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UNITED STATES DISTRICT COURT  
EASTERN DISTRICT OF LOUISIANA

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

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

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## RICHARD HEENAN - CROSS

**AFTERNOON SESSION****(March 6, 2013)**

\* \* \* \* \*

**THE DEPUTY CLERK:** All rise.**THE COURT:** Good afternoon, everyone. Please be seated.

All right, Mr. Brock.

**MR. BROCK:** Thank you, Your Honor.**CROSS-EXAMINATION****BY MR. BROCK:****Q.** Good afternoon, Mr. Heenan.**A.** Good afternoon.**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.**A.** Thank you.**Q.** First, you filed a single report in this case; correct?**A.** Correct.**Q.** You knew that you had the opportunity to file a rebuttal report, but you did not file one?**A.** I had that opportunity and I did not, you're correct.**Q.** And did you look at the expert reports of BP after they were filed?



## RICHARD HEENAN - CROSS

1:05 PM 1 A. Briefly.

1:05 PM 2 Q. You wouldn't say, as you sit here today, that you did a

1:05 PM 3 comprehensive study of those reports?

1:05 PM 4 A. No, I definitely would not say that.

1:05 PM 5 Q. Okay. Thank you.

1:05 PM 6 I've put your report there. It's marked as

1:05 PM 7 Exhibit 7528. Do you have it there?

1:05 PM 8 A. Yes, I do.

1:05 PM 9 Q. Just in case you need to refer to it as we go through, I

1:05 PM 10 just wanted you to have the opportunity to do that.

1:05 PM 11 A. Thank you.

1:05 PM 12 Q. Let me ask you to start by turning to page 3 of that

1:05 PM 13 report.

1:06 PM 14 MR. BROCK: Connie, can we put that up, please. And

1:06 PM 15 I want to focus on the top half of the page down to the bottom

1:06 PM 16 of the picture, please.

1:06 PM 17 BY MR. BROCK:

1:06 PM 18 Q. Now, this is the -- it says page 3, but it's actually the

1:06 PM 19 first page of the report; correct?

1:06 PM 20 A. Correct. I think the rest is just a -- yes. The rest is

1:06 PM 21 just a little bio.

1:06 PM 22 Q. And at the very top, you begin by telling the readers that

1:06 PM 23 this is the scope of the report; right?

1:06 PM 24 A. Correct.

1:06 PM 25 Q. And you say: "A series of events and decisions resulted

## RICHARD HEENAN - CROSS

1 : 0 6 P M 1 in the Macondo blowout."

1 : 0 6 P M 2 Correct?

1 : 0 6 P M 3 A. Correct.

1 : 0 6 P M 4 Q. And that series of events and decisions, from the work

1 : 0 6 P M 5 that you did, involved a number of different people and

1 : 0 6 P M 6 companies?

1 : 0 6 P M 7 A. Correct.

1 : 0 6 P M 8 Q. And you say: "The elimination of any one of these would

1 : 0 6 P M 9 have eliminated or at least reduced the magnitude of the event,

1 : 0 6 P M 10 presumably with a corresponding reduction in loss of life,

1 : 0 7 P M 11 injury, and environmental impact."

1 : 0 7 P M 12 Do you see that?

1 : 0 7 P M 13 A. Yes.

1 : 0 7 P M 14 Q. And then you go on to use the model from the Bly report to

1 : 0 7 P M 15 identify the three things that you will speak to in your

1 : 0 7 P M 16 report?

1 : 0 7 P M 17 A. Yes, I did.

1 : 0 7 P M 18 Q. And you have described those for the Court now?

1 : 0 7 P M 19 A. I have already.

1 : 0 7 P M 20 Q. Yes, that's what I mean. You have already described

1 : 0 7 P M 21 those?

1 : 0 7 P M 22 A. Yes.

1 : 0 7 P M 23 Q. The point being that you used the Bly report model as the

1 : 0 7 P M 24 way that you would organize your report here?

1 : 0 7 P M 25 A. Yes, that's an accurate characterization.

## RICHARD HEENAN - CROSS

1:07 PM 1 Q. Thank you.

1:07 PM 2 Now, I want to ask you to turn to page 7 of your  
1:07 PM 3 report, if you would, please, sir.

1:07 PM 4 In order to formulate your report, you needed to make  
1:07 PM 5 some assumptions; correct?

1:07 PM 6 A. Correct.

1:07 PM 7 Q. I want to ask you about the ones right there at the top.

1:07 PM 8 MR. BROCK: If you'll just do the call-out from  
1:07 PM 9 "Assumptions" down through No. 3.

1:08 PM 10 BY MR. BROCK:

1:08 PM 11 Q. And you say here: "The following assumptions have been  
1:08 PM 12 generally accepted, appear to be consistent with observations,  
1:08 PM 13 and supported by subsequent forensic examination of recovered  
1:08 PM 14 equipment. To date, they have not been disputed by any of the  
1:08 PM 15 major parties of the event. For this reason, no further  
1:08 PM 16 attempt has been made to verify them."

1:08 PM 17 Just a couple of questions about this.

1:08 PM 18 A. Okay.

1:08 PM 19 Q. When you speak here of "have not been disputed by the  
1:08 PM 20 major parties," are you referring to Transocean, BP, and  
1:08 PM 21 Halliburton?

1:08 PM 22 A. I didn't put a specific -- I would include them -- in  
1:08 PM 23 fact, I don't recall any significant dispute that I can recall.

1:08 PM 24 Q. Okay. Focusing on -- I'm asking a little bit different  
1:08 PM 25 question.

## RICHARD HEENAN - CROSS

1 : 0 8 P M 1 A. Okay. Sorry.

1 : 0 8 P M 2 Q. When you say "the parties of the event," are you referring

1 : 0 8 P M 3 to the people that are here in court asking you questions

1 : 0 8 P M 4 today, the companies?

1 : 0 9 P M 5 A. Yeah, the companies, yes. I think, if I understand your

1 : 0 9 P M 6 question correctly, the answer is, yes, I'm including them in

1 : 0 9 P M 7 there.

1 : 0 9 P M 8 Q. Thank you.

1 : 0 9 P M 9 And if you see here No. 1, you conclude: "The flow

1 : 0 9 P M 10 path of the hydrocarbons was down the outside of the casing,

1 : 0 9 P M 11 through the cement sheath, up the inside of the shoe track, and

1 : 0 9 P M 12 up through the float shoe."

1 : 0 9 P M 13 Do you see that?

1 : 0 9 P M 14 A. I see that.

1 : 0 9 P M 15 Q. And is that one of the assumptions that you make that

1 : 0 9 P M 16 appear to be consistent with observations supported by

1 : 0 9 P M 17 subsequent forensic examination and recovered equipment?

1 : 0 9 P M 18 A. Yes, I believe it is.

1 : 0 9 P M 19 Q. Just one point before we get too far into the exam. I

1 : 0 9 P M 20 want to come back to one of the pullouts that Mr. Underhill

1 : 0 9 P M 21 showed you, because I just want to make a point for the Court

1 : 0 9 P M 22 for completion, if I could.

1 : 0 9 P M 23 MR. BROCK: Could we pull up Treatment 7528.4.5,

1 : 1 0 P M 24 please.

25

## RICHARD HEENAN - CROSS

1 **BY MR. BROCK:**

2 **Q.** Do you remember you were looking at a quotation a little  
3 earlier and we noted that there was -- that there was a  
4 sentence missing, "The proposal of the bladder effect, which  
5 has no technical basis, and the adoption of that theory  
6 demonstrates the abdication of responsibility of both BP and  
7 Transocean."

8 Do you remember that?

9 **A.** I remember the discussion.

10 **Q.** Right. But do you remember that in the quote that was  
11 pulled up, we did not include -- or Mr. Underhill did not  
12 include "demonstrates the abdication of responsibility of both  
13 BP and Transocean"? Do you see that?

14 **A.** Yes. I think the part that was missing was the phrase  
15 "and the adoption," that line.

16 **Q.** Yes. And it was your conclusion and it is your opinion  
17 that both BP and Transocean violated the applicable standard of  
18 care in terms of the interpretation of the negative test?

19 **A.** Correct.

20 **Q.** Just a few questions on the roles and responsibilities in  
21 the industry from your perspective as an expert.

22 Do you believe that the well construction process is  
23 a collaborative effort?

24 **A.** Yes.

25 **Q.** It needs to be a collaborative effort?

## RICHARD HEENAN - CROSS

1 : 11 PM 1 A. Yes, it does.

1 : 11 PM 2 Q. And it involves various entities and personnel, including

1 : 11 PM 3 the well operator, government officials, the drilling

1 : 11 PM 4 contractor, the mud contractor, the casing contractor, the

1 : 11 PM 5 cement contractor, and others?

1 : 11 PM 6 A. Yes, "and others." Absolutely.

1 : 11 PM 7 Q. Your experience over the last 30 years has been that

1 : 11 PM 8 operators like BP will hire drilling contractors like

1 : 11 PM 9 Transocean to drill wells?

1 : 11 PM 10 A. Yes. Typically, operators hire joint contractors, not

1 : 11 PM 11 exclusively, but typically.

1 : 11 PM 12 Q. Right. You would say that in the vast majority of wells

1 : 12 PM 13 that are drilled, that a drilling contractor will do that for

1 : 12 PM 14 an operator?

1 : 12 PM 15 A. A vast majority, yes.

1 : 12 PM 16 Q. And the drilling contractor, in your experience and from

1 : 12 PM 17 your perspective as an expert, will own the drilling rig and

1 : 12 PM 18 provide a crew?

1 : 12 PM 19 A. Again, in the vast majority.

1 : 12 PM 20 Q. And that's true on land, shallow water, and deepwater?

1 : 12 PM 21 A. All of them, yes.

1 : 12 PM 22 Q. It's your experience that drilling contractors will have

1 : 12 PM 23 their own well control manuals and safety manuals?

1 : 12 PM 24 A. Yes. That's my experience.

1 : 12 PM 25 Q. When we talk about safety manuals, is the term "HSE"

## RICHARD HEENAN - CROSS

1 : 12 PM 1 familiar to you?

1 : 12 PM 2 A. Yes.

1 : 12 PM 3 Q. What is that?

1 : 12 PM 4 A. Health, safety, and environment.

1 : 12 PM 5 Q. And is it your experience as an expert in this field that

1 : 12 PM 6 in the area of health, safety, and environment, that the

1 : 12 PM 7 drilling contractor will have its own system in place?

1 : 12 PM 8 A. Just to clarify, you're saying as an expert in drilling,

1 : 13 PM 9 not in HSE; correct?

1 : 13 PM 10 Q. Correct.

1 : 13 PM 11 A. Yes, I would expect --

1 : 13 PM 12 Q. I'm just asking for your general knowledge in terms of who

1 : 13 PM 13 does what.

1 : 13 PM 14 A. That the drilling contractor does have such a manual?

1 : 13 PM 15 That was your question; right?

1 : 13 PM 16 Q. Yes. Is that correct?

1 : 13 PM 17 A. Correct.

1 : 13 PM 18 Q. Now, you had talked about in your report that -- one of

1 : 13 PM 19 the things that you said is that BP failed to use the best

1 : 13 PM 20 available and safest drilling technology; correct?

1 : 13 PM 21 A. Correct.

1 : 13 PM 22 Q. And you pulled some language out of one of the regulations

1 : 13 PM 23 that you cited in your report that supported that?

1 : 13 PM 24 A. Yes.

1 : 13 PM 25 Q. Interpreting regulations is not something that you

## RICHARD HEENAN - CROSS

1 : 13 PM 1 regularly do, is it?

1 : 13 PM 2 A. It's something I do all the time. I'm required to follow

1 : 13 PM 3 regulations in my job of this nature.

1 : 13 PM 4 Q. Thank you for that. Let me rephrase the question.

1 : 13 PM 5 Interpreting the U.S. regulations is not something

1 : 13 PM 6 you regularly do?

1 : 14 PM 7 A. I don't regularly interpret U.S. regulations, but they're

1 : 14 PM 8 the same concept. They're in plain English.

1 : 14 PM 9 Q. Just one question, please.

1 : 14 PM 10 A. Okay.

1 : 14 PM 11 Q. You don't regularly interpret U.S. regulations, do you?

1 : 14 PM 12 A. Correct, I do not.

1 : 14 PM 13 Q. Now, you agree that it is appropriate for an operator like

1 : 14 PM 14 BP to hire a contractor to satisfy the requirement of providing

1 : 14 PM 15 the best available and safest drilling technology?

1 : 14 PM 16 A. I don't know that that by itself satisfies that

1 : 14 PM 17 requirement.

1 : 14 PM 18 Q. Let's look at your deposition and just see what you've

1 : 14 PM 19 said. Page 93, lines 5 through 16.

1 : 14 PM 20 Do you see that you were asked the question:

1 : 14 PM 21 "QUESTION: Let me ask it this way: In using the

1 : 14 PM 22 best available and safest drilling technology to monitor

1 : 14 PM 23 and evaluate well conditions, is it appropriate for an

1 : 14 PM 24 operator to hire a contractor and require the contractor

1 : 14 PM 25 to use the best available and safest drilling technology



## RICHARD HEENAN - CROSS

1 to monitor and evaluate well conditions?"

2 And did you answer:

3 "ANSWER: Yes, it is appropriate for the operator to  
4 hire a contractor to discharge the using of the best  
5 available and safest technology. I think that was your  
6 question."

7 Is that what you said?

8 A. That was what I said.

9 Q. Now, do you know that Transocean is one of the largest  
10 offshore drilling contractors in the world?

11 A. Yes, I'm aware of that.

12 Q. And that they are experienced in drilling  
13 technically-demanding wells?

14 A. I'm also aware of that.

15 Q. You have no reason to think that it was a bad idea for BP  
16 to engage Transocean to drill the Macondo well?

17 A. No, I have no reason to think that's a bad decision.

18 Q. In fact, BP's decision to use the *Deepwater Horizon* to  
19 finish the Macondo well was a choice to use the best available  
20 and safest technology?

21 A. I can't tell you whether that was the best available, but  
22 it's acceptable.

23 Q. All right. If we use your definition that you pulled from  
24 the regulation that talks about best available and safest  
25 technology, do you agree that BP's decision to use *Deepwater*

## RICHARD HEENAN - CROSS

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

## RICHARD HEENAN - CROSS

1 : 17 PM 1 A. Yes, it does.

1 : 17 PM 2 Q. Now, in terms of personnel on a deepwater rig, you agree

1 : 17 PM 3 that having a toolpusher, a driller, and an assistant driller

1 : 17 PM 4 on their tour working in the driller's cabin is consistent with

1 : 17 PM 5 your use of this term "best available and safest technology" to

1 : 17 PM 6 monitor the well?

1 : 17 PM 7 A. Yes.

1 : 17 PM 8 Q. In the driller's cabin, if you have a toolpusher, a

1 : 17 PM 9 driller, and an assistant driller present to watch the well,

1 : 18 PM 10 that's redundancy in terms of your ability to monitor?

1 : 18 PM 11 A. If you have all those three there, yes.

1 : 18 PM 12 Q. And again, having that redundancy is something that

1 : 18 PM 13 demonstrates due care?

1 : 18 PM 14 A. Yes. I agree with that.

1 : 18 PM 15 Q. And if you add to the ability to monitor the well a mud

1 : 18 PM 16 logger, who is separately watching parameters in the well, that

1 : 18 PM 17 is, again, another very good redundant system to have in place?

1 : 18 PM 18 A. Yes.

1 : 18 PM 19 Q. And demonstrates due care?

1 : 18 PM 20 A. Yes.

1 : 18 PM 21 Q. We're not going to go through the details, because, as

1 : 18 PM 22 you've seen, we've spent a lot of time in the trial on

1 : 18 PM 23 training. So I just want to ask you one question so I can get

1 : 18 PM 24 your perspective as an expert. Okay?

1 : 19 PM 25 A. Sure.

## RICHARD HEENAN - CROSS

1:19 PM 1 Q. I'm just telling you, you can relax, I'm not going to go  
1:19 PM 2 through all of the training modules.

1:19 PM 3 But you are aware that the Transocean drilling  
1:19 PM 4 personnel on tour the night of April the 20th had gone through  
1:19 PM 5 well control training?

1:19 PM 6 A. I assumed they had, yes.

1:19 PM 7 Q. In the industry of deepwater drilling and drilling in  
1:19 PM 8 general, you're familiar with the concept of "stop the job" or  
1:19 PM 9 "stop-the-job authority"; correct?

1:19 PM 10 A. Yes. It comes under lots of names; but, yes, I'm familiar  
1:19 PM 11 with it.

1:19 PM 12 Q. And the concept is such that any individual involved in an  
1:19 PM 13 operation, if he sees something that he believes is unsafe or  
1:19 PM 14 potentially unsafe or has an understanding that it could lead  
1:19 PM 15 to a safety issue, he has the authority to stop the job?

1:19 PM 16 A. That's a good summary.

1:19 PM 17 Q. You're aware, are you not, that on the evening of April  
1:19 PM 18 the 20th, there was actually a stop-the-job called during the  
1:19 PM 19 conduct of the first negative test?

1:20 PM 20 A. I hadn't heard it termed that way, but I suppose --

1:20 PM 21 Q. Were you here for Mr. Ezell's testimony?

1:20 PM 22 A. Yes, I was.

1:20 PM 23 Q. Do you remember him saying that the test wasn't lined up  
1:20 PM 24 per the APD, and so he stopped the job; that he talked to the  
1:20 PM 25 crew and said, "Get the test lined up, get the agreement of BP,

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1 and then run the test on the drill pipe"?

2 Do you remember that?

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

5 Q. Compliance with Transocean policy?

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

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

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

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

19 Q. Okay. Fair enough.

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

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

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1 operations?

2 A. Primary, yes.

3 Q. From the time the vessel arrives on-site and begins  
4 drilling until it pulls the BP -- the BOP up and sails off, the  
5 drilling crew has the primary responsibility for monitoring the  
6 well?

7 A. The primary responsibility, yeah.

8 Q. And the person within the system who has that primary  
9 responsibility is the driller?

10 A. Correct.

11 Q. Is that true on the drilling operations that you  
12 participate with up in Canada?

13 A. Yes, it is.

14 Q. When you're in port or traveling, who's watching the well?

15 A. In the hierarchy, if you will, so the driller is watching  
16 it, assuming it is drilling, as you've described; and then, of  
17 course, there's a hierarchy above him. There's several levels  
18 between me and them.

19 Q. But in the operations that you are familiar with and in  
20 the work that you do, it's no different just south of the  
21 Arctic Circle than it is in the Gulf of Mexico: The driller  
22 for the contractor has the primary responsibility for watching  
23 the well?

24 A. The driller has the primary responsibility, and he is  
25 employed by the contractor.

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1 : 2 3 PM 1 Q. Now, the driller's cabin is located right where the rotary  
1 : 2 3 PM 2 table is located for a reason, isn't it?  
1 : 2 3 PM 3 A. I presume you're asking if it's so he can see what's going  
1 : 2 3 PM 4 on?  
1 : 2 3 PM 5 Q. Yes.  
1 : 2 3 PM 6 A. Yes, that's why it's there.  
1 : 2 3 PM 7 Q. Because it's his responsibility to look after the well,  
1 : 2 3 PM 8 physically his office is located right there at the rotary  
1 : 2 3 PM 9 table where the action occurs in terms of drilling operations?  
1 : 2 3 PM 10 A. Certainly some of the action occurs there. There are many  
1 : 2 3 PM 11 other places as well, of course.  
1 : 2 3 PM 12 Q. Sure. Yes.  
1 : 2 3 PM 13 A. But that's the central location.  
1 : 2 3 PM 14 Q. That's the idea.  
1 : 2 3 PM 15 Now, there's been a lot of talk in this case about  
1 : 2 4 PM 16 loss returns. You've probably heard some of it. Loss returns  
1 : 2 4 PM 17 is something you have experienced in drilling, is it not?  
1 : 2 4 PM 18 A. Yes, I have.  
1 : 2 4 PM 19 Q. And loss returns are not unusual in drilling, are they?  
1 : 2 4 PM 20 A. No.  
1 : 2 4 PM 21 Q. Just a couple questions from your perspective as an expert  
1 : 2 4 PM 22 on behalf of the United States.  
1 : 2 4 PM 23 You agree that any time there are indications of a  
1 : 2 4 PM 24 kick, prompt action by the crew is required?  
1 : 2 4 PM 25 A. Yes.

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1:24 PM 1 Q. Part of the purpose of well control training is to detect  
1:24 PM 2 kicks as rapidly and efficiently as possible so that they don't  
1:24 PM 3 turn into blowouts?

1:24 PM 4 A. Yes.

1:24 PM 5 Q. Just because you have a kick doesn't mean you're going to  
1:24 PM 6 have a blowout?

1:24 PM 7 A. No, it does not.

1:24 PM 8 Q. In fact, the entire industry is organized around detecting  
1:24 PM 9 influx of hydrocarbons into the well and getting the well shut  
1:24 PM 10 in before the event turns into a blowout?

1:25 PM 11 A. Well, it's a very important part of the industry, anyway.

1:25 PM 12 Q. And Transocean's policy of giving the driller full  
1:25 PM 13 authority to flow-check or shut in the well as he sees fit is  
1:25 PM 14 an appropriate and within the standard of care policy?

1:25 PM 15 A. It is.

1:25 PM 16 Q. It's what you would expect on a deepwater drilling well?

1:25 PM 17 A. I absolutely would.

1:25 PM 18 Q. Now, it's recognized in the industry, isn't it, that there  
1:25 PM 19 are a number of major causes of kicks?

1:25 PM 20 A. There are -- yes, there are a number of causes.

1:25 PM 21 Q. Okay.

1:25 PM 22 MR. BROCK: Let me see, please, Exhibit 15 --  
1:25 PM 23 1454.45.2, please.

1:25 PM 24 BY MR. BROCK:

1:25 PM 25 Q. I'm just going to show you one section here to get your



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

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

5 Q. Sure.

6 A. (Witness reviews document.)

7 Okay. I see that.

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

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

12 Q. Correct.

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

16 A. One of many, yes.

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

20 A. No.

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

22 **BY MR. BROCK:**

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

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1 want to focus on the language of it.

2 "Well control. One of the more important aspects of  
3 our business and one that we are 100 percent  
4 responsible/accountable for when the . . . hits the fan, is the  
5 drillers/ADs know in their hearts that the toolpusher, OIM,  
6 you, me, Jurgen and on up to Bob Long expects 100 percent,  
7 supports them to SI" -- which would that be shut-in?

8 A. Shut-in, yes.

9 Q. -- "if there are any questions or doubts. Not an area  
10 where we wait to see what the company man wants to do."

11 Do you see that?

12 A. I see that.

13 Q. Does that describe in lay terms the responsibility of the  
14 driller to shut in the well if he has even the slightest doubt?

15 A. It does say exactly that, that the driller has the  
16 responsibility to shut in the well if he has any doubt.

17 It says a couple other things, too. It says one of  
18 the more important aspects of our business, yes, one that we're  
19 100 percent responsible/accountable for. They are accountable  
20 for it, not to the exclusion others.

21 Q. Sure. But in terms of who is primarily responsible for  
22 that, it would be the drilling crew; correct?

23 A. Primarily, as we said, yes.

24 Q. You talked a little bit earlier with counsel for  
25 Halliburton about some of the well control options that are

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1 : 2 9 P M 1 available to the driller in the event of a well control event;  
1 : 2 9 P M 2 correct?

1 : 2 9 P M 3 A. In terms of?

