not off the top of my head.
5:54PM **Q.** But you know it was not five hours?
5:54PM **A.** I know it was less than five hours.
5:54PM **Q.** So BP didn't follow its own best practices in bottoms-up circulation?
5:54PM **A.** No, sir.

5:54PM 1 **Q.** Let's go to Demonstrative 6631.
5:54PM 2 Sir, this is a document that I prepared. Have you
5:54PM 3 seen this before?
5:54PM 4 **A.** No, sir, I have not.
5:54PM 5 **Q.** I took this table from your expert report. Do you
5:54PM 6 recognize it?
5:54PM 7 **A.** Oh, yes, sir, I do. I recognize the table.
5:54PM 8 **Q.** And it maxed out the limits of my Excel capability, but I
5:55PM 9 popped it into a bar chart.
5:55PM 10 **A.** That's why I didn't put a bar chart.
5:55PM 11 **Q.** What we know is, in terms of the volume of cement for
5:55PM 12 Macondo, that BP used 60 barrels?
5:55PM 13 **A.** Yes, sir.
5:55PM 14 **Q.** And that's total. That's the foam cement and the tail
5:55PM 15 cement; correct?
5:55PM 16 **A.** Yes, sir.
5:55PM 17 **Q.** And the cap cement?
5:55PM 18 **A.** Right. That's all the cement.
5:55PM 19 **Q.** For some of the other wells that BP drilled and cemented
5:55PM 20 in temporary abandonment procedures in the Gulf of Mexico, they
5:55PM 21 used 244 barrels at Isabella. Do you see that?
5:55PM 22 **A.** Yes, sir.
5:55PM 23 **Q.** That's 306 percent more than they used at Macondo;
5:55PM 24 correct?
5:55PM 25 **A.** I didn't bring my calculator, but 60 into 240 -- yes,

that's right in there.
Q. Four times more?
A. That's four times more.
Q. At Na Kika, they used 135.3 barrels. That's more than twice as much?
A. A little over double, yes, sir.
Q. And at King South, 99.8 barrels or two-thirds more?
A. One and a half times, yes, sir.
Q. The thing is -- and I think you said, if you can summarize for us -- in terms of volume of cement, particularly when you have these other issues, being so low on the full bottoms-up, using the base or having the ECD issues, there's some additional volume, you can use some safety margin there?
A. Yes, the small volume was a risk, yes, sir.
Q. Was Macondo the one well, given the other facts and circumstances we went over, where you want it to be this low in terms of volume?
A. That volume was driven by the top of cement, so that's an added risk. That means everything else has got to be done right.
Q. And in terms of everything else has got to be done right, let's go back to the ELMO real quick.

Let's look at this part of it. This shows what we have here on the fluid locations after the job. That shows what you term in your report "100 percent displacement

efficiency"; correct?
A. Yes, sir.
Q. Do you get that in the real world?
A. Never.
Q. And what displacement efficiency is, if I understand your testimony right, that is the ultimate physics of cementing; right?
A. That's right.
Q. Getting it to go exactly where you want it to go; correct?
A. Yes.
Q. Where you want to get it to go is -- what I'm putting in black is originally on the ELMO, but it didn't show up well on the ELMO.

These are the hydrocarbon-bearing zones, what I have in black.
A. Okay.
Q. Do you recognize that, sir?
A. I know those are about the locations of it. It's hard to see it on this particular one, but that's it.
Q. And you need to have your cement -- this is, what I'm drawing right here, that is the zonal isolation that you talk about; right?
A. Yes, sir.
Q. You're isolating these hydrocarbon-bearing zones, these pay sands, from getting into the annulus; correct?

5:58PM **A.** Yes, sir.
5:58PM **Q.** And in order to have an isolation, you have to have your cement exactly against those hydrocarbon-bearing zones; correct?
5:58PM **A.** Yes, sir.
5:58PM **Q.** And you're dealing with a low volume of cement here, a very low volume of cement here; right?
5:58PM **A.** Yes, sir.
5:58PM **Q.** So you needed to get the low volume exactly where it needed to be; correct?
5:58PM **A.** Yes, sir.
5:58PM **Q.** And without doing that, there's no zonal isolation; correct?
5:58PM **A.** No, sir.
5:58PM **Q.** Wait on cement, sir.
5:58PM Your expert report says at page 37: "Industry practice called for waiting until the cement hits 500 psi strength before concluding the well operations."
5:58PM **A.** Yes, sir.
5:58PM **Q.** And, again, that's something that BP knew; correct?
5:58PM **A.** Yes, sir, and there's a number of regulations that require that same thing.
5:58PM **Q.** Let's pull up TREX-569.
5:59PM Again, this is a BP document. Mr. Cernich showed the cover page. Let's go to 569.