1 : 2 9 P M 4 Q. Well, we talked about the location of the controls for the  
1 : 2 9 P M 5 BOP.

1 : 2 9 P M 6 A. Where the controls are or where they're not is what I  
1 : 2 9 P M 7 think we were talking about, yes.

1 : 2 9 P M 8 Q. And the controls for the BOP are typically in the  
1 : 2 9 P M 9 driller's cabin because the driller is the closest to the  
1 : 2 9 P M 10 operation, both physically and in terms of knowing what's going  
1 : 3 0 P M 11 on, and would enable him to take action if he's called on to do  
1 : 3 0 P M 12 something?

1 : 3 0 P M 13 A. Yes.

1 : 3 0 P M 14 Q. You know that a well site leader on a deepwater drilling  
1 : 3 0 P M 15 rig has many, many responsibilities?

1 : 3 0 P M 16 A. He does.

1 : 3 0 P M 17 Q. And it's not his primary responsibility to watch the well?

1 : 3 0 P M 18 A. He doesn't physically watch the well all the time, no.

1 : 3 0 P M 19 Q. He has to attend meetings; he has to interact with others  
1 : 3 0 P M 20 on the rig; he's responsible for ordering equipment and  
1 : 3 0 P M 21 sequencing equipment that's coming out to the rig and going  
1 : 3 0 P M 22 back; he has to manage people coming to the rig and going back.  
1 : 3 0 P M 23 He has many responsibilities.

1 : 3 0 P M 24 A. He certainly has many responsibilities. Which of those  
1 : 3 0 P M 25 ones you've just described are delegated, I don't know; but he

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1 has many responsibilities.

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

6 A. Correct.

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

11 A. Yes.

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

14 A. Correct, that's another redundancy.

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

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

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

19 A. Yes.

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

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

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

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1 : 3 2 P M 1 A. Potentially, they might be the first ones to notice it.  
1 : 3 2 P M 2 That's what you're asking; right?  
1 : 3 2 P M 3 Q. Yes.  
1 : 3 2 P M 4 A. Yes.  
1 : 3 2 P M 5 Q. And if they do, in the context of the way the contractors  
1 : 3 2 P M 6 are organized, communicate with one another, what does the mud  
1 : 3 2 P M 7 logger do if he detects a kick?  
1 : 3 2 P M 8 A. He would call the driller if he saw a kick indication.  
1 : 3 2 P M 9 Q. He doesn't have the ability to actually run the devices  
1 : 3 2 P M 10 that would shut in the well, but he would be obligated to pick  
1 : 3 2 P M 11 up the phone quickly and call the driller to see if the driller  
1 : 3 2 P M 12 had noticed it or, if not, to bring it to his attention?  
1 : 3 3 P M 13 A. He has two parts. Yes, he doesn't have the controls; but  
1 : 3 3 P M 14 he does have the obligation to contact the driller.  
1 : 3 3 P M 15 Q. I haven't used that term yet today, but let me just see if  
1 : 3 3 P M 16 you agree with this. Do you agree that well control is a team  
1 : 3 3 P M 17 sport?  
1 : 3 3 P M 18 A. Yeah, I don't think it's a sport, but it is a team  
1 : 3 3 P M 19 operation.  
1 : 3 3 P M 20 Q. That's fair enough. I'll rephrase it.  
1 : 3 3 P M 21 You agree that well control is a team operation?  
1 : 3 3 P M 22 A. Yes.  
1 : 3 3 P M 23 Q. And you need good communication between your drilling crew  
1 : 3 3 P M 24 and your mud logger?  
1 : 3 3 P M 25 A. Yes.

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

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1 : 3 5 P M 1 A. That difference is not critical.

1 : 3 5 P M 2 Q. Correct.

1 : 3 5 P M 3 But you say: "Whatever the exact time, the pumps  
1 : 3 5 P M 4 were slowed at 2052."

1 : 3 5 P M 5 A. Correct.

1 : 3 5 P M 6 Q. Do you see that?

1 : 3 5 P M 7 "Displacement continued as formation fluids began to  
1 : 3 5 P M 8 enter the wellbore." Do you see that?

1 : 3 5 P M 9 A. Yes, I do.

1 : 3 5 P M 10 Q. So your opinion is that the well was flowing at 2052?

1 : 3 5 P M 11 A. The modeling done by both parties says that, and I have no  
1 : 3 5 P M 12 ability to dispute it or no desire to dispute it.

1 : 3 5 P M 13 Q. Okay. Now, let's look at 7528.20.2. Now we're moving to  
1 : 3 6 P M 14 this period of time of 2108 -- 2101 to 2108. Are we on the  
1 : 3 6 P M 15 same page?

1 : 3 6 P M 16 A. Yes, I think so.

1 : 3 6 P M 17 Q. "Circulation continued at a further reduced rate." Do you  
1 : 3 6 P M 18 see that?

1 : 3 6 P M 19 A. Yes.

1 : 3 6 P M 20 Q. Does that mean they slowed the pumps again?

1 : 3 6 P M 21 A. Yes.

1 : 3 6 P M 22 Q. "During all this time, the mud in the annulus, at  
1 : 3 6 P M 23 approximately 14 pounds per gallon, was being replaced with  
1 : 3 6 P M 24 8.6 pounds per gallon seawater. If all other parameters were  
1 : 3 6 P M 25 constant, the drill pipe or standpipe pressure" -- and then you

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

2 Do you see that?

3 A. Yes.

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

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

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

17 A. Correct.

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

19 BY MR. BROCK:

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

22 A. Okay.

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



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1 : 3 7 P M 1 A. Okay.

1 : 3 7 P M 2 Q. And you might see here that I've put the bullet point you

1 : 3 7 P M 3 and I have just talked about, flow starts at 2052.

1 : 3 7 P M 4 Then over a period of time, 2101 to 2108, we see a

1 : 3 8 P M 5 100 psi increase with the pumps at a constant rate. Do you see

1 : 3 8 P M 6 that?

1 : 3 8 P M 7 A. Yes.

1 : 3 8 P M 8 Q. That's what you referred to as "reversing trend"?

1 : 3 8 P M 9 A. Yes. You can see earlier on, it's going down.

1 : 3 8 P M 10 Q. Correct. Correct.

1 : 3 8 P M 11 When you say you can see earlier that it's going

1 : 3 8 P M 12 down, if you see where the arrow is, just as you enter the 2052

1 : 3 8 P M 13 period, it's just level or maybe slightly descending?

1 : 3 8 P M 14 A. Yes. And prior to that, at the higher rate, it's more

1 : 3 8 P M 15 noticeable.

1 : 3 8 P M 16 Q. When you're pumping at a higher rate back in the period of

1 : 3 8 P M 17 time, say, around 2015 to 2045, you see decreasing -- decreases

1 : 3 8 P M 18 occurring there?

1 : 3 8 P M 19 A. Exactly.

1 : 3 8 P M 20 Q. All right. Now, let's look at 7528.20.3. And just a

1 : 3 9 P M 21 couple of questions on this before I ask you about it. I'll

1 : 3 9 P M 22 give you a chance to read it, so you don't have to do two

1 : 3 9 P M 23 things at once.

1 : 3 9 P M 24 Do you want to read it first, and then I'll ask you a

1 : 3 9 P M 25 question?

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1:39 PM 1 A. Just the highlighted section?

1:39 PM 2 Q. That's fine.

1:39 PM 3 A. (Witness reviews document.)

1:39 PM 4 Okay.

1:39 PM 5 Q. Okay. As you've testified to earlier today, there's no

1:39 PM 6 way for us to know, unfortunately, at this point in time

1:39 PM 7 precisely what the men in the drill shack were looking at in

1:39 PM 8 the hour or so before the unfortunate blowout; correct?

1:39 PM 9 A. Correct, you can't tell exactly what they were watching.

1:39 PM 10 Q. But you have been able to say, as an expert to the Court

1:39 PM 11 through your report and today, what they should have seen?

1:40 PM 12 A. Correct.

1:40 PM 13 Q. Now, you went back and looked at scales that were proposed

1:40 PM 14 by Transocean, and you also looked at the Sperry-Sun mud

1:40 PM 15 logging chart; correct?

1:40 PM 16 A. Correct.

1:40 PM 17 Q. And then if we look at this, it reflects precisely what

1:40 PM 18 I've just said: "As stated by Transocean, scales selected

1:40 PM 19 determine how obvious the trend is, but the increasing trend is

1:40 PM 20 apparent on the full scale 0 to 7500 psi, HITEC display

1:40 PM 21 proposed by Transocean."

1:40 PM 22 Do you see that?

1:40 PM 23 A. I see. That.

1:40 PM 24 Q. So what you're conveying there is even on the scale

1:40 PM 25 proposed by Transocean, you see this as evidence that would

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1 : 4 0 P M 1 have been observed by a diligent crew?

1 : 4 0 P M 2 A. Yes, sir.

1 : 4 1 P M 3 Q. Now, you agree that the pressure increase from 2101 to

1 : 4 1 P M 4 2108 was most likely due to an influx from the formation?

1 : 4 1 P M 5 A. Yes.

1 : 4 1 P M 6 Q. Let's look at 7528.21.2.

1 : 4 1 P M 7 Is this the paragraph where you give your explanation

1 : 4 1 P M 8 for how -- for what was happening during that period of time?

1 : 4 1 P M 9 A. Yes, I believe that's right. Without fitting it all into

1 : 4 1 P M 10 context, I believe that's correct.

1 : 4 1 P M 11 Q. Correct.

1 : 4 1 P M 12 This is what you were describing as the indication of

1 : 4 1 P M 13 a kick?

1 : 4 1 P M 14 A. Yes, the increase in pressure.

1 : 4 2 P M 15 Q. Yes.

1 : 4 2 P M 16 And let's look at 7528.21.3, please.

1 : 4 2 P M 17 And you note here, in fairness, that there are other

1 : 4 2 P M 18 possible explanations for the pressure changes. And I think

1 : 4 2 P M 19 what you're saying is: If you were sitting there at the time,

1 : 4 2 P M 20 if you didn't have the benefit of retrospect, which we have

1 : 4 2 P M 21 now, but if you're sitting in the chair at the time, there

1 : 4 2 P M 22 might be other explanations for the changes. A partial

1 : 4 2 P M 23 plugging of a drill string during circulation might be one of

1 : 4 2 P M 24 those things; right?

1 : 4 2 P M 25 A. Yes, there might be.

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1 : 4 2 P M 1 Q. In retrospect, we know the well was flowing?

1 : 4 2 P M 2 A. Yes.

1 : 4 2 P M 3 Q. But you say: "Whether these are correct, credible, or  
1 : 4 2 P M 4 likely is ultimately not really the question. The anomalies  
1 : 4 2 P M 5 needed to be investigated."  
1 : 4 2 P M 6 Correct?

1 : 4 2 P M 7 A. Correct.

1 : 4 2 P M 8 Q. "The standard of care required investigation of this  
1 : 4 2 P M 9 anomaly at 2101 to 2108 by the Transocean drill crew."  
1 : 4 3 P M 10 A. Yes.

1 : 4 3 P M 11 Q. "As well as by the Sperry-Sun mud logger."  
1 : 4 3 P M 12 A. Whoever noticed them.

1 : 4 3 P M 13 Q. Well, you understand that the Sperry-Sun group was  
1 : 4 3 P M 14 actually monitoring the well at the same time?  
1 : 4 3 P M 15 A. Whether they're watching at that moment, I don't know; but  
1 : 4 3 P M 16 they were on tour, as it were.

1 : 4 3 P M 17 Q. "And if on tour and watching, as they were required to be,  
1 : 4 3 P M 18 this is something that they should have noticed and reported."  
1 : 4 3 P M 19 A. Yes.

1 : 4 3 P M 20 Q. And you make the note that: "Tragically, the personnel  
1 : 4 3 P M 21 involved either did not notice the change that they should have  
1 : 4 3 P M 22 recognized or they didn't realize its significance."  
1 : 4 3 P M 23 A. Yes.

1 : 4 3 P M 24 Q. An investigation at this point in time, in the period of  
1 : 4 3 P M 25 time 2101 to 2108, would have been -- one of the techniques

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1 : 4 4 P M 1 that could have been used would have been a flow check?

1 : 4 4 P M 2 A. Yes.

1 : 4 4 P M 3 Q. And as you've described earlier, that's something that can

1 : 4 4 P M 4 be accomplished quickly?

1 : 4 4 P M 5 A. Yes. You can do the initial quickly; and if it's obvious

1 : 4 4 P M 6 it's flowing, it's obvious very quickly. If it's subtler, it

1 : 4 4 P M 7 takes longer.

1 : 4 4 P M 8 Q. So what you would have to do at 2101 to 2108 to do a flow

1 : 4 4 P M 9 check, would be -- you would need to shut the pumps down?

1 : 4 4 P M 10 A. Correct.

1 : 4 4 P M 11 Q. And once you shut the pumps down, the well should be

1 : 4 4 P M 12 static?

1 : 4 4 P M 13 A. Exactly.

1 : 4 4 P M 14 Q. And that happens quickly?

1 : 4 4 P M 15 A. Especially in cases like this.

1 : 4 4 P M 16 Q. And then you would ask someone to visually inspect for

1 : 4 4 P M 17 flow by calling down to the pits, or the driller or assistant

1 : 4 4 P M 18 driller could do it themselves?

1 : 4 4 P M 19 A. The proper -- you'd certainly call someone to look, and

1 : 4 4 P M 20 exactly how the driller and assistant driller were configured

1 : 4 4 P M 21 for telemetry and information is -- there's some debate about

1 : 4 5 P M 22 that.

1 : 4 5 P M 23 Q. But in any event, your view would be that a flow check

1 : 4 5 P M 24 should have been conducted at this point; and if it had been,

1 : 4 5 P M 25 flow would have been recognized?

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1 : 4 5 P M 1 A. Yes.

1 : 4 5 P M 2 Q. And this accident would have been avoided?

1 : 4 5 P M 3 A. Presumably.

1 : 4 5 P M 4 Q. Now, let's go to the next period of time, briefly.

1 : 4 5 P M 5 During the period of time 2108 to 2114, there was an

1 : 4 5 P M 6 operation on the rig that called for the pumps to be shut down?

1 : 4 5 P M 7 A. That's the time of the machine test, I believe?

1 : 4 5 P M 8 Q. Yes.

1 : 4 5 P M 9 A. Yes.

1 : 4 5 P M 10 Q. And the reason that you'd shut the pumps down is you

1 : 4 5 P M 11 actually have to determine where the fluids are in terms of

1 : 4 5 P M 12 what's coming back?

1 : 4 5 P M 13 A. Yes. Specifically you want to confirm that the fluids

1 : 4 5 P M 14 you're about to get back can be dumped overboard.

1 : 4 5 P M 15 Q. So if you've got the water-based materials that are coming

1 : 4 5 P M 16 back, then it's appropriate, from an environmental standpoint,

1 : 4 5 P M 17 to pump those overboard?

1 : 4 5 P M 18 A. Exactly.

1 : 4 6 P M 19 Q. Again, as we were saying a minute ago, when the pumps are

1 : 4 6 P M 20 shut down, there should be no flow?

1 : 4 6 P M 21 A. Correct.

1 : 4 6 P M 22 Q. Because if you're not pumping down into the hole with

1 : 4 6 P M 23 materials, nothing should be coming back; the well should be

1 : 4 6 P M 24 static?

1 : 4 6 P M 25 A. Yes.

## RICHARD HEENAN - CROSS

1 : 4 6 P M 1 Q. Unless there's a problem?

1 : 4 6 P M 2 A. Unless there's a problem.

1 : 4 6 P M 3 Q. Now, during this period of time with the pumps off, flow

1 : 4 6 P M 4 continued, and you had a significant increase of drill pipe

1 : 4 6 P M 5 pressure; correct?

1 : 4 6 P M 6 A. Correct.

1 : 4 6 P M 7 Q. Let's look at 7528.21.7. I'm not going to go through the

1 : 4 6 P M 8 whole note, just to make one point.

1 : 4 6 P M 9 At 2108, the pumps were shut off to allow a sheen

1 : 4 7 P M 10 test to be performed on the returning fluid prior to the

1 : 4 7 P M 11 returns being pumped overboard. 2108 to 2114, the drill pipe

1 : 4 7 P M 12 pressure increased from 1,017 to 1,263. And then you make the

1 : 4 7 P M 13 note: "With the pumps off."

1 : 4 7 P M 14 Correct?

1 : 4 7 P M 15 A. Correct.

1 : 4 7 P M 16 Q. And you call that a "disturbing trend"?

1 : 4 7 P M 17 A. Yes.

1 : 4 7 P M 18 Q. Why is that?

1 : 4 7 P M 19 A. Because they -- with the pumps shut off, the pressure

1 : 4 7 P M 20 should be constant. We talked earlier on, with it

1 : 4 7 P M 21 circulating -- about trends -- sometimes they're clear and

1 : 4 7 P M 22 sometimes they're not; but this one is absolutely clear.

1 : 4 7 P M 23 Q. And you say that: "This disturbing trend is visible not

1 : 4 7 P M 24 only on the BP reconstructed data" -- and you picked that up

1 : 4 7 P M 25 out of the Bly report; correct?

## RICHARD HEENAN - CROSS

1 : 4 7 P M 1 A. Correct.

1 : 4 7 P M 2 Q. -- "but also in the Transocean interpretation" -- it

1 : 4 7 P M 3 appears in their report; correct?

1 : 4 7 P M 4 A. I'm sure that's the reference.

1 : 4 7 P M 5 Q. Yes.

1 : 4 7 P M 6 And on the Sperry chart that you had access to?

1 : 4 8 P M 7 A. Yes.

1 : 4 8 P M 8 Q. And you say that: "This was very significant and an

1 : 4 8 P M 9 almost certain indicator of a kick."

1 : 4 8 P M 10 A. I couldn't imagine anything else it would be.

1 : 4 8 P M 11 Q. And from your perspective, this was an event that occurred

1 : 4 8 P M 12 that demanded immediate investigation?

1 : 4 8 P M 13 A. Yes.

1 : 4 8 P M 14 Q. And an immediate investigation, just like earlier, would

1 : 4 8 P M 15 have reflected that the well was flowing?

1 : 4 8 P M 16 A. Yes.

1 : 4 8 P M 17 Q. And this one is not even close, is it?

1 : 4 8 P M 18 A. Close?

1 : 4 8 P M 19 Q. In terms of the indication that you have from the data

1 : 4 8 P M 20 that you have a kick?

1 : 4 8 P M 21 A. This is a very strong indicator of a kick; and the next

1 : 4 8 P M 22 step, the flow check, would have been conclusive.

1 : 4 8 P M 23 Q. And there's still time to conduct that flow check and shut

1 : 4 8 P M 24 in the well before there's any damage or injury to persons or

1 : 4 8 P M 25 property?



## RICHARD HEENAN - CROSS

1:48 PM 1 A. Yes. I think the fluids are estimated to come above the  
1:48 PM 2 BOP about 2130, if I recall.

1:49 PM 3 Q. Correct.

1:49 PM 4 So let me just show you briefly D-4320, please.

1:49 PM 5 You see here I have in the yellow box: "With the  
1:49 PM 6 pumps off, flow continued and drill pipe pressure increases by  
1:49 PM 7 over 250 psi."

1:49 PM 8 A. Yes.

1:49 PM 9 Q. Is that the anomaly that we have just been discussing?

1:49 PM 10 A. That is the one, yes. Yes, I believe -- yeah, the pumps  
1:49 PM 11 are off, yeah.

1:49 PM 12 THE COURT: What time is that? 2108?

1:49 PM 13 MR. BROCK: 2108 to 2114.

1:49 PM 14 THE COURT: Okay.

1:49 PM 15 MR. BROCK: The pumps go down at 2108 and then stay  
1:49 PM 16 down during that period of time.

1:49 PM 17 THE COURT: All right.

1:49 PM 18 BY MR. BROCK:

1:49 PM 19 Q. Given the displacement that was taking place during that  
1:50 PM 20 period of time, again, is that a period during which you would  
1:50 PM 21 expect the drill pipe pressure to be decreasing?

1:50 PM 22 A. 2108 to 2115?

1:50 PM 23 Q. Yes.

1:50 PM 24 A. No, the pressure should be constant because the pumps  
1:50 PM 25 aren't running.

## RICHARD HEENAN - CROSS

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

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1 : 5 1 P M 1 have an anomalous event like this is not a well control step?

1 : 5 1 P M 2 A. It's not well control action.

1 : 5 1 P M 3 Q. Did you look at the modeling of the influx of hydrocarbons

1 : 5 1 P M 4 in terms of where gas was in the well and when it reached the

1 : 5 1 P M 5 riser? Was that one of the things that you did as part of your

1 : 5 2 P M 6 look at this case?

1 : 5 2 P M 7 A. I didn't do any of the modeling myself.

1 : 5 2 P M 8 Q. What I'm asking you is: Did you go back and look at the

1 : 5 2 P M 9 work of Morten Emilsen and ADD Energy and the language that was

1 : 5 2 P M 10 input into the Bly report?

1 : 5 2 P M 11 A. I looked at the summary, for want of a better word -- this

1 : 5 2 P M 12 is the OLGA modeling; correct?

1 : 5 2 P M 13 Q. Yes.

1 : 5 2 P M 14 A. Okay. So I looked in the body of the report, the

1 : 5 2 P M 15 interpretations of flow described as -- from OLGA modeling. I

1 : 5 2 P M 16 didn't go into the stuff behind it.

1 : 5 2 P M 17 Q. The reason I'm asking, I'm just asking: Can you confirm

1 : 5 2 P M 18 that at 2131, from the time lines that you looked at, that

1 : 5 2 P M 19 there was approximately 300 barrels of hydrocarbon influx by

1 : 5 2 P M 20 that point in time?

1 : 5 2 P M 21 A. I don't remember the exact time or volume, but that's the

1 : 5 2 P M 22 right order of magnitude and time scale.

1 : 5 2 P M 23 Q. At 2131, you have a massive kick underway, don't you?

1 : 5 2 P M 24 A. 300 barrels is a pretty massive kick.

1 : 5 3 P M 25 Q. And it's still undetected?

## RICHARD HEENAN - CROSS

1 : 5 3 P M 1 A. And it's getting worse.

1 : 5 3 P M 2 Q. And even though the pumps were shut down for ten minutes,

1 : 5 3 P M 3 there was no indication that a flow check was done?

1 : 5 3 P M 4 A. No, not as far as I'm aware.

1 : 5 3 P M 5 Q. You agree that the responsibility for detecting these

1 : 5 3 P M 6 anomalies that we've talked about is equally divided between

1 : 5 3 P M 7 Sperry-Sun, the mud logger, and the Transocean drilling crew;

1 : 5 3 P M 8 correct?

1 : 5 3 P M 9 A. I'd prefer not to say "divided." I say either one is

1 : 5 3 P M 10 responsible. I don't think you can divide that responsibility.

1 : 5 3 P M 11 Q. All right. You would say either one is responsible for

1 : 5 3 P M 12 detecting this kick and taking appropriate action to get the

1 : 5 3 P M 13 well shut in?

1 : 5 3 P M 14 A. Detecting the kick, appropriate action, of course, is

1 : 5 3 P M 15 physically done by the drilling crew.

1 : 5 3 P M 16 Q. Sure. For Sperry-Sun, it would be a call for

1 : 5 4 P M 17 notification. For Transocean, it would be to shut in the well

1 : 5 4 P M 18 immediately?

1 : 5 4 P M 19 A. It would be to perform the flow check followed by a

1 : 5 4 P M 20 shut-in.

1 : 5 4 P M 21 Q. And you've already discussed that, I won't go back into

1 : 5 4 P M 22 it. Thank you.

1 : 5 4 P M 23 Do you agree that if the parameters available to the

1 : 5 4 P M 24 rig crew and the mud loggers had been observed, interpreted

1 : 5 4 P M 25 correctly, and acted upon, the events of April 20th would have

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1 : 5 4 P M 1 been avoided?

1 : 5 4 P M 2 A. Yes.

1 : 5 4 P M 3 Q. Now, you were asked some questions -- I'm turning to  
1 : 5 4 P M 4 another subject now. Thank you for that.

1 : 5 4 P M 5 You were asked some questions earlier about different  
1 : 5 4 P M 6 operations that were going on on the rig. I want to just ask  
1 : 5 4 P M 7 you a couple of questions in terms of your knowledge base.

1 : 5 4 P M 8 Are you aware that the Halliburton mud logger, Joseph  
1 : 5 4 P M 9 Keith, testified in deposition that there was nothing unusual  
1 : 5 4 P M 10 about the activities that took place on the afternoon and  
1 : 5 4 P M 11 evening of April 20th?

1 : 5 4 P M 12 A. I believe that's what he said.

1 : 5 5 P M 13 Q. Would it be correct on the afternoon and evening of  
1 : 5 5 P M 14 April 20th that both Transocean and Halliburton had the ability  
1 : 5 5 P M 15 to conduct a manual flow check at any time?

1 : 5 5 P M 16 A. Transocean would have had the ability to conduct that flow  
1 : 5 5 P M 17 check. And you said Halliburton?

1 : 5 5 P M 18 Q. Yes. I'm talking about through Sperry-Sun.

1 : 5 5 P M 19 A. Right. Not on their own because they don't have the  
1 : 5 5 P M 20 ability to shut in the pumps.

1 : 5 5 P M 21 Q. Okay. With the pumps shut down, with knowledge that the  
1 : 5 5 P M 22 pumps were shut down, would the Sperry-Sun mud logger know how  
1 : 5 5 P M 23 to conduct a flow check?

1 : 5 5 P M 24 A. Yes, he would know how. Whether he would be able would  
1 : 5 5 P M 25 depend on the lineup.

## RICHARD HEENAN - CROSS

1:55 PM 1 Q. Well, there are a couple ways to check for flow. One is  
1:55 PM 2 to check a camera; another one is to go and look?

1:55 PM 3 A. Correct. Those are the two ways.

1:55 PM 4 Q. So in terms of a visual flow check -- that is, This is  
1:56 PM 5 serious, I'm going to send someone to look to see if there is  
1:56 PM 6 flow at the different places where that can be detected -- the  
1:56 PM 7 Sperry-Sun mud logger could conduct a visual flow check?

1:56 PM 8 A. I don't think that's an accurate characterization. I  
1:56 PM 9 don't think he would -- it would be appropriate for him to  
1:56 PM 10 leave his mud logging cabin and run down and look.

1:56 PM 11 Q. So in your view, he would be limited to what he could pick  
1:56 PM 12 up on his monitor?

1:56 PM 13 A. On his data, yes.

1:56 PM 14 Q. And there's just some dispute about whether he would have  
1:56 PM 15 access to both the Sperry-Sun information as well as the  
1:56 PM 16 Transocean HITEC information?

1:56 PM 17 A. Yes, I don't have an answer. I looked and I couldn't find  
1:56 PM 18 a conclusive answer either way.

1:56 PM 19 Q. You were not aware of any testimony from any witness in  
1:56 PM 20 this case who says that they could not do their job because of  
1:57 PM 21 simultaneous operations that were taking place on the night of  
1:57 PM 22 April the 20th?

1:57 PM 23 A. I don't recall any testimony in that regard.

1:57 PM 24 Q. In fact, Joe Keith testified that there were no activities  
1:57 PM 25 that were going on on the rig that he felt like affected his

## RICHARD HEENAN - CROSS

1 : 5 7 P M 1 ability to consistently and accurately monitor the well;  
1 : 5 7 P M 2 correct?  
1 : 5 7 P M 3 A. He did say that. Yes, I was surprised.  
1 : 5 7 P M 4 Q. And why is that?  
1 : 5 7 P M 5 A. Because with the open circuit system I referred to, the  
1 : 5 7 P M 6 non-closed loop, I would think that would affect his ability.  
1 : 5 7 P M 7 Q. But at least from his point of view, in terms of his  
1 : 5 7 P M 8 understanding of what was going on that evening -- he was  
1 : 5 7 P M 9 there; you, obviously, were not -- you understand that his  
1 : 5 7 P M 10 testimony is there was nothing that interfered with his ability  
1 : 5 7 P M 11 to consistently and accurately monitor the well?  
1 : 5 7 P M 12 A. I understand he testified to that fact; and, no, I was not  
1 : 5 8 P M 13 there.  
1 : 5 8 P M 14 Q. All right. I want to talk just a little bit about  
1 : 5 8 P M 15 negative pressure tests in general. Okay?  
1 : 5 8 P M 16 You're not aware of a law or a code provision in  
1 : 5 8 P M 17 Canada or the United States that required a negative pressure  
1 : 5 8 P M 18 test on April the 20th, 2010; correct?  
1 : 5 8 P M 19 A. The law doesn't require one, per se, that I'm aware of,  
1 : 5 8 P M 20 but once it's been put into the program -- and the law's the  
1 : 5 8 P M 21 same in both jurisdictions, I believe. Once it's in the  
1 : 5 8 P M 22 program, it is now implicitly required, if you will.  
1 : 5 8 P M 23 Q. See if you can just focus on my question. Thank you for  
1 : 5 8 P M 24 that.  
1 : 5 8 P M 25 There is no free-standing law or regulation that

## RICHARD HEENAN - CROSS

1 : 5 8 P M 1 requires the conduct of a negative test as part of a temporary  
1 : 5 8 P M 2 abandonment procedure; true?

1 : 5 9 P M 3 A. No, there's not.

1 : 5 9 P M 4 Q. You're not aware of any textbook that addressed negative  
1 : 5 9 P M 5 pressure tests that was in print prior to April 20th, 2010?

1 : 5 9 P M 6 A. I'm not aware of one, no.

1 : 5 9 P M 7 Q. You weren't aware of any published papers or peer-reviewed  
1 : 5 9 P M 8 articles from the drilling community concerning the proper way  
1 : 5 9 P M 9 to conduct a negative test prior to April 20th, 2010?

1 : 5 9 P M 10 A. I'm not aware of any.

1 : 5 9 P M 11 Q. Have you seen many times, in terms of instructions that  
1 : 5 9 P M 12 are given to drilling crews about negative tests, that the  
1 : 5 9 P M 13 instruction would be something as simple as, "Conduct a  
1 : 5 9 P M 14 negative test"?

1 : 5 9 P M 15 A. Occasionally I've seen instructions that look like that,  
1 : 5 9 P M 16 yes.

1 : 5 9 P M 17 Q. You're aware that there were no IADC guidances on how to  
1 : 5 9 P M 18 conduct a negative test prior to April 20th, 2010?

1 : 5 9 P M 19 A. That's my belief.

1 : 5 9 P M 20 Q. You know who SPE is?

1 : 5 9 P M 21 A. I do.

2 : 0 0 P M 22 Q. I'm asking because I can't remember.

2 : 0 0 P M 23 A. Society of Petroleum Engineers.

2 : 0 0 P M 24 Q. Right. Thank you.

2 : 0 0 P M 25 You're not aware of any guidance that they have on



## RICHARD HEENAN - CROSS

2:00 PM 1 how to conduct a negative test?

2:00 PM 2 A. I'm not aware of any.

2:00 PM 3 Q. Same for the Canadian Association of Petroleum Producers?

2:00 PM 4 A. Same thing.

2:00 PM 5 Q. You're a member of that group?

2:00 PM 6 A. I am.

2:00 PM 7 Q. They do not have a procedure for that?

2:00 PM 8 A. They do not.

2:00 PM 9 Q. When you teach your courses, you don't include a  
2:00 PM 10 presentation on how to conduct a negative test?

2:00 PM 11 A. I don't, but they're very basic courses, as we've covered.

2:00 PM 12 Q. You personally have not seen any written policy from  
2:00 PM 13 operators prior to April 20th with respect to how to conduct a  
2:00 PM 14 negative test?

2:00 PM 15 A. I don't believe I have.

2:00 PM 16 Q. You cannot identify an industry-accepted procedure for  
2:00 PM 17 conducting a negative test that was in existence prior to  
2:00 PM 18 April 20th, 2010?

2:00 PM 19 A. I cannot.

2:01 PM 20 Q. Now, you shared with us that negative tests that you have  
2:01 PM 21 been involved in commonly involve two steps.

2:01 PM 22 A. I'm missing what you're saying.

2:01 PM 23 Q. Yeah. Let me rephrase the question. That probably wasn't  
2:01 PM 24 a good one.

2:01 PM 25 The negative tests that you have supervised or been

## RICHARD HEENAN - CROSS

2:01PM 1 involved with in your operation consist of two steps, displace  
2 the well with water and check for flow?  
2:01PM 3 A. I described that as a general test, I believe, process.  
2:01PM 4 Q. The negative pressure tests you have supervised or been  
2:01PM 5 involved in in your operations consist of two steps, displace  
2:01PM 6 the well with water, check for flow?  
2:01PM 7 A. Okay. I guess I took that out of context. I understand  
2:01PM 8 what you're saying.  
2:01PM 9 Yes.  
2:01PM 10 Q. That's true, isn't it?  
2:01PM 11 A. Yes.  
2:01PM 12 Q. You did some work with MGM Energy?  
2:01PM 13 A. Yes.  
2:01PM 14 Q. What was your role there?  
2:02PM 15 A. I'm their drilling manager.  
2:02PM 16 Q. Is that still true today?  
2:02PM 17 A. Yes.  
2:02PM 18 Q. The drilling that you're doing just south of the Circle,  
2:02PM 19 is that who you're working with?  
2:02PM 20 A. That's also for MGM.  
2:02PM 21 Q. When we took your deposition, other than the two-step  
2:02PM 22 negative test that we've just described, that's all you had?  
2:02PM 23 A. You mean is that all that we --  
2:02PM 24 Q. For the negative test?  
2:02PM 25 A. That's all that we -- that's the process, yes.

## RICHARD HEENAN - CROSS

2 : 0 2 P M 1 Q. You've done some work for Paramount also, haven't you?

2 : 0 2 P M 2 A. Yes.

2 : 0 2 P M 3 Q. What are they? What do they do?

2 : 0 2 P M 4 A. They're also an oil company.

2 : 0 2 P M 5 Q. And you don't think they have a written negative pressure

2 : 0 2 P M 6 test procedure?

2 : 0 2 P M 7 A. I don't believe they do, but I should clarify that the

2 : 0 2 P M 8 process that we use is a little different.

2 : 0 2 P M 9 Q. I'm sorry. Say that again.

2 : 0 2 P M 10 A. The process -- the cementing process is somewhat different

2 : 0 2 P M 11 than they're doing, so it's not 100 percent applicable.

2 : 0 2 P M 12 Q. I'm just asking about your experience with negative tests.

2 : 0 2 P M 13 Have I accurately described it?

2 : 0 2 P M 14 A. Yes.

2 : 0 2 P M 15 Q. Now, you agree that a drilling engineer can design an

2 : 0 3 P M 16 appropriate negative test without a written policy or guidance?

2 : 0 3 P M 17 A. Yes, I believe you could.

2 : 0 3 P M 18 MR. BROCK: Just one second. I apologize.

2 : 0 3 P M 19 BY MR. BROCK:

2 : 0 3 P M 20 Q. Shifting gears just for a second to the temporary

2 : 0 3 P M 21 abandonment procedures that were in place in that period of

2 : 0 4 P M 22 time, April 12th to 16th.

2 : 0 4 P M 23 Do you remember there was a chart put up that laid

2 : 0 4 P M 24 out the provisions of your reports --

2 : 0 4 P M 25 A. The various different programs, yes.

## RICHARD HEENAN - CROSS

2 : 0 4 P M 1 Q. Yes. Yes.

2 : 0 4 P M 2 A. Yes.

2 : 0 4 P M 3 Q. It's true, is it not, that some of the documents that you

2 : 0 4 P M 4 were shown were the back-and-forths that were taking place

2 : 0 4 P M 5 between BP engineers onshore and the BP well site leaders on

2 : 0 4 P M 6 the rig; correct?

2 : 0 4 P M 7 A. I believe that's correct, yes.

2 : 0 4 P M 8 Q. And that's a good way to go about formulating a final

2 : 0 4 P M 9 procedure, isn't it?

2 : 0 4 P M 10 A. It's a good way to seek additional input.

2 : 0 4 P M 11 Q. Because at the BP office onshore, there's an engineering

2 : 0 4 P M 12 capability that's not present on the rig; correct?

2 : 0 4 P M 13 A. Correct.

2 : 0 4 P M 14 Q. And on the rig, there's an awareness and knowledge of

2 : 0 4 P M 15 operations and what equipment is available on the rig that also

2 : 0 4 P M 16 should be input to the final temporary abandonment procedure?

2 : 0 4 P M 17 A. That seems true, yes.

2 : 0 5 P M 18 Q. Yeah. So coordination and the back-and-forth is a good

2 : 0 5 P M 19 thing?

2 : 0 5 P M 20 A. Coordination is a good thing, yes.

2 : 0 5 P M 21 Q. It's not sinister that there was back-and-forth and drafts

2 : 0 5 P M 22 going on in terms of what the temporary abandonment plan would

2 : 0 5 P M 23 be?

2 : 0 5 P M 24 A. I would not characterize it as sinister, no.

2 : 0 5 P M 25 Q. You're not aware of any Transocean *Deepwater Horizon*

## RICHARD HEENAN - CROSS

2:05 PM 1 personnel who claimed after the accident that they didn't  
2:05 PM 2 understand how to conduct a negative test, do you?

2:05 PM 3 A. I haven't heard that.

2:05 PM 4 Q. You haven't read any notes where anyone has said, We  
2:05 PM 5 didn't know what was going on, we didn't know how to conduct  
2:05 PM 6 the test?

2:05 PM 7 A. I didn't see anything like that, no.

2:05 PM 8 Q. You have expressed that you believe that Transocean  
2:06 PM 9 breached the standard of care grossly -- strike that.

2:06 PM 10 You said that Transocean breached the standard of  
2:06 PM 11 care in terms of the interpretation of the negative test on the  
2:06 PM 12 evening of the 20th?

2:06 PM 13 A. I believe I said Transocean and BP.

2:06 PM 14 Q. Yes.

2:06 PM 15 Others have focused on BP; I'm going to focus on  
2:06 PM 16 Transocean.

2:06 PM 17 A. Okay. Fair enough.

2:06 PM 18 Q. For Transocean, you would expect that the men who were  
2:06 PM 19 there interacting with BP about the interpretation of the test  
2:06 PM 20 would understand the significance of the drill pipe pressure  
2:06 PM 21 that was being seen while the test was being conducted on the  
2:06 PM 22 kill line?

2:06 PM 23 A. Yes, I would expect that.

2:06 PM 24 Q. Now, I want to focus on the negative pressure test that  
2:06 PM 25 was utilized at the Macondo well.

## RICHARD HEENAN - CROSS

2 : 0 7 P M 1 MR. BROCK: If we could bring up Exhibit 97.1.1,  
2 : 0 7 P M 2 please.  
2 : 0 7 P M 3 BY MR. BROCK:  
2 : 0 7 P M 4 Q. Do you see that this is the April 20th Brian Morel note to  
2 : 0 7 P M 5 Don Vidrine, Bob Kaluza, Lee Lambert, and others?  
2 : 0 7 P M 6 A. Yes.  
2 : 0 7 P M 7 Q. And you have looked at this ops note for the final  
2 : 0 7 P M 8 negative pressure test procedure that was utilized at the  
2 : 0 7 P M 9 Macondo well; correct?  
2 : 0 7 P M 10 A. I think this is the final one.  
2 : 0 7 P M 11 Q. Yes.  
2 : 0 7 P M 12 A. Yes.  
2 : 0 7 P M 13 Q. And you agree that this ops note reflects good oil field  
2 : 0 7 P M 14 practice?  
2 : 0 7 P M 15 A. As written, yes.  
2 : 0 7 P M 16 Q. You would agree that this negative pressure test, as  
2 : 0 7 P M 17 written here, would reflect good practice?  
2 : 0 8 P M 18 A. Yes. It would be better if it had specified the negative  
2 : 0 8 P M 19 tests in more detail.  
2 : 0 8 P M 20 Q. Okay. Let me ask you -- let's just look at your  
2 : 0 8 P M 21 deposition here, if we could.  
2 : 0 8 P M 22 If we go to 233, lines 2 through 14, please.  
2 : 0 8 P M 23 And do you see here, my colleague, Mr. Regan is  
2 : 0 8 P M 24 asking you:  
2 : 0 8 P M 25 "QUESTION: Is it your opinion that what's set forth

## RICHARD HEENAN - CROSS

2 : 0 8 P M 1 in this April 20th, 2010 e-mail does not represent good oil  
2 : 0 8 P M 2 field practice, as you have defined that term?"

2 : 0 8 P M 3 And was your answer:

2 : 0 8 P M 4 "As written, I don't think it fails to meet -- I  
2 : 0 8 P M 5 would consider it good oilfield practice. It isn't perfect.  
2 : 0 8 P M 6 There are possible improvements in the program. It would  
2 : 0 8 P M 7 probably be considered good practice."

2 : 0 9 P M 8 Correct?

2 : 0 9 P M 9 A. Correct.

2 : 0 9 P M 10 Q. So if you look at this procedure, all of the steps that  
2 : 0 9 P M 11 are in it, that procedure is within the standard of care for  
2 : 0 9 P M 12 operators engaged in deepwater drilling?

2 : 0 9 P M 13 A. Yes. As I said, it's probably within that standard; but  
2 : 0 9 P M 14 it could be better.

2 : 0 9 P M 15 Q. Let me ask a really straight question, and let's see if  
2 : 0 9 P M 16 you agree with this. BP met the standard of care for an  
2 : 0 9 P M 17 operator in the way that the negative pressure test is written?

2 : 0 9 P M 18 A. Yes.

2 : 0 9 P M 19 Q. Now, the goal of the negative pressure test is to simulate  
2 : 0 9 P M 20 the hydrostatic condition that the well would experience once  
2 : 0 9 P M 21 temporarily abandoned; right?

2 : 0 9 P M 22 A. Yes.

2 : 0 9 P M 23 Q. So in doing that, you have to take into account what is  
2 : 1 0 P M 24 the depth of the cement plug going to be?

2 : 1 0 P M 25 A. Yes.

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2 : 10 PM 1 Q. That's a factor in simulating what the well is going to be  
2 : 10 PM 2 like when you temporarily abandon it?

2 : 10 PM 3 A. What you're really simulating is what the height of the  
2 : 10 PM 4 column of seawater would be in the worst case.

2 : 10 PM 5 Q. Right.

2 : 10 PM 6 A. Which is related to it.

2 : 10 PM 7 Q. Because the other technique that's utilized, as you've  
2 : 10 PM 8 described, is you shut in the annulars, you remove the  
2 : 10 PM 9 hydrostatic head during the conduct of the test, you have  
2 : 10 PM 10 seawater from the BOP down to, in this case, 8300 feet or so.  
2 : 10 PM 11 And so you're simulating now what the condition is going to be  
2 : 10 PM 12 once you complete the abandonment procedures on the BOP and  
2 : 10 PM 13 leave?

2 : 10 PM 14 A. You're actually simulating the worst case just before you  
2 : 10 PM 15 set the cement plug in.

2 : 10 PM 16 Q. But as you've described, it's a controlled test because  
2 : 10 PM 17 you still have the weight of the mud and spacer in the -- in  
2 : 11 PM 18 the BOP. And if you detect an issue, all you have to do is  
2 : 11 PM 19 open the BOP and you return your well to an overbalanced  
2 : 11 PM 20 situation?

2 : 11 PM 21 A. Yes, that's one option and there are others as well.

2 : 11 PM 22 Q. Sure.

2 : 11 PM 23 Now, for this test, the test that was conducted, you  
2 : 11 PM 24 have seen that consistently the well was telling the men on the  
2 : 11 PM 25 rig that there was a problem on the drill pipe, pressure was



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2 : 11 PM 1 consistent for a long period of time in the 12- to 1400-psi  
2 : 11 PM 2 range?  
2 : 11 PM 3 A. Yes, there was a problem.  
2 : 11 PM 4 Q. So do you agree that the test, as it was set up -- that  
2 : 11 PM 5 is, as it was designed, as it was written and as it was  
2 : 11 PM 6 performed -- answered the test -- it answered the question,  
2 : 12 PM 7 there's communication with the well?  
2 : 12 PM 8 A. Yes, that test determined what it was supposed to  
2 : 12 PM 9 determine, the test itself.  
2 : 12 PM 10 Q. The issue was with the interpretation of the test?  
2 : 12 PM 11 A. Yes, exactly.  
2 : 12 PM 12 Q. Now, you understand from your review of the materials that  
2 : 12 PM 13 there was a lot of discussion about the meaning of the drill  
2 : 12 PM 14 pipe pressure over a long period of time by lots of people on  
2 : 12 PM 15 the rig?  
2 : 12 PM 16 A. I don't know exactly if I'd call it lots; but yes, there  
2 : 12 PM 17 was a long -- there have been discussions, as I understand it.  
2 : 12 PM 18 Q. And you understand that it was folks from Transocean who  
2 : 12 PM 19 were advancing the idea that the explanation was related to  
2 : 12 PM 20 annular compression or a bladder effect?  
2 : 12 PM 21 **MR. DOYEN:** Your Honor, I object to that  
2 : 12 PM 22 characterization of the evidence. No foundation for this  
2 : 13 PM 23 witness.  
2 : 13 PM 24 **THE COURT:** Overrule the objection.  
2 : 13 PM 25 Can you answer that?

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2 : 13 PM 1           **THE WITNESS:** The question again.

2 : 13 PM 2   **BY MR. BROCK:**

2 : 13 PM 3   **Q.** Is it your understanding that in the course of  
2 : 13 PM 4   conversations that took place about the negative test, that it  
2 : 13 PM 5   was representatives of Transocean who were advancing the idea  
2 : 13 PM 6   that the explanation for the pressure was something called the  
2 : 13 PM 7   "bladder effect" or "annular compression"?

2 : 13 PM 8   **A.** There's certainly information to that effect. I can't  
2 : 13 PM 9   pass judgment on whether it's correct or not.

2 : 13 PM 10 **Q.** Have you looked at the deposition of Lee Lambert?

2 : 13 PM 11 **A.** Yes, I have.

2 : 13 PM 12 **Q.** And have you seen that he testified that he was present  
2 : 13 PM 13   and heard the Transocean representatives explaining the  
2 : 13 PM 14   pressure as annular compression or the bladder effect?

2 : 13 PM 15           **MR. DOYEN:** Your Honor, I object again to the  
2 : 13 PM 16   mischaracterization. If he wants, put up the testimony.

2 : 13 PM 17           **MR. BROCK:** I'm asking for his understanding.

2 : 13 PM 18           **THE COURT:** Can you answer that?

2 : 13 PM 19           **THE WITNESS:** Yes, I understand he said something to  
2 : 13 PM 20   that effect.