5:59PM 1 BP knew that; correct? They knew industry practice
5:59PM 2 here; right?
5:59PM 3 **A.** Yes, sir.
5:59PM 4 **Q.** "Review strength development indicated by laboratory
5:59PM 5 testing against time line for subsequent operations."
5:59PM 6 The time line is the "wait on cement"; right?
5:59PM 7 **A.** Yes, sir.
5:59PM 8 **Q.** And we know that BP pumped the cement the night of the
5:59PM 9 19th into the early morning of the 20th; correct?
5:59PM 10 **A.** Yes, sir.
5:59PM 11 **Q.** And we know that there was subsequent operations on the
5:59PM 12 20th; correct?
5:59PM 13 **A.** Yes, sir.
5:59PM 14 **Q.** There was a positive pressure test on the 20th?
5:59PM 15 **A.** Yes, sir.
5:59PM 16 **Q.** There was a negative pressure test on the 20th?
5:59PM 17 **A.** Yes, sir.
5:59PM 18 **Q.** And it says to discuss any wait on cement identified with
5:59PM 19 the cement company to discuss possible mitigations -- to assess
5:59PM 20 possible mitigations. Do you see that?
5:59PM 21 **A.** Yes, sir, I do.
5:59PM 22 **Q.** Sir, is there any evidence that this happened in this
5:59PM 23 case, that BP discussed possible mitigations with the cement
5:59PM 24 company with respect to this issue?
6:00PM 25 **A.** Not that I've found, sir.

6:00PM 1 **Q.** And given the other issues and challenges with the Macondo
6:00PM 2 cement, is that something, given your 36 years of experience,
6:00PM 3 that you would have expected to see?
6:00PM 4 **A.** Yes, sir.
6:00PM 5 **Q.** Getting back to this wait on cement topic, BP didn't have
6:00PM 6 compressive strength testing on the .09 retarder concentration
6:00PM 7 foam cement; correct?
6:00PM 8 **A.** No, sir, they did not.
6:00PM 9 **Q.** So BP couldn't look at it against a time line for
6:00PM 10 subsequent operations; correct?
6:00PM 11 **A.** That's correct.
6:00PM 12 **Q.** Instead, BP didn't have the data, but they plugged ahead
6:00PM 13 with the temporary abandonment procedure; correct?
6:00PM 14 **A.** They did not have that data, no, sir.
6:00PM 15 **Q.** And on the night of April 20th, there was a massive
6:00PM 16 blowout; correct?
6:01PM 17 **A.** Yes, sir, there was.
6:01PM 18 **Q.** Sir, in your 36 years in the industry, have you ever seen
6:01PM 19 an operator manage slurry design, cement testing, and cement
6:01PM 20 operations as poorly as BP managed it at Macondo?
6:01PM 21 **A.** Not and expect to get a barrier in the well, no, sir.
6:01PM 22 **Q.** How would you describe BP's conduct in managing the cement
6:01PM 23 job at Macondo, in your own words?
6:01PM 24 **A.** I would not have pumped that cement job as it was
6:01PM 25 designed.

6:01PM **Q.** Sir, your report in this case -- and I think you only issued one; correct?
6:01PM **A.** Yes, sir.
6:01PM **Q.** You don't mention -- you don't mention Transocean, do you, sir?
6:01PM **A.** No, sir, not at all.
6:01PM **Q.** And you didn't analyze any of Transocean's conduct at Macondo; correct?
6:01PM **A.** No, sir, I did not.
6:01PM **MR. MILLER:** Thank you, sir. No more questions.
6:01PM **THE COURT:** All right. We're going to recess until tomorrow morning. However, before we leave, I want to go over the witnesses after Mr. Benge. There apparently have been some changes to the witness list.
6:02PM Who are going to be the plaintiffs' witnesses tomorrow and in what order?
6:02PM **MR. ROY:** Calvert will be first, Your Honor. After this witness.
6:02PM **THE COURT:** Okay. David Calvert will be the next witness. He's an expert; right?
6:02PM **MR. ROY:** Correct.
6:02PM **THE COURT:** And then who after him?
6:02PM **MR. ROY:** Mr. Davis.
6:02PM **THE COURT:** Mr. Davis is also an expert?
6:02PM **MR. WILLIAMSON:** He's an expert for the USA on the

6:02PM BOP, Judge.

MR. O'ROURKE: Except, Your Honor, if Mr. Davis doesn't start in time tomorrow, he may not be the next in order. If he goes to next week, we may have to refigure next week.

THE COURT: But your current plan is Calvert and then Davis; correct?

MR. WILLIAMSON: Correct.

UNIDENTIFIED SPEAKER: Your Honor, could we ask if they decide not to put on Davis, who they would call instead?

MR. O'ROURKE: Whoever was next after Davis. It's in the bulletin.

UNIDENTIFIED SPEAKER: Who is that?

MR. O'ROURKE: Probert.

THE COURT: I've got Tim Probert on my list. Did you guys circulate this same list that I have?

MR. HERMAN: Yes, Your Honor.

THE COURT: The list keeps changing, and I know that can't be helped sometimes.

So the plan is Calvert, Davis, and then Probert? Or Probert before Davis?

Anything else before we recess?

See everyone back at 8:00 a.m.

THE DEPUTY CLERK: All rise.

(WHEREUPON, the proceedings were concluded.)

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CERTIFICATE

I, Jodi Simcox, RMR, FCRR, Official Court Reporter for the United States District Court, Eastern District of Louisiana, do hereby certify that the foregoing is a true and correct transcript, to the best of my ability and understanding, from the record of the proceedings in the above-entitled and numbered matter.

s/Jodi Simcox, RMR, FCRR
Jodi Simcox, RMR, FCRR
Official Court Reporter