2 : 14 PM 21 **BY MR. BROCK:**

2 : 14 PM 22 **Q.** Do you agree that Don Vidrine believed that the negative  
2 : 14 PM 23   pressure test was successfully completed and that there were no  
2 : 14 PM 24   issues with the well on the evening of the 20th?

2 : 14 PM 25 **A.** Yes, I believe he believed that. I don't think he would

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2 : 14 PM 1 have proceeded as he did if he hadn't believe that.

2 : 14 PM 2 Q. Consistent with that, you don't believe that Don Vidrine  
2 : 14 PM 3 would have put his own life at risk, or the lives of the people  
2 : 14 PM 4 that he was out there working with on that rig, if he believed  
2 : 14 PM 5 that there was a problem with the negative test?

2 : 14 PM 6 A. I don't believe he would have intentionally put his life  
2 : 14 PM 7 or anyone else's in danger.

2 : 14 PM 8 Q. And likewise, do you believe that the men of Transocean,  
2 : 15 PM 9 who also thought that the test passed and who believed that  
2 : 15 PM 10 there was an explanation for that -- do you believe that to  
2 : 15 PM 11 their way of thinking, the test was a good test?

2 : 15 PM 12 A. I believe that's what they thought.

2 : 15 PM 13 Q. They would not have put their own lives at risk or the  
2 : 15 PM 14 lives of their friends and other folks that they work with?

2 : 15 PM 15 A. I wouldn't think they would, no.

2 : 16 PM 16 Q. Just to summarize, we have identified here today, as well  
2 : 16 PM 17 as in your report, numerous time periods where there were  
2 : 16 PM 18 anomalies that should have been observed; correct?

2 : 16 PM 19 A. Correct.

2 : 16 PM 20 Q. And the anomalies that should have been observed in the  
2 : 16 PM 21 period of time 9:01 to 9:38 were not related to the negative  
2 : 16 PM 22 pressure test; they were independent items?

2 : 16 PM 23 A. If we're speaking of the anomalies in terms of pressure  
2 : 16 PM 24 increasing, pump shut off, those were not related; the other  
2 : 16 PM 25 anomalies, of course, were.

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2 : 16 PM 1 Q. When I say "related," the anomalies that were detected  
2 : 16 PM 2 should have been -- strike that.

2 : 16 PM 3 The anomalies that should have been detected from  
2 : 17 PM 4 9:01, let's say, up to 9:31 or 9:38 are separate and distinct  
2 : 17 PM 5 events from the interpretation of the negative test?

2 : 17 PM 6 A. They are separate events, but they obviously were caused  
2 : 17 PM 7 by the faulty interpretation of the negative test.

2 : 17 PM 8 Q. In this case a failed negative test does not equate to a  
2 : 17 PM 9 blowout?

2 : 17 PM 10 A. Not if that's the only thing that happens.

2 : 17 PM 11 Q. Because you still have the opportunities that we've talked  
2 : 17 PM 12 about for well control that were available to detect an  
2 : 17 PM 13 anomaly, conduct a flow check, and get the well shut in before  
2 : 17 PM 14 we have a blowout?

2 : 17 PM 15 A. Yes. Those options were available at a certain time.

2 : 17 PM 16 MR. BROCK: That's all I have. Thank you very much.

2 : 17 PM 17 THE COURT: All right. Cameron?

2 : 17 PM 18 MR. BECK: Your Honor, Cameron has no questions of  
2 : 18 PM 19 this witness.

2 : 18 PM 20 THE COURT: M-I SWACO?

2 : 18 PM 21 MR. TANNER: We have no questions.

2 : 18 PM 22 THE COURT: Any redirect, Mr. Underhill?

2 : 18 PM 23 MR. UNDERHILL: No, Your Honor.

2 : 18 PM 24 THE COURT: All right. You're finished, sir. Thank  
2 : 18 PM 25 you, sir.

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2 : 1 8 P M 1 THE WITNESS: Thank you.

2 : 1 8 P M 2 THE COURT: All right. Who's the next witness? It

2 : 1 8 P M 3 will be another expert?

2 : 1 8 P M 4 MR. UNDERHILL: Yes, sir. Mr. Glen Benge.

2 : 1 8 P M 5 THE COURT: Why don't we take about a 10- to

2 : 1 8 P M 6 15-minute recess.

2 : 1 8 P M 7 THE DEPUTY CLERK: All rise.

2 : 2 8 P M 8 (WHEREUPON, the Court took a recess.)

2 : 3 3 P M 9 THE DEPUTY CLERK: All rise.

2 : 3 3 P M 10 THE COURT: Please be seated, everyone.

2 : 3 3 P M 11 (WHEREUPON, GLEN BENGE, having been duly sworn,

2 : 3 3 P M 12 testified as follows.)

2 : 3 3 P M 13 THE DEPUTY CLERK: Please state your full name and

2 : 3 3 P M 14 correct spelling for the record.

2 : 3 3 P M 15 THE WITNESS: My name is Glen Benge, G-L-E-N,

2 : 3 3 P M 16 B-E-N-G-E.

2 : 3 3 P M 17 MR. REGAN: Your Honor, Matt Regan on behalf of BP.

2 : 3 3 P M 18 Just a note for the record that we do have a pending motion.

2 : 3 3 P M 19 And as we've talked about, I believe, on Monday, we assume

2 : 3 3 P M 20 you'll take it up with the testimony as a whole.

2 : 3 3 P M 21 THE COURT: Yes, I will.

2 : 3 4 P M 22 MR. REGAN: Thank you, Your Honor.

2 : 3 4 P M 23 MR. CERNICH: May it please the Court, Scott Cernich

2 : 3 4 P M 24 on behalf of the United States of America.

2 : 3 4 P M 25 The United States calls Glen Benge. In

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2 : 3 4 P M 1 addition, the United States would like to offer into evidence  
2 : 3 4 P M 2 the expert report of Mr. Benge, which is Exhibit 5990.  
2 : 3 4 P M 3 Mr. Benge's CV is included with the report, along with a list  
2 : 3 4 P M 4 of the materials he considered in forming his opinions.

2 : 3 4 P M 5 **THE COURT:** All right. Subject to the pending  
2 : 3 4 P M 6 objections, those will be admitted.

2 : 3 4 P M 7 **MR. CERNICH:** Thank you, Your Honor.

**DIRECT EXAMINATION**

2 : 3 4 P M 8  
2 : 3 4 P M 9 **BY MR. CERNICH:**

2 : 3 4 P M 10 **Q.** Mr. Benge, I'd like to start with a discussion of your  
2 : 3 4 P M 11 cementing experience. Would you please describe your  
2 : 3 4 P M 12 experience for the Court.

2 : 3 4 P M 13 **A.** Yes, sir. I've spent my entire career in oil field  
2 : 3 4 P M 14 cementing. I've got about 36 years. I've worked rigs on land,  
2 : 3 4 P M 15 offshore, shallow water, deepwater; worked on every aspect of  
2 : 3 5 P M 16 cementing from design, execution, to evaluation.

2 : 3 5 P M 17 I've been involved with foam cementing, as it's  
2 : 3 5 P M 18 pertinent here, since its inception. I performed the first  
2 : 3 5 P M 19 foam cement job offshore in Mobile Bay. We wrote a paper on  
2 : 3 5 P M 20 that back in '95.

2 : 3 5 P M 21 **Q.** This is Exhibit 31003.

2 : 3 5 P M 22 **A.** And in that particular case, I designed, executed, and  
2 : 3 5 P M 23 performed all of the functions for that particular well.

2 : 3 5 P M 24 **Q.** Do you consider yourself to be one of the top oil field  
2 : 3 5 P M 25 cementing experts in the world?

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2 : 3 5 P M 1 A. Yes, sir, I do.

2 : 3 5 P M 2 Q. Mr. Benge, if you could give the Court some background on  
2 : 3 5 P M 3 your employment history.

2 : 3 5 P M 4 A. Yes, sir. I actually -- starting at the bottom, I was  
2 : 3 5 P M 5 with a company called Dowell, a division of Dow Chemical  
2 : 3 5 P M 6 that -- ultimately it's been merged and is part of  
2 : 3 5 P M 7 Schlumberger.

2 : 3 5 P M 8 Moved to Mobil Oil fluids team here in New Orleans.  
2 : 3 6 P M 9 From there went to Mobil Oil in Dallas as a global cementing  
2 : 3 6 P M 10 adviser and, with the merger of Exxon and Mobil in 2000, moved  
2 : 3 6 P M 11 to Houston and was the global cementing adviser for -- or the  
2 : 3 6 P M 12 senior technical adviser and global cementing adviser for  
2 : 3 6 P M 13 ExxonMobil in their drilling operations. And then in the last  
2 : 3 6 P M 14 two years, I served as the drilling training manager for the  
2 : 3 6 P M 15 global drilling organization for ExxonMobil.

2 : 3 6 P M 16 Q. Would you please describe your job as the ExxonMobil  
2 : 3 6 P M 17 senior technical adviser for cementing.

2 : 3 6 P M 18 A. As that senior technical adviser, you're the adviser to  
2 : 3 6 P M 19 senior management for the business of cementing. That includes  
2 : 3 6 P M 20 how you're applying technology on a global basis. You're  
2 : 3 6 P M 21 setting standards for internally.

2 : 3 6 P M 22 I also served as an adviser to service companies to  
2 : 3 6 P M 23 help direct research. But it's the senior-most technical  
2 : 3 7 P M 24 position for cementing. You are the technical resource for the  
2 : 3 7 P M 25 drilling organization.

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



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2 : 3 8 P M 1 on a one-week school. I noticed Mr. Morel attended that class.

2 : 3 8 P M 2 Q. Did you have any opportunity to assess those drilling

2 : 3 8 P M 3 engineers' knowledge in cementing?

2 : 3 8 P M 4 A. Yes, I did.

2 : 3 8 P M 5 Q. And how did you do that?

2 : 3 8 P M 6 A. We would assess competency in cementing through testing

2 : 3 8 P M 7 during the classes, through looking at their work products,

2 : 3 8 P M 8 through any number of -- any number of things of looking at

2 : 3 8 P M 9 programs, how they were -- how they were interacting.

2 : 3 8 P M 10 Q. Did you also have the opportunity to assess drilling

2 : 3 8 P M 11 engineers' cementing knowledge when you consulted with them on

2 : 3 8 P M 12 individual wells?

2 : 3 8 P M 13 A. Most certainly, yes, sir.

2 : 3 9 P M 14 Q. And how did you do that?

2 : 3 9 P M 15 A. You would look at their degree of knowledge associated

2 : 3 9 P M 16 with cement, how they would approach the problem. And if you

2 : 3 9 P M 17 found -- if we found that -- from the questions they asked,

2 : 3 9 P M 18 from their involvement with it. And if we found that to be

2 : 3 9 P M 19 appropriate, that was fine; if not, we'd give them additional

2 : 3 9 P M 20 training.

2 : 3 9 P M 21 Q. Is cementing a skill set you expected drilling engineers

2 : 3 9 P M 22 to have?

2 : 3 9 P M 23 A. Yes, sir.

2 : 3 9 P M 24 Q. Mr. Bengé, if we could briefly discuss your professional

2 : 3 9 P M 25 organizations that you've been involved with over the years.

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2 : 3 9 P M 1 A. Yes, sir. I was the -- the AADE or American Association  
2 : 3 9 P M 2 of Drilling Engineers actually started here in New Orleans. I  
2 : 3 9 P M 3 served on its board of directors for several years and was the  
2 : 3 9 P M 4 president of that organization for one year.

2 : 3 9 P M 5 Q. But you're not a drilling engineer?

2 : 3 9 P M 6 A. I've not held the title of drilling engineer; but we do a  
2 : 3 9 P M 7 lot of drilling engineering, even being a cementer.

2 : 3 9 P M 8 Q. And then the American Petroleum Institute, can you  
2 : 3 9 P M 9 describe your involvement with that.

2 : 4 0 P M 10 A. Yes. I've been a member of API for over 30 years. It was  
2 : 4 0 P M 11 at one time Committee 10, now it's Subcommittee 10 on oil well  
2 : 4 0 P M 12 cements. I've been a member of that since 1980. That's the --  
2 : 4 0 P M 13 I don't want to say "ruling body," but that's the group that  
2 : 4 0 P M 14 sets the industry protocols of standards for testing, for  
2 : 4 0 P M 15 cement evaluation, everything -- all of the API standards  
2 : 4 0 P M 16 funnel through that organization.

2 : 4 0 P M 17 I chaired that organization for three years, from  
2 : 4 0 P M 18 2002 to 2005. And I also have served on a number of work  
2 : 4 0 P M 19 groups, task groups on everything from centralizers. I chaired  
2 : 4 0 P M 20 the task group on foam cement. And work, actually, that came  
2 : 4 0 P M 21 out of that group was the current document on foam cementing  
2 : 4 0 P M 22 for API.

2 : 4 0 P M 23 Q. Were you also a member -- or are you also a member of the  
2 : 4 0 P M 24 Society of Petroleum Engineers?

2 : 4 0 P M 25 A. Yes, sir. I've been a member of SPE for as long -- since

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2 : 4 1 P M 1 '97. I have served as program and session chairs for a number  
2 : 4 1 P M 2 of conferences.

2 : 4 1 P M 3 I'm also a technical editor. So when we talk about  
2 : 4 1 P M 4 peer-reviewed journals, I'm one of those guys that peer-reviews  
2 : 4 1 P M 5 those papers for publication. And fortunately, I've received a  
2 : 4 1 P M 6 couple of Outstanding Technical Editor awards for that work.

2 : 4 1 P M 7 Q. And just to cover the various aspects of oil field  
2 : 4 1 P M 8 cementing, are you an expert in planning and designing cement  
2 : 4 1 P M 9 jobs?

2 : 4 1 P M 10 A. Yes, sir.

2 : 4 1 P M 11 Q. Approximately how many cement jobs have you designed?

2 : 4 1 P M 12 A. Designed from start to finish and everything in between,  
2 : 4 1 P M 13 well over 100.

2 : 4 1 P M 14 Q. And you consulted on the design of other jobs?

2 : 4 1 P M 15 A. Yes, sir.

2 : 4 1 P M 16 Q. On how many, would you say?

2 : 4 1 P M 17 A. Well over 1,000. That was a core part of my job.

2 : 4 1 P M 18 Q. Are you an expert in designing cement slurries?

2 : 4 1 P M 19 A. Yes, sir.

2 : 4 1 P M 20 Q. Including foam cement slurries?

2 : 4 1 P M 21 A. Yes, sir.

2 : 4 1 P M 22 Q. Approximately how many cement slurries have you designed?

2 : 4 2 P M 23 A. Hundreds. More than 100, less than 10,000. It's been a  
2 : 4 2 P M 24 lot.

2 : 4 2 P M 25 Q. Of foam slurries?

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2 : 4 2 P M 1 A. Well over 100.

2 : 4 2 P M 2 Q. Have you assisted or consulted on the design of additional

2 : 4 2 P M 3 slurries?

2 : 4 2 P M 4 A. Yes, sir, I have.

2 : 4 2 P M 5 Q. And that would be many more?

2 : 4 2 P M 6 A. Every time you consult on a well, there's at least two

2 : 4 2 P M 7 cement slurries for every cement job and there's several cement

2 : 4 2 P M 8 jobs on every well.

2 : 4 2 P M 9 Q. And did you generally review the slurry designs when you

2 : 4 2 P M 10 consulted on a well?

2 : 4 2 P M 11 A. Yes, sir.

2 : 4 2 P M 12 Q. Are you an expert in laboratory testing of oilfield

2 : 4 2 P M 13 cement?

2 : 4 2 P M 14 A. Yes, sir.

2 : 4 2 P M 15 Q. And you ran the cement lab when you worked for

2 : 4 2 P M 16 Schlumberger?

2 : 4 2 P M 17 A. Well, actually, when I was here in New Orleans, the

2 : 4 2 P M 18 laboratory reported to me. So I had the lab manager and a full

2 : 4 2 P M 19 set of technicians that reported to me.

2 : 4 2 P M 20 Q. Are you an expert in field equipment and field operations

2 : 4 2 P M 21 for cementing?

2 : 4 2 P M 22 A. Yes, sir. Now, I don't want to say I can go out and run

2 : 4 2 P M 23 the trucks; but I know what they're supposed to do.

2 : 4 3 P M 24 Q. You've been on rigs?

2 : 4 3 P M 25 A. Yes, sir, all over the world.

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2 : 4 3 P M 1 Q. Onshore and offshore?

2 : 4 3 P M 2 A. Onshore, offshore, shallow water, deepwater, pretty much

2 : 4 3 P M 3 the whole gamut.

2 : 4 3 P M 4 Q. Approximately how many cement jobs have you actually

2 : 4 3 P M 5 attended in person on the rig?

2 : 4 3 P M 6 A. Well over 100.

2 : 4 3 P M 7 Q. Are you an expert in cement evaluation?

2 : 4 3 P M 8 A. Yes, sir.

2 : 4 3 P M 9 Q. Can you describe cement evaluation for the Court?

2 : 4 3 P M 10 A. Cement evaluation takes a lot of different things. It can

2 : 4 3 P M 11 be pressure evaluation; you can do temperature logs; you can do

2 : 4 3 P M 12 electronic logs where -- the CBLs. There's any number of those

2 : 4 3 P M 13 different types. So depending on what the objectives are, your

2 : 4 3 P M 14 evaluation criteria will change; but on all of those different

2 : 4 3 P M 15 types, I know how to do those.

2 : 4 3 P M 16 Q. And that would include cement bond logs?

2 : 4 3 P M 17 A. That would include cement bond logs in all their forms.

2 : 4 3 P M 18 MR. CERNICH: Your Honor, I would like to proffer

2 : 4 3 P M 19 Mr. Bengé as an expert in oil field cementing.

2 : 4 4 P M 20 THE COURT: Other than the *Daubert* pending motion,

2 : 4 4 P M 21 any other questions at this time?

2 : 4 4 P M 22 MR. REGAN: Not at this time, Your Honor.

2 : 4 4 P M 23 THE COURT: Again, subject to that, I accept him and

2 : 4 4 P M 24 will allow him to testify in that field.

2 : 4 4 P M 25 MR. CERNICH: Thank you.

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2 : 4 4 P M 1 BY MR. CERNICH:

2 : 4 4 P M 2 Q. Mr. Bengé, I'd like to talk a little bit about your  
2 : 4 4 P M 3 background on the Macondo well specifically.

2 : 4 4 P M 4 Did you have any involvement in the Macondo well  
2 : 4 4 P M 5 before you began your expert work for the United States in this  
2 : 4 4 P M 6 case?

2 : 4 4 P M 7 A. Yes, sir, I did.

2 : 4 4 P M 8 Q. Can you describe that?

2 : 4 4 P M 9 A. As part of the industry -- I worked with Secretary Chu and  
2 : 4 4 P M 10 his group as an industry adviser during the final cement job  
2 : 4 4 P M 11 that was on the Macondo well itself. So I advised with that  
2 : 4 4 P M 12 group under Secretary Chu.

2 : 4 4 P M 13 Q. Have you ever served as an expert witness before?

2 : 4 4 P M 14 A. No, sir, I have not.

2 : 4 4 P M 15 Q. How did you come to serve as an expert in this case?

2 : 4 4 P M 16 A. I was contacted by a member of NETL, National Energy  
2 : 4 5 P M 17 Technology Lab, and understood that they were looking for some  
2 : 4 5 P M 18 experts. At that time, I was still with ExxonMobil. When I  
2 : 4 5 P M 19 retired, I decided to help with this.

2 : 4 5 P M 20 Q. Why did you agree to serve as an expert in this case?

2 : 4 5 P M 21 A. The Macondo well was a major event for the entire  
2 : 4 5 P M 22 industry. I don't know the gentlemen who worked on that rig,  
2 : 4 5 P M 23 but I've been on those rigs and I know the type of folks they  
2 : 4 5 P M 24 were. And anything that I could do to understand this and keep  
2 : 4 5 P M 25 it from happening in whatever small way, I wanted to assist

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2 : 4 5 P M 1 with.

2 : 4 5 P M 2 Q. And what was your task in this matter?

2 : 4 5 P M 3 A. My task in this manner was to determine why the cement did  
2 : 4 5 P M 4 not form a barrier in the Macondo well.

2 : 4 5 P M 5 Q. And what types of information did you review or consider  
2 : 4 5 P M 6 in forming your opinions?

2 : 4 5 P M 7 A. The available information that I had was everything from  
2 : 4 5 P M 8 laboratory tests, the on-location operations, design documents,  
2 : 4 5 P M 9 communications. I looked at all of the pertinent testimony,  
2 : 4 6 P M 10 depositions. I also looked at interview notes, anything I  
2 : 4 6 P M 11 could find that would have -- that was relevant to this.

2 : 4 6 P M 12 And I also went out and searched industry papers and  
2 : 4 6 P M 13 all the stuff that would be available on cementing for that.

2 : 4 6 P M 14 Q. Before we get into the details of the Macondo cement job,  
2 : 4 6 P M 15 I thought we could cover some of the basics of cementing for  
2 : 4 6 P M 16 the Court.

2 : 4 6 P M 17 A. Sure.

2 : 4 6 P M 18 Q. What is oil well cement?

2 : 4 6 P M 19 A. Well, we've got a brief little animation, if we can, that  
2 : 4 6 P M 20 will just look at the very bottom of the well.

2 : 4 6 P M 21 Q. Before we get to that, can you just describe what -- what  
2 : 4 6 P M 22 cement is? What is oil well cement?

2 : 4 6 P M 23 A. Well, oil well cement is basically burnt dirt. You take  
2 : 4 6 P M 24 limestone, grind it up, you add in clay and other minerals and  
2 : 4 6 P M 25 you put it through a -- through a kiln. And then it comes out

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2 : 4 6 P M 1 and you grind it and it makes -- that's how you make cement.

2 : 4 7 P M 2 So it's not a pure material. It varies from manufacturer to

2 : 4 7 P M 3 manufacturer and from plant to plant.

2 : 4 7 P M 4 Q. And what is oil well cementing?

2 : 4 7 P M 5 A. Well, oil well cementing is taking that cement, putting it

2 : 4 7 P M 6 in with different materials, different blends, and much like

2 : 4 7 P M 7 you take flour and you add all different sorts of materials in

2 : 4 7 P M 8 it for a dry blend for it to make a cake.

2 : 4 7 P M 9 Oil field cementing is coming up with that recipe.

2 : 4 7 P M 10 So you've got the solids, the liquids, and then also there's

2 : 4 7 P M 11 the physics of placing that. So there's slurry design; there's

2 : 4 7 P M 12 the job design, if you will. It's a combination of chemistry

2 : 4 7 P M 13 and physics.

2 : 4 7 P M 14 Q. And why do you cement wells?

2 : 4 7 P M 15 A. To provide isolation; to prevent the pipe from moving up,

2 : 4 7 P M 16 down, left, right, so you get pipe support or casing support.

2 : 4 7 P M 17 You also can cement the well for -- this well had a sidetrack,

2 : 4 7 P M 18 so you'll do what we call a kick-off plug. You get a firm

2 : 4 8 P M 19 foundation so the well's got something to kick off of. That's

2 : 4 8 P M 20 a cement kick-off plug.

2 : 4 8 P M 21 Q. Would you like to go to the animation now?

2 : 4 8 P M 22 A. Yes. That would be fine.

2 : 4 8 P M 23 Before this starts, we're going to see a number of

2 : 4 8 P M 24 things that go on with it. One is you'll see several different

2 : 4 8 P M 25 colors of fluids that go on. This is a representation -- if I



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2 : 4 8 P M 1 can, this is the float collar, this is in the reamer shoe.  
2 : 4 8 P M 2 From here to where the bottom of that shoe is, that's the  
2 : 4 8 P M 3 18,000-plus feet. It says "not to scale." Between here and  
2 : 4 8 P M 4 here is the size of the building next door. It's a 17-,  
2 : 4 8 P M 5 18-story building.

2 : 4 8 P M 6 And so what we'll see is the cement will begin --  
2 : 4 8 P M 7 will start pumping.

2 : 4 8 P M 8 If we can start the animation.

2 : 4 8 P M 9 This is just the bottom section of this well. What  
2 : 4 9 P M 10 we'll see is we're pumping fluids down. This would be the  
2 : 4 9 P M 11 drilling mud coming up and around. And if we can pause for  
2 : 4 9 P M 12 just a brief second, we'll see purple coming in as a base  
2 : 4 9 P M 13 oil -- that's the unweighted oil -- followed by a spacer,  
2 : 4 9 P M 14 followed by a cap or -- and tail cement. That cap and tail  
2 : 4 9 P M 15 cement are not foam. And then the light gray will be the foam  
2 : 4 9 P M 16 cement.

2 : 4 9 P M 17 And so if we can continue on.

2 : 4 9 P M 18 What we'll see here is the base oil coming ahead of  
2 : 4 9 P M 19 the spacer, and it's followed by the bottom plug. Now, that  
2 : 4 9 P M 20 bottom plug has a rupture disc in it. So it protects or it  
2 : 4 9 P M 21 keeps contamination, as that cement is being placed, from -- it  
2 : 4 9 P M 22 won't get contaminated with anything inside the pipe.

2 : 4 9 P M 23 We see that -- the base oil followed by the spacer,  
2 : 4 9 P M 24 here comes our unfoamed cement and now our foam cement. That's  
2 : 5 0 P M 25 finally being followed by what we'll call the "tail cement."

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2:50 PM 1 And then behind it will be the top wiper plug. So we'll call  
2:50 PM 2 that "bumping the plug."

2:50 PM 3 So what we have here is -- from the float collar down  
2:50 PM 4 to the reamer shoe has got a tail cement. It's the same  
2:50 PM 5 cement, it just doesn't have foam in it. And then we've got  
2:50 PM 6 foamed cement in that annulus from there on, and above that,  
2:50 PM 7 again, the cap and the spacer base oil.

2:50 PM 8 Q. Before we move on, Mr. Bengé, you mentioned -- you were  
2:50 PM 9 talking about the wiper plugs and separating the fluids. Do  
2:50 PM 10 the wiper plugs perfectly separate the fluids?

2:50 PM 11 A. They do a pretty good job; but no, there's not -- you've  
2:50 PM 12 got a plug and it's going down the pipe, it doesn't -- it does  
2:50 PM 13 a pretty good job; but, no, it doesn't completely separate  
2:50 PM 14 them. You'll get some intermixing.

2:50 PM 15 Also, artists are great. They can draw things that  
2:51 PM 16 are nice and level. You saw the fluids were very pristine as  
2:51 PM 17 they went up in the annulus. There's also intermixing of  
2:51 PM 18 those. That always happens.

2:51 PM 19 Q. Can you provide the Court with any sort of indication of  
2:51 PM 20 the scale of a cement job and how it's done?

2:51 PM 21 A. I can, and I'll thank my daughter for this because she  
2:51 PM 22 actually originally came up with it. I've brought a  
2:51 PM 23 demonstrative, and I don't mean to -- I didn't bring one for  
2:51 PM 24 everybody.

2:51 PM 25 What this is is a 9-inch plastic plate that you can

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2 : 5 1 P M 1 buy down at the grocery store. And what I did, the black line  
2 : 5 1 P M 2 on here, the outside of that is 7 inches. The inside of it is  
2 : 5 1 P M 3 the ID of the pipe. And so you can tell -- I don't know if you  
2 : 5 1 P M 4 can see it very well, but where you put your food on a 9-inch  
2 : 5 1 P M 5 place is where -- that's the inside of the -- that's the inside  
2 : 5 1 P M 6 of the pipe here. The annulus -- in this case, this is  
2 : 5 1 P M 7 9-inches -- the annulus, that's where the cement goes.

2 : 5 2 P M 8 So go take this plate, set it down 3 miles away. You  
2 : 5 2 P M 9 get to pump cement 3 miles down, through the center of this,  
2 : 5 2 P M 10 back up the outside. And to get a seal in this well, you get  
2 : 5 2 P M 11 one chance to do it right; and that seal area is the decoration  
2 : 5 2 P M 12 on your plate.

2 : 5 2 P M 13 So when you're at dinner tonight -- I'm sorry, that  
2 : 5 2 P M 14 will mess you up. But at dinner tonight, where your food is is  
2 : 5 2 P M 15 where the pipe is; the decoration on your plate is the size of  
2 : 5 2 P M 16 the cement sheath, 3 miles away.

2 : 5 2 P M 17 **THE COURT:** I don't think any of these folks use  
2 : 5 2 P M 18 plastic plates, though.

2 : 5 2 P M 19 **THE WITNESS:** The group I'm working with, their  
2 : 5 2 P M 20 credit rating kind of went down lately, so I've got to use  
2 : 5 2 P M 21 anything I can.

2 : 5 2 P M 22 **THE COURT:** Well, these folks might -- they're about  
2 : 5 2 P M 23 to be furloughed by the Government.

2 : 5 3 P M 24 **MR. CERNICH:** We'll have to live with paper.  
25

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2 : 5 3 P M 1 BY MR. CERNICH:

2 : 5 3 P M 2 Q. It sounds like a difficult process.

2 : 5 3 P M 3 A. It is. It's a very difficult process.

2 : 5 3 P M 4 Q. All right. Does anyone ever get it right?

2 : 5 3 P M 5 A. We get it right all the time. But to get that right,

2 : 5 3 P M 6 little things matter a lot.

2 : 5 3 P M 7 Q. What if you don't get it right?

2 : 5 3 P M 8 A. Then you have to go back and repair. You have to repair

2 : 5 3 P M 9 that cement job.

2 : 5 3 P M 10 Q. Is repairing the cement job as good as getting it right

2 : 5 3 P M 11 the first time?

2 : 5 3 P M 12 A. Oh, it never is.

2 : 5 3 P M 13 Q. Can you tell the Court -- we've talked a little bit about

2 : 5 3 P M 14 foam cement. What is foam cement?

2 : 5 3 P M 15 A. Foam cement is a stable mixture of cement and in this

2 : 5 3 P M 16 case -- for our case, it's nitrogen. I understand you had a

2 : 5 3 P M 17 geologist that brings rocks, and so cementers have to bring

2 : 5 3 P M 18 cement.

2 : 5 3 P M 19 And I don't want to represent this as being the

2 : 5 3 P M 20 Macondo slurry at all. This is not. This is just -- this is a

2 : 5 4 P M 21 standard cement system.

2 : 5 4 P M 22 THE WITNESS: And, Your Honor, this weighs 16 --

2 : 5 4 P M 23 excuse me. That is just a standard, normal, unfoamed cement

2 : 5 4 P M 24 system. I have the exact same one that's got about -- it says

2 : 5 4 P M 25 on there 13 percent gas. And here's one that's got 23 percent

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2 : 5 4 P M 1 gas. And you can tell that as you add gas, it gets lighter.  
2 : 5 4 P M 2 You can see the -- and so you're -- it's a stable mixture of  
2 : 5 4 P M 3 gas and cement; and as you add more gas to it, it weighs less.

2 : 5 4 P M 4 **THE COURT:** So, in essence, you have gas bubbles, I  
2 : 5 4 P M 5 would say, in the cement?

2 : 5 4 P M 6 **THE WITNESS:** Right. And you've got -- the soap  
2 : 5 4 P M 7 that's in there and the surfactants help to lock all of that in  
2 : 5 4 P M 8 place, yes, sir.

2 : 5 4 P M 9 **THE COURT:** All right.

2 : 5 4 P M 10 **BY MR. CERNICH:**

2 : 5 4 P M 11 **Q.** And so you mentioned a drive line earlier. What is that?

2 : 5 5 P M 12 **A.** Well, that's the dry cement with its additives. If  
2 : 5 5 P M 13 there's any dry additives in the cement, you'll blend those  
2 : 5 5 P M 14 together at a bulk plant and you'll ship those to the rig. So  
2 : 5 5 P M 15 that would be the cement with the additives that you're going  
2 : 5 5 P M 16 to ultimately mix with the fluid in the cement unit, and then  
2 : 5 5 P M 17 that will go down the hole.

2 : 5 5 P M 18 **Q.** And there are also liquid additives?

2 : 5 5 P M 19 **A.** Yes, sir. And that would be in the water phase. So  
2 : 5 5 P M 20 you're adding the solids and you're adding the liquids together  
2 : 5 5 P M 21 on location.

2 : 5 5 P M 22 **Q.** And then once they're added together, the cement is pumped  
2 : 5 5 P M 23 down the well?

2 : 5 5 P M 24 **A.** Yes, sir.

2 : 5 5 P M 25 **Q.** Do you have an opinion on whether --

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2 : 5 5 P M 1 MR. CERNICH: We're going to move on to the actual  
2 : 5 5 P M 2 Macondo cement job now, Your Honor.

2 : 5 5 P M 3 BY MR. CERNICH:

2 : 5 5 P M 4 Q. Do you have any opinion on whether the Macondo cement  
2 : 5 5 P M 5 actually formed a barrier in the well?

2 : 5 5 P M 6 A. Yes, I do. And that's that the cement did not form a  
2 : 5 5 P M 7 barrier in the well.

2 : 5 5 P M 8 Q. And can you tell the Court why it didn't form a barrier in  
2 : 5 6 P M 9 the well?

2 : 5 6 P M 10 A. There's generally two reasons why any cement would not  
2 : 5 6 P M 11 form a barrier. One is it's not there. It's not present  
2 : 5 6 P M 12 across the formation to be able to form a barrier, or it's not  
2 : 5 6 P M 13 set and, yet, it's still acting as a liquid. So it's not set  
2 : 5 6 P M 14 or able to form a barrier, or a combination of the two.

2 : 5 6 P M 15 Q. Does every cement job form a barrier?

2 : 5 6 P M 16 A. No, sir.

2 : 5 6 P M 17 Q. Are cement jobs that are intended to form a barrier  
2 : 5 6 P M 18 sometimes unsuccessful?

2 : 5 6 P M 19 A. Yes, sir, they are.

2 : 5 6 P M 20 Q. Do you consider an unsuccessful -- let me strike that.

2 : 5 6 P M 21 Do you know whether such cement jobs result in  
2 : 5 6 P M 22 blowouts?

2 : 5 6 P M 23 A. No, sir, they result in a squeeze job.

2 : 5 6 P M 24 Q. What's a squeeze job?

2 : 5 6 P M 25 A. A squeeze job is where you're going back and you're

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2 : 5 6 P M 1 repairing the cement job. You're forcing cement under  
2 : 5 6 P M 2 pressure -- you're not circulating it in place; now you're  
2 : 5 6 P M 3 forcing it under pressure into place. It's a repair job.  
2 : 5 6 P M 4 Q. How do you get it into place?  
2 : 5 7 P M 5 A. With pump pressure. You'll pump it in. You'll usually  
2 : 5 7 P M 6 perforate the pipe and you'll force cement under pressure  
2 : 5 7 P M 7 into -- in through that hole you created.  
2 : 5 7 P M 8 Q. How do you know that you have to do such a repair?  
2 : 5 7 P M 9 A. Depending on what your objectives of the well are -- or  
2 : 5 7 P M 10 the cement, you've tested to those objectives and know that the  
2 : 5 7 P M 11 cement has not met those objectives. So you've tested it,  
2 : 5 7 P M 12 found it to be -- found it to not have performed as you wanted  
2 : 5 7 P M 13 it to, so you go back and repair.  
2 : 5 7 P M 14 Q. How would you test it?  
2 : 5 7 P M 15 A. Again, any number of ways. Pressure testing is probably  
2 : 5 7 P M 16 the most common, cement bond logs, temperature logs.  
2 : 5 7 P M 17 Q. Have you ever been involved in a cement job that has  
2 : 5 7 P M 18 failed to form a barrier?  
2 : 5 7 P M 19 A. Yes, sir, I have.  
2 : 5 7 P M 20 Q. What happened on those jobs?  
2 : 5 7 P M 21 A. In those particular cases, it didn't meet the requirements  
2 : 5 7 P M 22 of the job. We had to go back and remediate or squeeze the  
2 : 5 7 P M 23 well.  
2 : 5 7 P M 24 Q. Is it common for cement jobs not to form a barrier?  
2 : 5 8 P M 25 A. Unfortunately -- well, it doesn't sound like a big number

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2 : 5 8 P M 1 unless you're a cementer. About 10 percent, 8 to 10 percent  
2 : 5 8 P M 2 don't meet those objectives and have to be repaired.

2 : 5 8 P M 3 When you start getting into deep water or into much  
2 : 5 8 P M 4 more challenging environments, that failure rate tends to go up  
2 : 5 8 P M 5 a little bit. But 10 to 20 percent of those won't form a  
2 : 5 8 P M 6 barrier to start out with.

2 : 5 8 P M 7 Q. You said that you've been involved in some cement jobs  
2 : 5 8 P M 8 that failed to form a barrier in the well. Did any of those  
2 : 5 8 P M 9 wells blow out?

2 : 5 8 P M 10 A. No, sir.

2 : 5 8 P M 11 Q. How did you know that the cement job failed to form a  
2 : 5 8 P M 12 barrier?

2 : 5 8 P M 13 A. Again, they failed the cement evaluation test that we did,  
2 : 5 8 P M 14 be that a positive test, a negative test, a CBL, or what have  
2 : 5 8 P M 15 you.

2 : 5 8 P M 16 Q. Did you determine why the Macondo cement did not form a  
2 : 5 8 P M 17 barrier?

2 : 5 8 P M 18 A. Yes, sir.

2 : 5 8 P M 19 Q. Go to the next slide, please.

2 : 5 9 P M 20 A. I believe there were two things -- well, four things,  
2 : 5 9 P M 21 really, that looked at the reason that it didn't form a  
2 : 5 9 P M 22 barrier. One's what I call a failure of engineering design.

2 : 5 9 P M 23 To design a cementing job, to design a cementing  
2 : 5 9 P M 24 operation is really two parts: You've got chemistry, which is  
2 : 5 9 P M 25 the design of the cement slurry itself; and physics, which is



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2 : 5 9 P M 1 the placement of the cement itself.

2 : 5 9 P M 2 I found there was a failure in both of those. The  
2 : 5 9 P M 3 Macondo well used a leftover cement blend. It was not  
2 : 5 9 P M 4 originally intended -- originally designed as a foam cement.  
2 : 5 9 P M 5 And so because of that, it puts more onus on lab testing to  
2 : 5 9 P M 6 make sure that all of the testing was done and completed.

2 : 5 9 P M 7 I also found that there was a failure to really  
2 : 5 9 P M 8 mitigate several acknowledged risks to the job itself.

3 : 0 0 P M 9 And then, finally, there was a failure to evaluate  
3 : 0 0 P M 10 the cumulative risks that were acknowledged. So it wasn't just  
3 : 0 0 P M 11 one risk that happened, but the cumulative risks that caused  
3 : 0 0 P M 12 that failure.

3 : 0 0 P M 13 Q. How does the cement design process work? What's the  
3 : 0 0 P M 14 relationship between the operator and the cement service  
3 : 0 0 P M 15 provider?

3 : 0 0 P M 16 A. It's a very iterative process. The operator will -- they  
3 : 0 0 P M 17 set the boundary conditions, they set the limits, what's the  
3 : 0 0 P M 18 objectives of the well. So what do I want the cement job to  
3 : 0 0 P M 19 do?

3 : 0 0 P M 20 And once I've set those goals and I understand those  
3 : 0 0 P M 21 goals, then what's my operating window? What's the well doing?  
3 : 0 0 P M 22 How deep is it? What's the size of everything? What's my pore  
3 : 0 0 P M 23 pressure, frac gradient, what have you? They give that to the  
3 : 0 0 P M 24 cementing service company.

3 : 0 0 P M 25 And with their portfolio of materials, they go and,

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3:01PM 1 within the limits or the constraints of that well, design the  
3:01PM 2 chemistry, if you will, the cement slurry itself.

3:01PM 3 Also involved with that and in concert with that are  
3:01PM 4 the design of the physics. What's the constraints? How fast  
3:01PM 5 can we pump? What are fluid densities? What's the well look  
3:01PM 6 like? So it's a very iterative technique.

3:01PM 7 And then, once all that's come together, you bring  
3:01PM 8 that back together and the operator then reviews that and then  
3:01PM 9 it's ultimately approved by the operator before it's used on  
3:01PM 10 the well.

3:01PM 11 Q. Is the operator ultimately responsible for cementing the  
3:01PM 12 well?

3:01PM 13 A. Yes.

3:01PM 14 Q. Who has the ultimate authority on the cement job? Is that  
3:01PM 15 also the operator?

3:01PM 16 A. Yes, sir. You can't pump anything in that well that the  
3:01PM 17 operator doesn't approve.

3:01PM 18 Q. I'd like you to talk about -- a bit more about the  
3:01PM 19 chemistry and the physics that you mentioned.

3:01PM 20 MR. CERNICH: If we could go to the next slide,  
3:01PM 21 please.

3:01PM 22 BY MR. CERNICH:

3:02PM 23 Q. Can you tell the Court a little bit more about the  
3:02PM 24 chemistry and physics?

3:02PM 25 A. Well, the chemistry is -- it's the cake mix. It's what's

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3 : 0 2 P M 1 in there. It's the dry blend with all of its additives. So  
3 : 0 2 P M 2 the chemistry is basically the cement slurry itself, what  
3 : 0 2 P M 3 additives it has in it, what those additives have the effect  
3 : 0 2 P M 4 of. So that has to be designed within the constraints of the  
3 : 0 2 P M 5 well. What's expected of it, I've got to get additives that  
3 : 0 2 P M 6 will give me the properties that I want.

3 : 0 2 P M 7 So the chemistry is really the cement slurry, and  
3 : 0 2 P M 8 then the physics is the placement of that slurry. They have to  
3 : 0 2 P M 9 work hand in hand. They're not separates but equals. They  
3 : 0 2 P M 10 have to work together. I can have the best cement slurry  
3 : 0 2 P M 11 design in the world; and if I don't get it on the plate right,  
3 : 0 2 P M 12 you're not going to work. And if I can get it on the plate  
3 : 0 2 P M 13 perfectly but it's not what I wanted, then you'll still have a  
3 : 0 2 P M 14 failure. So it's really both.

3 : 0 3 P M 15 Q. So is slurry design more important than cement placement?

3 : 0 3 P M 16 A. No, sir.

3 : 0 3 P M 17 MR. CERNICH: Can we go to Exhibit 3058.

3 : 0 3 P M 18 BY MR. CERNICH:

3 : 0 3 P M 19 Q. Do you recognize this document, Mr. Bengé?

3 : 0 3 P M 20 A. Yes, sir, I do.

3 : 0 3 P M 21 Q. What is it?

3 : 0 3 P M 22 A. That's a global deepwater design guideline that -- that's  
3 : 0 3 P M 23 a BP document that actually Ashley Hibbert put together some  
3 : 0 3 P M 24 years ago.

3 : 0 3 P M 25 Q. Do you know Mr. Hibbert?

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3:03 PM 1 A. Yes, sir. I've known Ashley for a number of years. He's  
3:03 PM 2 a global -- he's since retired, but he was the global cementing  
3:03 PM 3 specialist for BP out of the UK.

3:03 PM 4 MR. CERNICH: Can you go to page 7, please.

3:03 PM 5 BY MR. CERNICH:

3:03 PM 6 Q. Do you recall reviewing this portion of the document?

3:03 PM 7 A. Yes, sir, I do.

3:03 PM 8 Q. And can you describe what this says?

3:03 PM 9 A. Yes. I like the way Ashley put this, because this is a  
3:03 PM 10 misconception that slurry design is more important than getting  
3:03 PM 11 optimum wellbore conditions for cementing, good hole, good  
3:03 PM 12 fluid or mud properties, good centralization and displacement;  
3:03 PM 13 in other words, the physics.

3:04 PM 14 And the common mistake is that I've got an additive  
3:04 PM 15 or a 5-gallon bucket of something I can put in the cement that  
3:04 PM 16 will overcome physics, and that doesn't exist.

3:04 PM 17 Q. Is this consistent with your opinions?

3:04 PM 18 A. Oh, yes.

3:04 PM 19 Q. Can poor placement of cement affect stability?

3:04 PM 20 A. Yes, it can.

3:04 PM 21 Q. How does it do that?

3:04 PM 22 A. Well, if you don't place it properly -- and we talked a  
3:04 PM 23 little bit about the plugs keeping the cement separated -- it  
3:04 PM 24 will contaminate it. You can get contamination with fluids  
3:04 PM 25 that you don't intend.

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3 : 0 4 P M 1 So if you don't have it placed properly, those fluids  
3 : 0 4 P M 2 will intermix more and you'll get contamination and the cement  
3 : 0 4 P M 3 can't perform.

3 : 0 4 P M 4 Q. What is stability?

3 : 0 4 P M 5 A. Stability is where -- in the case of every slurry design  
3 : 0 4 P M 6 is -- it stays together; it does what I said it was going to do.  
3 : 0 4 P M 7 So that doesn't necessarily have to be just foam. That can be  
3 : 0 4 P M 8 with a standard cement slurry.

3 : 0 4 P M 9 You see that when you put in the foundation of your  
3 : 0 5 P M 10 house. If it wasn't stable, all of the gravel would be down at  
3 : 0 5 P M 11 the bottom. We don't pump gravel in oil field cement. All of  
3 : 0 5 P M 12 the gravel would be down at the bottom and you'd have cement at  
3 : 0 5 P M 13 the top. That would be unstable, and that means you're not  
3 : 0 5 P M 14 going to get the properties that you want.

3 : 0 5 P M 15 Q. On page 2 of your report, you wrote: "BP engineers chose  
3 : 0 5 P M 16 to accept risks when designing the cement job based on their  
3 : 0 5 P M 17 awareness that remedial cementing work could be done at a later  
3 : 0 5 P M 18 date."

3 : 0 5 P M 19 Do you recall writing that in your report?

3 : 0 5 P M 20 A. Yes, sir, I do.

3 : 0 5 P M 21 Q. And that's your opinion?

3 : 0 5 P M 22 A. Yes, sir, it is.

3 : 0 5 P M 23 Q. What did you mean by that?

3 : 0 5 P M 24 A. There are a number of accepted risks that were identified  
3 : 0 5 P M 25 and noted by BP engineers that, you know, we are going to

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3 : 0 5 P M 1 compromise some of the practices associated with cementing and  
3 : 0 5 P M 2 we can come back and squeeze it later.

3 : 0 5 P M 3 And there's a number of -- or there's an e-mail that  
3 : 0 5 P M 4 specifically states to that effect.

3 : 0 6 P M 5 MR. CERNICH: Could we go to Exhibit 1367, please.

3 : 0 6 P M 6 BY MR. CERNICH:

3 : 0 6 P M 7 Q. Do you recognize this document, Mr. Bengé?

3 : 0 6 P M 8 A. Yes, sir, I do.

3 : 0 6 P M 9 Q. Is this the e-mail to which you were referring?

3 : 0 6 P M 10 A. Yes. This is one that -- it basically says that I  
3 : 0 6 P M 11 would -- in this particular case, they're looking at --

3 : 0 6 P M 12 Q. Can I stop you for a minute?

3 : 0 6 P M 13 This is an e-mail dated April 16th, 2010, from Brett  
3 : 0 6 P M 14 Cocalés to Brian Morel; is that right?

3 : 0 6 P M 15 A. Yes, sir, it is.

3 : 0 6 P M 16 Q. Can you tell the Court who Mr. Cocalés and Mr. Morel are?

3 : 0 6 P M 17 A. Those are both BP drilling engineers that worked on the  
3 : 0 6 P M 18 Macondo well.

3 : 0 6 P M 19 Q. Thank you.

3 : 0 6 P M 20 What does this e-mail say?

3 : 0 6 P M 21 A. This e-mail is talking about the placement of  
3 : 0 6 P M 22 centralizers, and I know the Court has seen this one before.  
3 : 0 6 P M 23 But it says that there's a risk -- it says: "So Guide is  
3 : 0 6 P M 24 right. Is the risk/reward" -- "Guide" is John Guide, the  
3 : 0 6 P M 25 operations man for BP for Macondo.

## GLEN BENGE - DIRECT

3:07 PM 1 So he says the risk -- the acknowledged risk is  
3:07 PM 2 getting stuck in the wellhead. And so he would rather accept  
3:07 PM 3 that risk and have to come back and squeeze than get stuck in  
3:07 PM 4 the wellhead. So he's acknowledging that If we don't do this  
3:07 PM 5 right, we'll come back and we'll have to squeeze the well  
3:07 PM 6 later.

3:07 PM 7 Q. While we're on this e-mail, Mr. Benge, is a hole ever  
3:07 PM 8 perfectly straight?

3:07 PM 9 A. Oh, no. The hole isn't perfectly straight. Anybody  
3:07 PM 10 that's done woodworking and tried to drill a straight hole  
3:07 PM 11 knows you can't. You'll have to use a drill press. If you can  
3:07 PM 12 imagine trying to do that 3 miles away. The hole spirals.  
3:07 PM 13 You're turning to the right and that bit, the drill string,  
3:07 PM 14 tends to spiral. So it literally will spiral. It's never  
3:07 PM 15 straight.

3:07 PM 16 You can see that very easily just looking at the  
3:07 PM 17 survey data. If it was very perfectly straight, all those  
3:07 PM 18 numbers would be the same, and they're all over the board  
3:08 PM 19 showing it spiraling.

3:08 PM 20 Q. And Mr. Cocalles writes: "But who cares? It's done. End  
3:08 PM 21 of story, we'll probably be fine and we'll get a good cement  
3:08 PM 22 job."

3:08 PM 23 Did I read that correctly?

3:08 PM 24 A. Yes, sir, you did.

3:08 PM 25 Q. Did BP get a good cement job?

## GLEN BENGE - DIRECT

3:08 PM 1 A. No, sir, they did not.

3:08 PM 2 MR. CERNICH: Could I go to Exhibit 4451, please.

3:08 PM 3 BY MR. CERNICH:

3:08 PM 4 Q. Can you identify this document, Mr. Bengé?

3:08 PM 5 A. Yes. These are the Bly interview notes for Mr. Mark

3:08 PM 6 Hafle, who is a senior engineer the Macondo well.

3:08 PM 7 MR. CERNICH: Can we go to page 3, please.

3:08 PM 8 BY MR. CERNICH:

3:08 PM 9 Q. Do you recall reading this portion of the notes,

3:08 PM 10 Mr. Bengé?

3:08 PM 11 A. Yes, sir, I do.

3:08 PM 12 Q. And could you please read the highlighted section for the

3:08 PM 13 Court?

3:08 PM 14 A. Yes, sir. It says: Weekend RNG, running pipe. Brian

3:08 PM 15 call, says they are not running all centralizers, only the six

3:08 PM 16 across pay. Time issues. Glue, cent" -- for centralizers --

3:08 PM 17 Don't know who made the final decision. Thought we were going

3:09 PM 18 to get a shitty cement job.

3:09 PM 19 It goes on to say: 12 to 18 hours -- talking of the

3:09 PM 20 centralizers -- of downtime. Glue has to cure? Bryan Clawson.

3:09 PM 21 Communication plan, who makes decisions?

3:09 PM 22 Q. And do you know what Mr. Hafle meant by "glue has to

3:09 PM 23 cure"?

3:09 PM 24 MR. REGAN: Objection, Your Honor. The witness can

3:09 PM 25 give his interpretation, but -- with respect to Mr. Hafle's



## GLEN BENGE - DIRECT

3 : 0 9 P M 1 state of mind as before today as to these notes.

3 : 0 9 P M 2 THE COURT: Okay. With that understanding, I'll let  
3 : 0 9 P M 3 him answer.

3 : 0 9 P M 4 What is your interpretation then?

3 : 0 9 P M 5 THE WITNESS: The glue has to cure. These are  
3 : 0 9 P M 6 specialty centralizers that -- there's a glue that goes onto  
3 : 0 9 P M 7 the stop collar, and those were ones that are --

3 : 0 9 P M 8 THE COURT: These are the 15 extra collars; right?

3 : 0 9 P M 9 THE WITNESS: Yes, sir.

3 : 0 9 P M 10 THE COURT: The ones that -- actually, they're not  
3 : 0 9 P M 11 collars. They're --

3 : 0 9 P M 12 THE WITNESS: Well, they're centralizers.

3 : 0 9 P M 13 THE COURT: -- centralizers that go around the drill  
3 : 0 9 P M 14 pipe?

3 : 0 9 P M 15 THE WITNESS: Right, they go around the casing, yes,  
3 : 1 0 P M 16 sir.

3 : 1 0 P M 17 THE COURT: Casing, I'm sorry. They snap on or  
3 : 1 0 P M 18 attach somehow?

3 : 1 0 P M 19 THE WITNESS: Well, you slide them on from the bottom  
3 : 1 0 P M 20 and there's a stop collar, is what it's called. And those have  
3 : 1 0 P M 21 Allen screws in them, but they also have to have glue. And  
3 : 1 0 P M 22 that's what -- BP upped the design with Weatherford from the  
3 : 1 0 P M 23 work off of *Thunder Horse*.

3 : 1 0 P M 24 BY MR. CERNICH:

3 : 1 0 P M 25 Q. What did you mean by that, Mr. Bengé?

## GLEN BERGE - DIRECT

3 : 10 PM 1 A. Well, they improved the centralizer design based on some  
3 : 10 PM 2 problems they'd had on the *Thunder Horse* well. So part of it  
3 : 10 PM 3 ways changing that stop collar but also was applying a glue to  
3 : 10 PM 4 those to keep those stop collars in place.

3 : 10 PM 5 Q. So based on your knowledge of these types of centralizers  
3 : 10 PM 6 and this glueing process, would it have taken additional time  
3 : 10 PM 7 to install those and allow them to cure?

3 : 10 PM 8 A. Yes, sir, it would have.

3 : 10 PM 9 Q. Would you agree with the sentiment expressed here by  
3 : 10 PM 10 Mr. Hafle about the quality of the Macondo cement job?

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

3 : 11 PM 12 Q. How do the comments regarding the centralizers factor into  
3 : 11 PM 13 your opinion?

3 : 11 PM 14 A. Well, I would agree that if they were only going to run  
3 : 11 PM 15 six, that was a risk that was acknowledged and that was going  
3 : 11 PM 16 to result in a suboptimal cement job.

3 : 11 PM 17 Q. Does your report identify risks that were taken on the  
3 : 11 PM 18 Macondo cement job?

3 : 11 PM 19 A. Yes, sir, it does.

3 : 11 PM 20 MR. CERNICH: Can we go to the next slide, please.

3 : 11 PM 21 BY MR. CERNICH:

3 : 11 PM 22 Q. Does this list identify risks that you identified on the  
3 : 11 PM 23 Macondo cement job?

3 : 11 PM 24 A. Yes, sir, it does. I've grouped them into nine separate  
3 : 11 PM 25 categories.

## GLEN BENGE - DIRECT

3 : 11 PM 1 Q. And did you identify these risks in your expert report?

3 : 11 PM 2 A. Yes, sir, I did.

3 : 11 PM 3 Q. In your review, did you observe anything done to mitigate

3 : 11 PM 4 these risks?

3 : 11 PM 5 A. No sir, I did not.

3 : 11 PM 6 Q. Did you see any evidence that anyone assessed the

3 : 11 PM 7 cumulative effects of these risks?

3 : 11 PM 8 A. No, sir.

3 : 11 PM 9 Q. What was the cumulative effect, if you've considered that?

3 : 12 PM 10 A. Based on everything I saw with this, there was -- you were

3 : 12 PM 11 not going to get a successful cement job, and the cement would

3 : 12 PM 12 not form a barrier in this well.

3 : 12 PM 13 Q. And you testified earlier that BP accepted known risks.

3 : 12 PM 14 Which of these were known risks?

3 : 12 PM 15 A. Well, if we look through the list, there was an

3 : 12 PM 16 acknowledgment of using leftover cement. We know that BP did

3 : 12 PM 17 not have all of the lab data prior to the cement job. There is

3 : 12 PM 18 documented an acknowledged risk for foam cement and synthetic

3 : 12 PM 19 oil-based mud -- that's SOBMs. As we've seen, it was understood

3 : 12 PM 20 there was inadequate centralization.

3 : 12 PM 21 Not prior to the job -- I mean, not in a design

3 : 12 PM 22 phase, but prior to the job, we know there was problems with

3 : 12 PM 23 the float collar conversion: limited pre-job circulation and

3 : 13 PM 24 low cement volume and low pump rates. So those are the

3 : 13 PM 25 majority that were known.

## GLEN BENGE - DIRECT

3 : 13 PM 1 Q. Given these risks, in your opinion, should BP have pumped  
3 : 13 PM 2 the cement job as designed?

3 : 13 PM 3 A. I would not have pumped that and expected it to be  
3 : 13 PM 4 successful.

3 : 13 PM 5 Q. And that's consistent with Mr. Hafle's comments to  
3 : 13 PM 6 Mr. Corser?

3 : 13 PM 7 A. Yes, sir.

3 : 13 PM 8 Q. I'd like to talk about the first risk you identified, no  
3 : 13 PM 9 expressed job objectives. Did you see the Macondo cement job  
3 : 13 PM 10 objectives documented anywhere?

3 : 13 PM 11 A. No, sir, I did not. And without -- if you don't know  
3 : 13 PM 12 where you're going, you don't know how you're going to get  
3 : 13 PM 13 there.

3 : 13 PM 14 MR. CERNICH: Could we go to page 36 of Mr. Bengé's  
3 : 13 PM 15 report.

3 : 13 PM 16 THE WITNESS: And without those total objectives --  
3 : 13 PM 17 now, the only objective I did find -- and this is a decision  
3 : 13 PM 18 tree on what to do for the cement job, what's going to  
3 : 14 PM 19 designate a successful cement job.

3 : 14 PM 20 And the only objective that you'll find on this  
3 : 14 PM 21 is did we have full return? In other words, if you pumped a  
3 : 14 PM 22 gallon in, a gallon came out. All of the cement went up the  
3 : 14 PM 23 outside of that plate, nothing spilled out into the formation  
3 : 14 PM 24 or broke the formation.

3 : 14 PM 25 So if you had full returns, consider it a

## GLEN BENGE - DIRECT

3 : 14 PM 1 success, then that's the only documented goal that I saw.

3 : 14 PM 2 **BY MR. CERNICH:**

3 : 14 PM 3 **Q.** And was there a particular concern about full returns?

3 : 14 PM 4 **A.** There was. This is a very fragile well. You didn't have  
3 : 14 PM 5 a whole lot of room between pore pressure and frac gradient.  
3 : 14 PM 6 And it was a very, very difficult and challenging cement job.

3 : 14 PM 7 **MR. CERNICH:** Could we go to page 7 of Mr. Bengé's  
3 : 14 PM 8 report, Exhibit 5590. And if we could please focus in on this  
3 : 15 PM 9 paragraph -- no, the one above it. Above that one.

3 : 15 PM 10 **BY MR. CERNICH:**

3 : 15 PM 11 **Q.** In here you write: "BP's engineering design for the  
3 : 15 PM 12 production string cement job was driven by the singular desire  
3 : 15 PM 13 to minimize equivalent circulation density, ECD."

3 : 15 PM 14 Did I read that correctly?

3 : 15 PM 15 **A.** Yes, sir, you did.

3 : 15 PM 16 **Q.** What did you mean by that?

3 : 15 PM 17 **A.** Well, in order to -- in that decision tree it was -- we  
3 : 15 PM 18 have to have full circulation. We can't break that well. So  
3 : 15 PM 19 ECD, or equivalent circulation, it's the pressure on that well.

3 : 15 PM 20 And so all of the decisions and the documented  
3 : 15 PM 21 decisions on that cement job were to reduce that down and to  
3 : 15 PM 22 minimize the ECD from the selection of the base oil ahead of  
3 : 15 PM 23 the cement, to foam cement, to low pump rates.

3 : 15 PM 24 All of those are designed and are documented in an  
3 : 16 PM 25 MOC. That's to minimize ECD.

## GLEN BENGE - DIRECT

3 : 16 PM 1 Q. Did you note any unexpressed job objectives?

3 : 16 PM 2 A. Well, there's also an unexpressed or an inherent job

3 : 16 PM 3 objective to get -- you want to get a barrier in the well, or a

3 : 16 PM 4 seal. And that's always an -- really, an unexpressed goal for

3 : 16 PM 5 a cement job.

3 : 16 PM 6 Q. A moment ago you mentioned top of cement in your

3 : 16 PM 7 discussion of the flow chart. Can you explain the concept of

3 : 16 PM 8 "top of the cement" to the Court.

3 : 16 PM 9 A. Top of cement is how high in the well that cement has got

3 : 16 PM 10 to be. So when we're done with the job, there's a sufficient

3 : 16 PM 11 volume of cement to put in that annulus up to some height. And

3 : 16 PM 12 so the top of the cement, once you define that's where I want

3 : 16 PM 13 top of cement, from a cementer's standpoint, that defines the

3 : 16 PM 14 volume of your job.

3 : 16 PM 15 So I need cement. That will tell me how much cement

3 : 17 PM 16 I have to have. It will define -- in part, because that's your

3 : 17 PM 17 volume of cement, it will define a lot of the properties that

3 : 17 PM 18 you have to have for that cement.

3 : 17 PM 19 Q. And how was top of cement relevant specifically to the

3 : 17 PM 20 Macondo production casing cement job?

3 : 17 PM 21 A. In this particular well, the top of cement was chosen to

3 : 17 PM 22 be 500 feet above the hydrocarbon zone, and that's an MMS

3 : 17 PM 23 requirement.

3 : 17 PM 24 Q. So that was the minimum standard?

3 : 17 PM 25 A. That's the minimum standard, yes, sir.

## GLEN BENGE - DIRECT

3 : 17 PM 1 Q. Did you observe the cementing knowledge of the BP  
3 : 17 PM 2 engineers working on the Macondo cement job?

3 : 17 PM 3 A. Yes, sir, I did.

3 : 17 PM 4 Q. And what did you observe?

3 : 17 PM 5 A. I observed a good deal of knowledge of cementing from the  
3 : 17 PM 6 engineers as well as a great deal of control that BP had over  
3 : 17 PM 7 the cement and down to individual additives that were chosen  
3 : 17 PM 8 for the cement.

3 : 17 PM 9 MR. CERNICH: Could we go to Exhibit 7717, please.

3 : 18 PM 10 BY MR. CERNICH:

3 : 18 PM 11 Q. Can you identify this document, Mr. Bengé?

3 : 18 PM 12 A. Yes, sir. If I -- we can move away from -- let's just  
3 : 18 PM 13 move away from the primary cement job or the production cement  
3 : 18 PM 14 job.

3 : 18 PM 15 This is for the kickoff plug, or that sidetrack plug  
3 : 18 PM 16 that's way up the well. This is a series of e-mails back and  
3 : 18 PM 17 forth on how much spacer do you run.

3 : 18 PM 18 Now, that spacer is the fluid you pump ahead to keep  
3 : 18 PM 19 the cement and the mud apart. So it's your preflusher, the  
3 : 18 PM 20 spacer that helps to clean that hole.

3 : 18 PM 21 Q. Just for a moment here, to pause. This bottom e-mail here  
3 : 18 PM 22 is from Jesse Gagliano to Brian Morel and Mark Hafle, dated  
3 : 18 PM 23 March 15th, 2010; is that right?

3 : 18 PM 24 A. Yes, sir.

3 : 18 PM 25 Q. And is the subject "KOP Procedure"?

## GLEN BENGE - DIRECT

3 : 18 PM 1 A. Yes. And that stands for kick-off plug.

3 : 18 PM 2 Q. And do you know who Mr. Gagliano is?

3 : 19 PM 3 A. Mr. Gagliano is the desk engineer for Halliburton that was

3 : 19 PM 4 assigned to BP.

3 : 19 PM 5 Q. And could you go ahead and explain this to the Court.

3 : 19 PM 6 A. Yes, sir. What this is, you -- in order to clean the

3 : 19 PM 7 hole, to get it prepared for cementing, you've got to get the

3 : 19 PM 8 mud out. You have to replace mud with cement. And mud and

3 : 19 PM 9 cement don't like each other very much. When you get the two

3 : 19 PM 10 mixed together, you'll sacrifice those cementing properties.

3 : 19 PM 11 So a spacer is designed to act as a fluid buffer

3 : 19 PM 12 between the two. Now, as the hole gets bigger and such, you

3 : 19 PM 13 need more spacer because the volumes -- because you have to

3 : 19 PM 14 have more volume.

3 : 19 PM 15 In this particular case, Mr. Gagliano is noting

3 : 19 PM 16 that -- well, he said: The volume you want to run is

3 : 19 PM 17 75 barrels. But best practices -- and he's quoting from best

3 : 19 PM 18 practices -- that you need a minimum of about 1,000 to

3 : 19 PM 19 1,500 feet in order to be able to separate out the cement and

3 : 19 PM 20 the mud.

3 : 20 PM 21 And he goes through the explanation of you need more

3 : 20 PM 22 because the hole's bigger.

3 : 20 PM 23 Now, in that -- and then Mark Hafle sends this to

3 : 20 PM 24 Erick. Erick is Erick Cunningham. He's the BP Western

3 : 20 PM 25 Hemisphere cementing specialist.



## GLEN BENGE - DIRECT

3:20 PM

1 Q. Do you know Mr. Cunningham?

3:20 PM

2 A. I've known Erick for a lot of years. He used to be at  
3 Schlumberger and then moved over to BP in a position very  
4 similar to what I held at ExxonMobil.

3:20 PM

5 So Mark's asking him: Erick, well, can you comment  
6 or review, and what are your thoughts on this? So he's asking  
7 his cementing specialist to look at Mr. Gagliano's  
8 recommendation and say, you know, What do you think about it?  
9 Because our team's wanting to run 75 barrels."

3:20 PM

10 MR. CERNICH: Can we move to the next page, please.  
11 Can we go back to the prior exhibit, the next page?

3:20 PM

12 There we go.

3:20 PM

13 THE WITNESS: So this is a continuation of those  
14 e-mails. And the bottom portion of this, it says -- this is  
15 Erick Cunningham writing back to Mr. Hafle and Mr. Morel, so  
16 these are all BP folks.

3:21 PM

3:21 PM

17 He says: "Mark, I haven't had a chance to look  
18 at it in detail, but I agree. We need more spacer to separate  
19 out the cement and the mud."

3:21 PM

3:21 PM

20 So he's agreeing with Halliburton.

3:21 PM

3:21 PM

21 And then we see up at the top --

3:21 PM

3:21 PM

22 MR. CERNICH: Can we focus in on the top of that  
23 e-mail, please.

3:21 PM

3:21 PM

24 BY MR. CERNICH:

3:21 PM

3:21 PM

25 Q. And this is an e-mail from Mr. Hafle to Mr. Morel --

3:21 PM

## GLEN BENGE - DIRECT

3 : 2 1 P M 1 A. Right.

3 : 2 1 P M 2 Q. -- dated March 16th?

3 : 2 1 P M 3 A. Yes. Now you have the BP engineers communicating back and  
3 : 2 1 P M 4 forth with each other.

3 : 2 1 P M 5 And he's asking him -- Mr. Morel is asking: "Do you  
3 : 2 1 P M 6 want to talk about spacer volume? If so, give me a call."

3 : 2 1 P M 7 "Guide" -- in this case was John Guide -- "wants to  
3 : 2 1 P M 8 stay with the 75-barrels, and they've reduced the cement  
3 : 2 2 P M 9 volume."

3 : 2 2 P M 10 If we go down to the very bottom of this, it says:  
3 : 2 2 P M 11 "Well, we don't need to water-wet the hole because we don't  
3 : 2 2 P M 12 care about it setting or stick to the walls. Just need a hard  
3 : 2 2 P M 13 core to push off. I know some people think I'm crazy."

3 : 2 2 P M 14 What that tells you with respect to this, spacers  
3 : 2 2 P M 15 have to clean the hole. And so there's an understanding from  
3 : 2 2 P M 16 Mr. Morel of the function of a spacer, that it water-wets the  
3 : 2 2 P M 17 hole; that in order for cement to stick to that hole, you have  
3 : 2 2 P M 18 to clean the mud and to water-wet it. So that's an  
3 : 2 2 P M 19 understanding of the fluid dynamics, the understanding of the  
3 : 2 2 P M 20 cementing process that goes on with simply the selection of a  
3 : 2 2 P M 21 spacer.

3 : 2 2 P M 22 **MR. REGAN:** Your Honor, if I might, just with respect  
3 : 2 2 P M 23 to this line of questioning about e-mails, I understand the  
3 : 2 2 P M 24 witness can give his understanding of what these e-mails mean;  
3 : 2 2 P M 25 but for the record, beyond reading the words on the page, the

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3 : 2 3 PM 1 witness has not met Mr. Morel and doesn't have a basis as to  
3 : 2 3 PM 2 what Mr. Morel believed or thought at the time he wrote the  
3 : 2 3 PM 3 message.

3 : 2 3 PM 4 **THE COURT:** All right. I understand.

3 : 2 3 PM 5 **MR. REGAN:** All right. Thank you, Your Honor.

3 : 2 3 PM 6 **BY MR. CERNICH:**

3 : 2 3 PM 7 **Q.** And, Mr. Benge, do you know what volume of spacer was  
3 : 2 3 PM 8 ultimately run on this kick-off plug?

3 : 2 3 PM 9 **A.** Actually, ultimately, in reading a lot of the deposition  
3 : 2 3 PM 10 testimony, they did go with -- "they," BP, went with the volume  
3 : 2 3 PM 11 that was recommended by Halliburton and seconded by Mr. -- or  
3 : 2 3 PM 12 by Erick.

3 : 2 3 PM 13 **MR. CERNICH:** Okay. Can we go to Exhibit 31001,  
3 : 2 3 PM 14 please.

3 : 2 3 PM 15 **BY MR. CERNICH:**

3 : 2 3 PM 16 **Q.** Can you identify this document?

3 : 2 3 PM 17 **A.** Yes, sir, I can. That's a -- this is involving the  
3 : 2 3 PM 18 selection process of an individual additive for loss  
3 : 2 3 PM 19 circulation control. If I break that well down, I can put some  
3 : 2 4 PM 20 fibers in that cement; and it will go up against the formation  
3 : 2 4 PM 21 and help prevent loss circulation control.

3 : 2 4 PM 22 So this is a selection of that -- of a material to  
3 : 2 4 PM 23 put into the cement for the production string on the Macondo  
3 : 2 4 PM 24 well.

3 : 2 4 PM 25 These are some communications back and forth. In

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3 : 2 4 P M 1 this particular case, Erick Cunningham, in the middle here, has  
3 : 2 4 P M 2 said that he's looking at both, and Erick is looking at both  
3 : 2 4 P M 3 Halliburton, HAL, and Schlumberger products, sending that to  
3 : 2 4 P M 4 Brian Morel.

3 : 2 4 P M 5 And then in the top portion of this e-mail, Mr. Morel  
3 : 2 4 P M 6 is asking his team -- he's saying: "I'm looking to find the  
3 : 2 4 P M 7 most effective product for loss circulation during our  
3 : 2 4 P M 8 production cement job."

3 : 2 4 P M 9 So the reason that I brought this in and put this in  
3 : 2 4 P M 10 with my report is this shows that, you know, you've got a drill  
3 : 2 4 P M 11 team here that's very involved in cement to the point they're  
3 : 2 5 P M 12 selecting individual additives to be used on the production --  
3 : 2 5 P M 13 on the production cement job for the Macondo well.

3 : 2 5 P M 14 **MR. CERNICH:** Can we go to Exhibit 987, please.

3 : 2 5 P M 15 **BY MR. CERNICH:**

3 : 2 5 P M 16 **Q.** Can you identify this document, Mr. Bengé?

3 : 2 5 P M 17 **A.** Yes, sir, I can. This is where Mr. Gagliano has sent --  
3 : 2 5 P M 18 sent the results of laboratory testing for two different  
3 : 2 5 P M 19 concentrations of retarder.

3 : 2 5 P M 20 **Q.** And this is on April 17th, 2010?

3 : 2 5 P M 21 **A.** Yes, sir, it is.

3 : 2 5 P M 22 **Q.** And has he sent this e-mail to Mr. Morel, Mr. Hafle,  
3 : 2 5 P M 23 Mr. Cocalés, and Mr. Walz?

3 : 2 5 P M 24 **A.** Yes, sir, he did.

3 : 2 5 P M 25 And just so the Court understands, this has 8 gallons

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3 : 2 5 P M 1 and 9 gallons; that's per 100 sacks. We try to confuse  
3 : 2 5 P M 2 everybody as much as possible. So it's 8 gallons or 9 gallons  
3 : 2 5 P M 3 per 100 sacks, which you'll see also .108, and that's gallons  
3 : 2 6 P M 4 per one sack of cement. They're the same number. It just  
3 : 2 6 P M 5 whether it's per 100 sacks or per 1 sack.

3 : 2 6 P M 6 And in this case Mr. Gagliano is saying, you know,  
3 : 2 6 P M 7 the job placement time is about four hours. He's comfortable  
3 : 2 6 P M 8 with the 5 1/2-hour pump time, or thickening time, how long the  
3 : 2 6 P M 9 cement stays liquid.

3 : 2 6 P M 10 And so he would recommend the 8 gallons, which gave  
3 : 2 6 P M 11 him 5 1/2-hours.

3 : 2 6 P M 12 Q. Why are they concerned about how long the cement stays  
3 : 2 6 P M 13 liquid?

3 : 2 6 P M 14 A. Well, you have to -- once you mix the solid and liquid at  
3 : 2 6 P M 15 surface, you have to pump it into place. So it has to stay a  
3 : 2 6 P M 16 fluid for that entire trip all the way down and as it goes into  
3 : 2 6 P M 17 that annulus. So you don't want it setting early, so you  
3 : 2 6 P M 18 retard the cement with, in this case, the SCR-100 is a cement  
3 : 2 6 P M 19 retarder. And so it extends that liquid time or the fluid  
3 : 2 7 P M 20 time.

3 : 2 7 P M 21 Q. So what does Mr. Gagliano say to Mr. Morel?

3 : 2 7 P M 22 A. He said that he feels comfortable with 8 gallons, which is  
3 : 2 7 P M 23 the shorter thickening time.

3 : 2 7 P M 24 And then Mr. Morel, in the top portion of this, said:  
3 : 2 7 P M 25 "I would prefer the extra pump time, with the added risk of

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3 : 2 7 P M 1 having issues with the nitrogen."

3 : 2 7 P M 2 He goes on to say: "What are your thoughts? There  
3 : 2 7 P M 3 isn't compressive strength development yet, so it's hard to  
3 : 2 7 P M 4 ensure we'll get what we need until it's done."

3 : 2 7 P M 5 So he's acknowledging a risk. "In this particular  
3 : 2 7 P M 6 case, I'd prefer the extra pump time." He's making a decision,  
3 : 2 7 P M 7 and he's acknowledged the risk of that decision.

3 : 2 7 P M 8 Q. And do you know what the issues with the nitrogen might  
3 : 2 7 P M 9 be?

3 : 2 7 P M 10 MR. REGAN: Objection, Your Honor. This is rank  
3 : 2 8 P M 11 speculation with respect to what Mr. Morel meant in these  
3 : 2 8 P M 12 words.

3 : 2 8 P M 13 MR. CERNICH: Your Honor, Mr. Bengé is an expert in  
3 : 2 8 P M 14 oil field cementing. He clearly knows what effects retarders  
3 : 2 8 P M 15 have on nitrogen.

3 : 2 8 P M 16 THE COURT: Overrule the objection.

3 : 2 8 P M 17 Before you do that, explain to me -- I know you  
3 : 2 8 P M 18 talked about 8 gallons versus 9-gallons and this is retarder  
3 : 2 8 P M 19 we're talking about.

3 : 2 8 P M 20 THE WITNESS: Yes, sir.

3 : 2 8 P M 21 THE COURT: So the more retarder, the slower the  
3 : 2 8 P M 22 cement would set?

3 : 2 8 P M 23 THE WITNESS: That's correct. Yeah, that's exactly  
3 : 2 8 P M 24 right. It will stay liquid longer and it will take longer to  
3 : 2 8 P M 25 set.

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3 : 2 8 P M 1 THE COURT: So what was your understanding of what  
3 : 2 8 P M 2 the trade-off here was? Why were they debating? Was there a  
3 : 2 8 P M 3 big difference between 8 or 9 here?

3 : 2 8 P M 4 THE WITNESS: In this particular case --

3 : 2 8 P M 5 THE COURT: In the context here?

3 : 2 8 P M 6 THE WITNESS: -- we went from 5 1/2-hours to  
3 : 2 8 P M 7 7 1/2 hours, so almost a 50 percent increase in thickening time  
3 : 2 8 P M 8 or liquid time. It stayed liquid longer.

3 : 2 9 P M 9 These are very powerful additives. So just that  
3 : 2 9 P M 10 small amount --

3 : 2 9 P M 11 THE COURT: So they used the 9 instead of the 8?

3 : 2 9 P M 12 THE WITNESS: Right, they used the 9 instead of the  
3 : 2 9 P M 13 8. So that gave them -- it stayed liquid longer.

3 : 2 9 P M 14 THE COURT: And your understanding is to note -- you  
3 : 2 9 P M 15 can't get into his mind; but your understanding, from looking  
3 : 2 9 P M 16 at all of this, why is it that he wanted to do that? Why would  
3 : 2 9 P M 17 he want to do that?

3 : 2 9 P M 18 THE WITNESS: Right. It gets back to that ECD  
3 : 2 9 P M 19 control, that pressure control. He's going to have to pump  
3 : 2 9 P M 20 this job slower. If you pump it slower, it's going to take  
3 : 2 9 P M 21 longer. And so he wants that additional -- that additional  
3 : 2 9 P M 22 safety factor in there to make sure he gets it in place.

3 : 2 9 P M 23 THE COURT: Okay.

3 : 2 9 P M 24 BY MR. CERNICH:

3 : 2 9 P M 25 Q. Mr. Bengé, a moment ago I was asking about the effect of

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3 : 2 9 P M 1 retarder on the nitrogen.

3 : 2 9 P M 2 A. Yes, sir.

3 : 2 9 P M 3 Q. Can you explain that concept?

3 : 2 9 P M 4 A. Well, as it stays -- as you can imagine, the -- as it

3 : 3 0 P M 5 stays liquid longer, there's more chance for instability. The

3 : 3 0 P M 6 foam is a stable mixture of gas and cement slurry; but the

3 : 3 0 P M 7 longer it stays liquid, the more chance there is of something

3 : 3 0 P M 8 bad to happen. You can get some destabilization, you can get

3 : 3 0 P M 9 gas movement. If you leave it liquid longer, bad things can

3 : 3 0 P M 10 happen.

3 : 3 0 P M 11 Q. And do you know what retarder concentration BP ultimately

3 : 3 0 P M 12 used on the Macondo well?

3 : 3 0 P M 13 A. It was 9 gallons per 100, or .09 gallons per sack.

3 : 3 0 P M 14 Q. Do you know whether BP provided its engineers with any

3 : 3 0 P M 15 training in cement?

3 : 3 0 P M 16 A. Yes, sir, I do.

3 : 3 0 P M 17 Q. How do you know that?

3 : 3 0 P M 18 A. Well, I've looked at job performance reports that the

3 : 3 0 P M 19 folks filled out; but I also have looked at the work from

3 : 3 0 P M 20 Dr. Robert Beirute.

3 : 3 1 P M 21 Q. Did you look at any job performance reports for any of the

3 : 3 1 P M 22 engineers on the Macondo well?

3 : 3 1 P M 23 A. Yes, sir, I did.

3 : 3 1 P M 24 Q. Do you recall whose you reviewed?

3 : 3 1 P M 25 A. Boy, you've lost -- I can't remember off the top of my



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3 : 3 1 PM 1 head. I know I've looked at Mr. Morel's. I've looked at John  
3 : 3 1 PM 2 Guide's, but he's not in engineering. I'll apologize. I just  
3 : 3 1 PM 3 can't remember right now all of them that I looked at. I  
3 : 3 1 PM 4 looked at as many as I had available.

3 : 3 1 PM 5 Q. Did any of those job performance reviews have anything  
3 : 3 1 PM 6 about training?

3 : 3 1 PM 7 A. Yes. They identified a lot of the training schools that  
3 : 3 1 PM 8 people went to. One was Brian Morel -- and I'll apologize.  
3 : 3 1 PM 9 That's where we identified that Mr. Morel had attended the DTA,  
3 : 3 1 PM 10 Drilling Training Alliance, the same one-week class that I  
3 : 3 1 PM 11 would send ExxonMobil engineers to.

3 : 3 1 PM 12 Q. You mentioned Dr. Beirute?

3 : 3 1 PM 13 A. Oh, I'm sorry, I've known Robert forever also.  
3 : 3 2 PM 14 Dr. Beirute is, in my opinion, a world-class cementing expert.  
3 : 3 2 PM 15 He also has served as past chairman of the API. He's written a  
3 : 3 2 PM 16 number of papers. He actually started with Western, worked for  
3 : 3 2 PM 17 Amoco and retired during the BP merger. He's now -- he teaches  
3 : 3 2 PM 18 classes. Like I say, he's an excellent -- he's a world-class  
3 : 3 2 PM 19 cementer.

3 : 3 2 PM 20 Q. Is Dr. Beirute serving as a testifying expert for BP in  
3 : 3 2 PM 21 this matter?

3 : 3 2 PM 22 A. No, sir. That's rather curious.

3 : 3 2 PM 23 Q. Before we move on from the express job objectives, is it  
3 : 3 2 PM 24 the operator's responsibility to set the job objectives?

3 : 3 2 PM 25 A. Yes, it is.

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3 : 3 2 PM 1 Q. You also identified the use of leftover cement as a risk.

3 : 3 2 PM 2 MR. CERNICH: Can we go to the next slide, please.

3 : 3 2 PM 3 THE WITNESS: Yes, I did. That's an additional risk.  
3 : 3 2 PM 4 The cement -- the dry blend, if you will, that mix that's out  
3 : 3 3 PM 5 on the rig, was not originally designed as a foam cement  
3 : 3 3 PM 6 system. It was designed for a different purpose. So it's  
3 : 3 3 PM 7 being repurposed. And so you've got to use it as the foam  
3 : 3 3 PM 8 cement.

3 : 3 3 PM 9 It was not originally intended to be foamed; and  
3 : 3 3 PM 10 because of that, there's additives that are already blended in  
3 : 3 3 PM 11 there that you wouldn't normally put into a foam cement design.

3 : 3 3 PM 12 BY MR. CERNICH:

3 : 3 3 PM 13 Q. Okay. I'd like to look briefly at the actual slurry  
3 : 3 3 PM 14 design.

3 : 3 3 PM 15 MR. CERNICH: If we could go to Exhibit 3020, please.

3 : 3 3 PM 16 BY MR. CERNICH:

3 : 3 3 PM 17 Q. Do you recognize this document, Mr. Bengé?

3 : 3 3 PM 18 A. Yes, sir, I do.

3 : 3 3 PM 19 Q. Okay. And this is an e-mail from Jesse Gagliano, dated  
3 : 3 3 PM 20 April 15th, 2010, to -- I'm sorry, Brett Cocalés and John Guide  
3 : 3 3 PM 21 and Greg Walz, among others; is that right?

3 : 3 4 PM 22 A. Yes, sir, a whole gaggle of folks from both BP and  
3 : 3 4 PM 23 Halliburton.

3 : 3 4 PM 24 Q. And there are a couple of attachments.

3 : 3 4 PM 25 MR. CERNICH: If we could go to the next page,

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3 : 3 4 P M 1 please.

3 : 3 4 P M 2 **BY MR. CERNICH:**

3 : 3 4 P M 3 **Q.** Do you recognize this document?

3 : 3 4 P M 4 **A.** Yes, sir, I do.

3 : 3 4 P M 5 **Q.** And what is this?

3 : 3 4 P M 6 **A.** This is one of the design reports that was attached to  
3 : 3 4 P M 7 that e-mail.

3 : 3 4 P M 8 **MR. CERNICH:** If we could go to the next page,  
3 : 3 4 P M 9 please.

3 : 3 4 P M 10 **BY MR. CERNICH:**

3 : 3 4 P M 11 **Q.** Do you know what this page is?

3 : 3 4 P M 12 **A.** Yes, sir. That's the first -- that's the canned page you  
3 : 3 4 P M 13 always get with these types of reports. That's marketing  
3 : 3 4 P M 14 speak. It doesn't -- I never pay attention to it. It doesn't  
3 : 3 4 P M 15 mean anything to me.

3 : 3 4 P M 16 **Q.** It says: "Enclosed is our recommended procedure."

3 : 3 5 P M 17 Did you consider that to be a recommended procedure  
3 : 3 5 P M 18 when you received it?

3 : 3 5 P M 19 **A.** No, sir. I've worked with these reports and OptiCem for  
3 : 3 5 P M 20 years. You always get that. We use OptiCem and the design as  
3 : 3 5 P M 21 a what-if. So you have to get the printout for it, and that  
3 : 3 5 P M 22 always comes with every printout.

3 : 3 5 P M 23 So if I ask Halliburton, for example, to run three  
3 : 3 5 P M 24 different scenarios for me, well, I'll get the same thing on  
3 : 3 5 P M 25 each one. I know they're not the recommendation because we're

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3 : 3 5 P M 1 playing what-if. We don't know our recommendation yet until we  
3 : 3 5 P M 2 see the results of output.

3 : 3 5 P M 3 Q. Were there additional reports like this from Halliburton  
3 : 3 5 P M 4 that were provided to BP before the cementing of the well?

3 : 3 5 P M 5 A. Yes, sir. This is one of several.

3 : 3 5 P M 6 MR. CERNICH: Could we go to the next page, please.

3 : 3 5 P M 7 BY MR. CERNICH:

3 : 3 5 P M 8 Q. Can you identify this page to the Court?

3 : 3 5 P M 9 A. Yes, sir. This is the -- this is a page showing some of  
3 : 3 5 P M 10 the fluids that would be pumped on the Macondo well.

3 : 3 5 P M 11 Q. Does this include the --

3 : 3 6 P M 12 MR. CERNICH: If we could move down the page a bit.

3 : 3 6 P M 13 BY MR. CERNICH:

3 : 3 6 P M 14 Q. That's the spacer that's up at the top; is that right?

3 : 3 6 P M 15 A. Right. There will be the spacer. You'll have the lead  
3 : 3 6 P M 16 cement or the -- the only difference in the unfoamed and the  
3 : 3 6 P M 17 foamed cement, turn the nitrogen truck on or off. It's all one  
3 : 3 6 P M 18 blend. We talk about in this case a lead or a tail. It's  
3 : 3 6 P M 19 either unfoamed or it's foamed, but the constituents are all  
3 : 3 6 P M 20 the same.

3 : 3 6 P M 21 MR. CERNICH: Could we focus in on the constituents,  
3 : 3 6 P M 22 please. Right there in the middle of the page, please. Thank  
3 : 3 6 P M 23 you.

3 : 3 6 P M 24 BY MR. CERNICH:

3 : 3 6 P M 25 Q. And is this the formula for the Macondo slurry?

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3 : 3 6 P M 1 A. Yes, sir, it is.

3 : 3 6 P M 2 Q. And is this the formula that was actually pumped down the

3 : 3 6 P M 3 well?

3 : 3 6 P M 4 A. Yes, sir, it is. That has the .09, or 9 gallons per 100

3 : 3 6 P M 5 of the SDR. So that is the cement system that was pumped on

3 : 3 7 P M 6 the Macondo well.

3 : 3 7 P M 7 Q. And do you see the third constituent down there, something

3 : 3 7 P M 8 called D-Air 3000?

3 : 3 7 P M 9 A. Yes, sir. That's a defoamer.

3 : 3 7 P M 10 Q. And it says "defoamer" right there in the document?

3 : 3 7 P M 11 A. Yes, it does. And the name's pretty self explanatory:

3 : 3 7 P M 12 D-Air and defoamer.

3 : 3 7 P M 13 Q. And this is the document that was sent to BP engineers on

3 : 3 7 P M 14 April 15th?

3 : 3 7 P M 15 A. Yes, sir.

3 : 3 7 P M 16 Q. Do you know why someone would use leftover cement for a

3 : 3 7 P M 17 cement job?

3 : 3 7 P M 18 A. There can be logistics. It's also a cost saving. You try

3 : 3 7 P M 19 to optimize. As an operator, once that cement's on my rig, I

3 : 3 7 P M 20 own it. So if I can optimize it and use it somewhere else,

3 : 3 7 P M 21 that's good business sense. You're trying to make the best of

3 : 3 7 P M 22 your inventory.

3 : 3 7 P M 23 Q. What's the role of the operator in slurry design?

3 : 3 7 P M 24 A. The operator has to set the objectives. They have to

3 : 3 7 P M 25 understand -- and if -- by the objectives and what the well --

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3 : 3 7 P M 1 what the operating envelope is, that's going to drive the  
3 : 3 8 P M 2 slurry design.

3 : 3 8 P M 3 But in the end, the operator still has to look and  
3 : 3 8 P M 4 see, is that slurry design appropriate for that well, and does  
3 : 3 8 P M 5 it meet the requirements?

3 : 3 8 P M 6 MR. CERNICH: Could we go to Exhibit 569, please.

3 : 3 8 P M 7 BY MR. CERNICH:

3 : 3 8 P M 8 Q. Can you identify this document, Mr. Benge?

3 : 3 8 P M 9 A. Yes, sir. That's a BP document on cementing  
3 : 3 8 P M 10 responsibilities for various personnel in their organization.

3 : 3 8 P M 11 Q. Did you have similar documents at ExxonMobil?

3 : 3 8 P M 12 A. Yes, sir, we did.

3 : 3 8 P M 13 MR. CERNICH: All right. Could we go to the next  
3 : 3 8 P M 14 page, please. If we could focus in on the top of that page.

3 : 3 8 P M 15 BY MR. CERNICH:

3 : 3 8 P M 16 Q. Do you see this item in the checklist?

3 : 3 8 P M 17 A. Yes, sir, I do.

3 : 3 8 P M 18 Q. This says: "Verify that the final slurry recommendation  
3 : 3 8 P M 19 meets the job requirements, including DWOP and ETP compliance."

3 : 3 8 P M 20 Did I read that correctly?

3 : 3 8 P M 21 A. Yes, sir. That's in concert with the documents that I've  
3 : 3 8 P M 22 prepared throughout my career.

3 : 3 8 P M 23 Q. And this particular item in the checklist is listed as a  
3 : 3 9 P M 24 responsibility of whom?

3 : 3 9 P M 25 A. That's for the well site leaders and for the engineers.

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3 : 3 9 P M 1 Q. Who are operator employees?

3 : 3 9 P M 2 A. That's correct, yes. This is a BP document.

3 : 3 9 P M 3 MR. CERNICH: Could we go to Exhibit 6233.

3 : 3 9 P M 4 BY MR. CERNICH:

3 : 3 9 P M 5 Q. Do you recognize this document, Mr. Bengé?

3 : 3 9 P M 6 A. Yes, sir, I do. This is an SRP, or a segment-recommended

3 : 3 9 P M 7 practice, for cement laboratory testing.

3 : 3 9 P M 8 MR. CERNICH: If you could focus in on the center of

3 : 3 9 P M 9 that, please.

3 : 3 9 P M 10 BY MR. CERNICH:

3 : 3 9 P M 11 Q. Do you see the author of this document?

3 : 3 9 P M 12 A. Yes. The technical authority, that is Daryl Kellingray.

3 : 3 9 P M 13 He worked with Ashley a whole lot. Daryl is over in the UK.

3 : 3 9 P M 14 He's one of the global cement specialists for BP.

3 : 3 9 P M 15 Q. You know Mr. Kellingray as well?

3 : 3 9 P M 16 A. I know Daryl as well.

3 : 3 9 P M 17 Q. Did you have similar documents to this at ExxonMobil?

3 : 4 0 P M 18 A. Yes, sir, we did.

3 : 4 0 P M 19 Q. Why did you have those documents?

3 : 4 0 P M 20 A. Well, again, if you've got a particular way that you want

3 : 4 0 P M 21 tests run, if there are risks that you want to identify, you

3 : 4 0 P M 22 would have that available to your engineers to use.

3 : 4 0 P M 23 Q. Did you provide these types of documents to your cement

3 : 4 0 P M 24 service providers?

3 : 4 0 P M 25 A. Yes, sir. If I've got something I want them to do

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3 : 4 0 P M 1 special, if I don't tell them, I can't expect them to do it.  
3 : 4 0 P M 2 So we would absolutely -- as a matter of fact, some of ours  
3 : 4 0 P M 3 would be in the contracts. I would do training with the  
3 : 4 0 P M 4 service providers to make sure that, yes, they're complying  
3 : 4 0 P M 5 with whatever requirements we had. And we'd double-check on  
3 : 4 0 P M 6 that. I'd go to the lab and see if they're doing it.

3 : 4 0 P M 7 MR. CERNICH: Could we go to the next slide, please.

3 : 4 0 P M 8 BY MR. CERNICH:

3 : 4 0 P M 9 Q. You identified "started job without lab testing as a  
3 : 4 0 P M 10 risk"; is that right?

3 : 4 0 P M 11 A. Yes, I did. Again, these start to become additive.  
3 : 4 1 P M 12 Because I used the leftover cement that wasn't originally  
3 : 4 1 P M 13 designed for foaming, it puts more onus on lab testing. I need  
3 : 4 1 P M 14 to make sure I've got all those lab tests. Because if I'm  
3 : 4 1 P M 15 using a make-do slurry, if you will, I've got to make sure that  
3 : 4 1 P M 16 I've got all my testing done. And this job we started without  
3 : 4 1 P M 17 what I consider critical lab tests.

3 : 4 1 P M 18 Q. Did you have some criticisms of lab tests in here?

3 : 4 1 P M 19 A. Yes, I did, and that's in my report.

3 : 4 1 P M 20 Q. And who was responsible for testing the slurry?

3 : 4 1 P M 21 A. That's Halliburton who's responsible for testing the  
3 : 4 1 P M 22 slurry.

3 : 4 1 P M 23 Q. Could you summarize for the Court your criticisms of the  
3 : 4 1 P M 24 lab testing?

3 : 4 1 P M 25 A. Once again, this is a leftover cement, and because of



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3 : 4 1 P M 1 that, it puts more onus on the testing. I didn't see any --  
3 : 4 1 P M 2 API, in the testing document that we prepared, has both testing  
3 : 4 1 P M 3 for set and unset cement. None of the unset testing was run.  
3 : 4 2 P M 4 That gives you a real quick screening. You don't have to wait  
3 : 4 2 P M 5 for it to set to do that. That wasn't done in this case. So  
3 : 4 2 P M 6 you're missing out on an opportunity to get some additional  
3 : 4 2 P M 7 data.

3 : 4 2 P M 8 And, again, it's because it's a leftover cement. All  
3 : 4 2 P M 9 the data you can get from it is very important.

3 : 4 2 P M 10 Q. Did BP have any responsibility with regard to lab testing?

3 : 4 2 P M 11 A. No. They don't have a lab.

3 : 4 2 P M 12 Q. Did you review the lab testing that was available before  
3 : 4 2 P M 13 this cement job was pumped?

3 : 4 2 P M 14 A. Yes, sir, I did.

3 : 4 2 P M 15 Q. What was available?

3 : 4 2 P M 16 A. Prior to starting this cement job, what was available were  
3 : 4 2 P M 17 some compressive strength tests; thickening time tests;  
3 : 4 2 P M 18 rheology, how thick is the slurry; and a mixability test, I  
3 : 4 2 P M 19 believe. But there were no -- there were no foam -- there was  
3 : 4 2 P M 20 no successful foam stability test prior to pumping this job.

3 : 4 2 P M 21 Q. So did BP start this job without a successful foam  
3 : 4 3 P M 22 stability test?

3 : 4 3 P M 23 A. Yes, sir.

3 : 4 3 P M 24 Q. Should BP have started this job without a successful foam  
3 : 4 3 P M 25 stability test?

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3 : 4 3 P M 1 A. In my opinion, no, sir.

3 : 4 3 P M 2 Q. Is it prudent to start a foam cement job without a

3 : 4 3 P M 3 successful foam stability test?

3 : 4 3 P M 4 A. It's not.

3 : 4 3 P M 5 Q. And as the operator, was it BP's decision to proceed with

3 : 4 3 P M 6 the cement job with incomplete lab testing?

3 : 4 3 P M 7 A. Yes, sir, it was.

3 : 4 3 P M 8 MR. CERNICH: If we could go to Exhibit 1396, please.

3 : 4 3 P M 9 BY MR. CERNICH:

3 : 4 3 P M 10 Q. Can you identify this document, Mr. Bengé?

3 : 4 3 P M 11 MR. CERNICH: Actually, if we could go to the next

3 : 4 3 P M 12 page of this e-mail.

3 : 4 3 P M 13 BY MR. CERNICH:

3 : 4 3 P M 14 Q. Do you recall this document?

3 : 4 3 P M 15 A. Yes, sir, I do.

3 : 4 3 P M 16 Q. This is an e-mail from Mr. Morel to Mr. Hafle dated

3 : 4 3 P M 17 April 17th, 2010; is that right?

3 : 4 3 P M 18 A. Yes, sir, it is.

3 : 4 3 P M 19 Q. With the subject "lab tests"?

3 : 4 3 P M 20 A. Yes, sir.

3 : 4 3 P M 21 Q. And Mr. Morel writes to Mr. Hafle: "I'm about to send

3 : 4 4 P M 22 this to John and Greg but wanted to send it past you first to

3 : 4 4 P M 23 make sure I'm not being out of line. Jesse isn't cutting it

3 : 4 4 P M 24 anymore."

3 : 4 4 P M 25 Did I read that correctly?

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3 : 4 4 P M 1 A. Yes, sir, you did.

3 : 4 4 P M 2 MR. CERNICH: Can we move down to the next section of  
3 : 4 4 P M 3 the e-mail, please.

3 : 4 4 P M 4 BY MR. CERNICH:

3 : 4 4 P M 5 Q. Mr. Morel goes on: "John and Greg, I need help next week  
3 : 4 4 P M 6 dealing with Jesse. I asked for these lab tests to be  
3 : 4 4 P M 7 completed multiple times early last week and Jesse still waited  
3 : 4 4 P M 8 until the last minute, as he has done throughout this well.  
3 : 4 4 P M 9 This doesn't give us enough time to tweak the slurry to meet  
3 : 4 4 P M 10 our needs. As a team, we requested that he run another test  
3 : 4 4 P M 11 with 9 gallons on Wednesday. I know the first test had issues,  
3 : 4 4 P M 12 but I do not understand what took so long to get it underway  
3 : 4 4 P M 13 and why a new one can't be put on right away. There is no  
3 : 4 4 P M 14 excuse for this as the cement and chemicals we are running has  
3 : 4 4 P M 15 been on location for weeks."

3 : 4 4 P M 16 Did I read that correctly?

3 : 4 5 P M 17 A. Yes, sir, you did.

3 : 4 5 P M 18 Q. What does this indicate to you?

3 : 4 5 P M 19 A. Well, BP was having difficulties with getting timely test  
3 : 4 5 P M 20 results from Jesse and was aware of that and were prepared to  
3 : 4 5 P M 21 send this up to their management.

3 : 4 5 P M 22 Q. Yet, BP still proceeded with the cement job without a  
3 : 4 5 P M 23 successful foam stability test?

3 : 4 5 P M 24 A. Yes, sir.

3 : 4 5 P M 25 Q. And did BP save time by not waiting on a foam stability

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3 : 4 5 P M 1 test?

3 : 4 5 P M 2 A. Yes, sir.

3 : 4 5 P M 3 Q. Can we go to the next risk you identified, foam cement in

3 : 4 5 P M 4 SOBM? And that's synthetic oil-based mud?

3 : 4 5 P M 5 A. Yes.

3 : 4 5 P M 6 **THE WITNESS:** As I stated, Your Honor, foam cement's

3 : 4 5 P M 7 got surfactants in it that allow it to be foam. So -- and soap

3 : 4 5 P M 8 and oil love each other, I guess, for lack of a better word.

3 : 4 5 P M 9 Synthetic oil-based mud and contamination will

3 : 4 6 P M 10 destabilize that foam. It will -- any time you've done --

3 : 4 6 P M 11 well, any time some people have done dishes in a sink, you

3 : 4 6 P M 12 always wash your greasy pan last because -- and if you do that,

3 : 4 6 P M 13 the foam disappears and it's because that surfactant goes in

3 : 4 6 P M 14 and grabs ahold of that oil. That's the love of its life.

3 : 4 6 P M 15 The same thing happens with foam cement; if you

3 : 4 6 P M 16 get synthetic oil-based mud into a foam cement, it will

3 : 4 6 P M 17 destabilize it, the gas will come out. That's an

3 : 4 6 P M 18 acknowledgment and that's a very common risk and it's

3 : 4 6 P M 19 acknowledged.

3 : 4 6 P M 20 **BY MR. CERNICH::**

3 : 4 6 P M 21 Q. Is it uncommon to use foam cement with oil-based mud?

3 : 4 6 P M 22 A. No, there's a lot of folks that do it. But because it's

3 : 4 6 P M 23 in a synthetic oil-based environment, it adds a risk; you've

3 : 4 6 P M 24 got to be more careful with everything else.

3 : 4 6 P M 25 Q. Do you personally do it?

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3 : 4 6 P M 1 A. I don't. I don't find that to be an acceptable risk and I  
3 : 4 6 P M 2 have not ever recommended a foam in a synthetic mud  
3 : 4 6 P M 3 environment, but it is done.

3 : 4 7 P M 4 Q. Did you see any evidence that BP was aware of that risk?

3 : 4 7 P M 5 A. Yes, sir, from both their internal -- Erick Cunningham,  
3 : 4 7 P M 6 their internal expert, as well as Halliburton informed them of  
3 : 4 7 P M 7 that risk.

3 : 4 7 P M 8 MR. CERNICH: Could we go to Exhibit 625, please.

3 : 4 7 P M 9 BY MR. CERNICH:

3 : 4 7 P M 10 Q. Can you identify this document?

3 : 4 7 P M 11 A. Yes. This is an e-mail from Mr. Cunningham to Mr. Morel  
3 : 4 7 P M 12 about the foam -- or a nitrogen production job, foam cement  
3 : 4 7 P M 13 job. And within this, in the second paragraph down, where we  
3 : 4 7 P M 14 can really quickly see it, it says: Foaming cement after  
3 : 4 7 P M 15 swapping to SOBM, synthetic oil-based mud, presents some  
3 : 4 7 P M 16 significant stability challenges for the foam as the base oil  
3 : 4 7 P M 17 in the mud destabilizes most foaming surfactants and will  
3 : 4 7 P M 18 result in nitrogen breakout if contamination occurs, which is  
3 : 4 7 P M 19 exactly what we just discussed.

3 : 4 7 P M 20 So this is Mr. Cunningham, who is the BP Western  
3 : 4 7 P M 21 Hemisphere's cement expert, back in March sending to Brian  
3 : 4 8 P M 22 Morel, who's on the drill team, if you do this, there's a  
3 : 4 8 P M 23 danger of the foam destabilizing in a synthetic oil mud  
3 : 4 8 P M 24 environment.

3 : 4 8 P M 25 Q. Did Mr. Cunningham suggest a way to mitigate this?

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3 : 4 8 P M 1 A. There is. You've got to spend a lot of attention -- like  
3 : 4 8 P M 2 I said, little things matter. So you've got to spend a lot of  
3 : 4 8 P M 3 attention to spacer programs. You also have to run a  
3 : 4 8 P M 4 non-foamed cap to try to separate, to keep those fluids apart.  
3 : 4 8 P M 5 Because you get them together and they will destabilize.  
3 : 4 8 P M 6 Q. Did you see any evidence that Mr. Cunningham agreed with  
3 : 4 8 P M 7 the Macondo cement design?  
3 : 4 8 P M 8 A. Actually, I saw quite the opposite.  
3 : 4 8 P M 9 MR. CERNICH: Could we go to Exhibit 16, please.  
3 : 4 8 P M 10 BY MR. CERNICH:  
3 : 4 8 P M 11 Q. Can you identify this document, Mr. Bengé?  
3 : 4 8 P M 12 A. Yes, sir. These are interview notes of Erick Cunningham.  
3 : 4 8 P M 13 Q. Okay.  
3 : 4 8 P M 14 MR. CERNICH: Could we go to the next page, please?  
3 : 4 8 P M 15 And I think we have a fly-out there. Yes.  
3 : 4 8 P M 16 BY MR. CERNICH:  
3 : 4 8 P M 17 Q. Do you know, are these Bly report interview notes?  
3 : 4 9 P M 18 A. Yes, sir.  
3 : 4 9 P M 19 Q. Can you explain the portion -- the relevant portions of  
3 : 4 9 P M 20 these e-mails to the Court?  
3 : 4 9 P M 21 A. Sure. These are from Erick Cunningham, and he's  
3 : 4 9 P M 22 challenging the foam application usage and the complexity of  
3 : 4 9 P M 23 the job. As we've been talking, this is a synthetic oil mud  
3 : 4 9 P M 24 environment. It adds additional complexity.  
3 : 4 9 P M 25 He's also saying that, during the meeting, unfoamed

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3 : 4 9 P M 1 cement was feasible and was a better option in his opinion. So  
3 : 4 9 P M 2 this well did not require the use of foam cement.

3 : 4 9 P M 3 Q. Was unfoamed cement feasible here?

3 : 4 9 P M 4 A. Yes, sir, it was.

3 : 4 9 P M 5 Q. What would have been required to use unfoamed cement?

3 : 4 9 P M 6 A. You would have designed a 14.5 pound per gallon standard  
3 : 4 9 P M 7 cement system. Pretty generic. You would have had to have  
3 : 4 9 P M 8 designed it, blended it, sent it out to the rig. You would  
3 : 5 0 P M 9 have not used the leftover cement. You would have had a new  
3 : 5 0 P M 10 cement plan.

3 : 5 0 P M 11 Q. And in the next section from the April 14th, 8:30 a.m.  
3 : 5 0 P M 12 meeting, it says: Concerns about frac gradients and pore  
3 : 5 0 P M 13 pressure and what was the most representative scenario.

3 : 5 0 P M 14 So does this indicate that the team was concerned  
3 : 5 0 P M 15 about the frac gradients and pore pressure at this meeting?

3 : 5 0 P M 16 A. Well, again, this echos what we've seen throughout the  
3 : 5 0 P M 17 design of the cement job, the ECD control was driven by pore  
3 : 5 0 P M 18 pressure and frac gradient and that remained a concern  
3 : 5 0 P M 19 throughout the design process.

3 : 5 0 P M 20 Q. Okay. Thank you.

3 : 5 0 P M 21 Was it ultimately BP's decision to use foam cement?

3 : 5 0 P M 22 A. I don't know. I think it was a shared -- it was  
3 : 5 0 P M 23 recommended it was done; but in order to put it in the well, BP  
3 : 5 0 P M 24 had to approve it.

3 : 5 0 P M 25 Q. And that was despite a challenge from Mr. Cunningham, BP's

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3 : 5 0 P M 1 in-house cement expert?

3 : 5 0 P M 2 A. Despite a challenge from Mr. Cunningham.

3 : 5 1 P M 3 MR. REGAN: Your Honor, I'm just going to object to  
3 : 5 1 P M 4 his last question because they're using a document that appears  
3 : 5 1 P M 5 to be an interview note of a meeting of what appears to be six  
3 : 5 1 P M 6 people, plus Mr. Cunningham. There's no indication in the  
3 : 5 1 P M 7 notes that are being used as to who is saying what and who is  
3 : 5 1 P M 8 expressing concerns.

3 : 5 1 P M 9 I understand as an expert he can read it and  
3 : 5 1 P M 10 give his interpretation; but for the record, I don't think it's  
3 : 5 1 P M 11 fair to attribute specific sentences in this memo to an intent  
3 : 5 1 P M 12 or a state of mind or belief of one person amongst the multiple  
3 : 5 1 P M 13 people that were there.

3 : 5 1 P M 14 MR. CERNICH: Your Honor, we have the deposition of  
3 : 5 1 P M 15 Mr. Cunningham where he was questioned about these notes and  
3 : 5 1 P M 16 confirmed that he made these statements. I also have the --

3 : 5 1 P M 17 THE COURT: Did you read that deposition, sir?

3 : 5 1 P M 18 THE WITNESS: Yes, sir, I did.

3 : 5 1 P M 19 THE COURT: Okay. Overrule the objection.

3 : 5 1 P M 20 MR. CERNICH: Thank you, Your Honor.

3 : 5 1 P M 21 If we could go to the next slide, please.

3 : 5 2 P M 22 Mr. Bengé -- slide 17, please.

3 : 5 2 P M 23 BY MR. CERNICH:

3 : 5 2 P M 24 Q. You identify inadequate centralization as another risk?

3 : 5 2 P M 25 A. Yes, sir, that's an additional risk that I've identified.



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3 : 5 2 P M 1 Q. What is centralization?

3 : 5 2 P M 2 A. Centralization, I've got a brief little graphic on that or  
3 : 5 2 P M 3 a video, if we can. But it's basically putting that  
3 : 5 2 P M 4 centralizer on the pipe to move it toward the middle of the  
3 : 5 2 P M 5 wellbore.

3 : 5 2 P M 6 MR. CERNICH: Could we have the animation pulled up  
3 : 5 2 P M 7 on centralizers, please? And this is D-3528. This is a  
3 : 5 2 P M 8 demonstrative.

3 : 5 2 P M 9 THE WITNESS: And this is a -- if we can, I'll ask if  
3 : 5 2 P M 10 we can pause the video for just a moment.

3 : 5 2 P M 11 The red -- the red thing here is a bow spring  
3 : 5 3 P M 12 centralizer. So those bows on the outside are made to move in  
3 : 5 3 P M 13 and out. They're a spring, basically.

3 : 5 3 P M 14 The small -- the second thing that's in there in  
3 : 5 3 P M 15 the middle, that's the stop collar. So that has the screws in  
3 : 5 3 P M 16 it and the -- so that's slipped onto the pipe.

3 : 5 3 P M 17 So this is a bow spring centralizer -- and we  
3 : 5 3 P M 18 can move forward with the video real quick -- showing in a very  
3 : 5 3 P M 19 stylized -- artists are always real good at stylizing things  
3 : 5 3 P M 20 and making them nice and straight -- of a centralized hole on  
3 : 5 3 P M 21 the left where you've got complete coverage all the way around.  
3 : 5 3 P M 22 There's no --

3 : 5 3 P M 23 MR. CERNICH: Can we pause this, please?

3 : 5 3 P M 24 THE WITNESS: Yeah. There's no preferential flow  
3 : 5 3 P M 25 path, if you will. And on the right-hand side, that pipe is

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3 : 5 3 P M 1 off to the side, it's X-centered. So it's easier to flow on  
3 : 5 3 P M 2 the wide side of that annulus.

3 : 5 3 P M 3 We always talk about percent standoff. Percent  
3 : 5 3 P M 4 standoff, if you're perfectly in the middle, that's  
3 : 5 4 P M 5 100 percent. If that pipe is touching that formation, you're  
3 : 5 4 P M 6 at zero percent. So what percent are you, how far are you away  
3 : 5 4 P M 7 from being right smack dab in the middle?

3 : 5 4 P M 8 **MR. CERNICH:** Can we continue with the animation,  
3 : 5 4 P M 9 please.

3 : 5 4 P M 10 **THE WITNESS:** And this portion of the animation will  
3 : 5 4 P M 11 show as fluids are being pumped, the gray's coming up as  
3 : 5 4 P M 12 cement. And you can see because the pipe is over to one side,  
3 : 5 4 P M 13 you get a preferential flow path. It's easier to flow where  
3 : 5 4 P M 14 there's more room. So you get a preferential flow path  
3 : 5 4 P M 15 where -- on the casing on the right-hand side that's  
3 : 5 4 P M 16 X-centered, you're leaving behind a channel, a fluid filled --  
3 : 5 4 P M 17 that will be a mud channel. There won't be any cement there.  
3 : 5 4 P M 18 You can't -- that won't form a barrier. It will leave you a  
3 : 5 4 P M 19 flow path in the well.

3 : 5 4 P M 20 **BY MR. CERNICH:**

3 : 5 4 P M 21 **Q.** And a flow path for what?

3 : 5 4 P M 22 **A.** The flow path for formation fluids up or down.

3 : 5 4 P M 23 **Q.** And that could be hydrocarbons?

3 : 5 5 P M 24 **A.** Yes, that could be hydrocarbons.

3 : 5 5 P M 25 **Q.** Or water?

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3 : 5 5 P M 1 A. Or water or anything that's down there.

3 : 5 5 P M 2 Q. Why is centralization important?

3 : 5 5 P M 3 A. Well, that goes to the physics. Again, I have to marry

3 : 5 5 P M 4 chemistry and physics. And the physics, there's not an

3 : 5 5 P M 5 additive that will overcome physics in this case. So you've

3 : 5 5 P M 6 got to move that pipe away to be able to put -- to be able to

3 : 5 5 P M 7 put cement all the way around to effect a -- to give you a

3 : 5 5 P M 8 barrier.

3 : 5 5 P M 9 MR. CERNICH: Can we go to Exhibit 6230, please.

3 : 5 5 P M 10 BY MR. CERNICH:

3 : 5 5 P M 11 Q. Do you recognize this document, Mr. Bengé?

3 : 5 5 P M 12 A. Yes, sir, I do.

3 : 5 5 P M 13 Q. Okay. And this is an e-mail from Mr. Cunningham, who

3 : 5 5 P M 14 you've discussed already today?

3 : 5 5 P M 15 A. Yes, sir, that's from Erick.

3 : 5 5 P M 16 MR. CERNICH: And can we go to the attachment,

3 : 5 5 P M 17 please.

3 : 5 5 P M 18 BY MR. CERNICH:

3 : 5 5 P M 19 Q. Can you identify this document?

3 : 5 5 P M 20 A. Yes, sir. This is a BP SRP document on cement placement.

3 : 5 6 P M 21 Q. And is on the author Daryl Kellingray?

3 : 5 6 P M 22 A. Again, yes, that's Daryl.

3 : 5 6 P M 23 MR. CERNICH: Could we go to the next page, please.

3 : 5 6 P M 24 I'm sorry. Can we go to page 3 of that report?

25

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3 : 5 6 P M 1 **BY MR. CERNICH:**

3 : 5 6 P M 2 **Q.** This is the introduction to that, and it says: "The

3 : 5 6 P M 3 following document is a summary of BP and industry best

3 : 5 6 P M 4 practices that are proven to maximize the chance of first-time

3 : 5 6 P M 5 success."

3 : 5 6 P M 6 Did I read that correctly?

3 : 5 6 P M 7 **A.** Yes, sir, you did.

3 : 5 6 P M 8 **Q.** And is this, like some of the other documents we've talked

3 : 5 6 P M 9 about, similar to the types of best practices you had at

3 : 5 6 P M 10 ExxonMobil?

3 : 5 6 P M 11 **A.** Yes, sir, all those best practices are in concert with

3 : 5 6 P M 12 each other.

3 : 5 6 P M 13 **Q.** That you developed?

3 : 5 6 P M 14 **A.** That I developed, yes, sir.

3 : 5 6 P M 15 **Q.** And it reads: The primary cause of poor zonal isolation

3 : 5 6 P M 16 is due to poor mud placement [verbatim].

3 : 5 6 P M 17 Did I read that correctly?

3 : 5 6 P M 18 **A.** No. I believe you said "mud placement" and it's "mud

3 : 5 7 P M 19 displacement."

3 : 5 7 P M 20 **Q.** Thank you. Thank you.

3 : 5 7 P M 21 And then the second bullet point there says: "Not

3 : 5 7 P M 22 executing the agreed design effectively, incorrect installation

3 : 5 7 P M 23 of centralizers, mud not conditioned, unable to move pipe,

3 : 5 7 P M 24 reduced pump rates, incorrect spacer preparation."

3 : 5 7 P M 25 Did I read that correctly?

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3 : 5 7 P M 1 A. Yes, sir, you did.

3 : 5 7 P M 2 Q. And in your opinion, are those causes of poor zonal

3 : 5 7 P M 3 isolation?

3 : 5 7 P M 4 A. Yes, sir. As the document said, those are leading reasons

3 : 5 7 P M 5 for poor zone isolation.

3 : 5 7 P M 6 Q. And did you identify some of these specific reasons in

3 : 5 7 P M 7 your report?

3 : 5 7 P M 8 A. Yes, sir, I did. I identified centralizers, mud

3 : 5 7 P M 9 conditioning, and reduced pump rates as risks in the Macondo

3 : 5 7 P M 10 well.

3 : 5 7 P M 11 MR. CERNICH: And if we could go to page 5 of that

3 : 5 7 P M 12 document, please.

3 : 5 7 P M 13 I'm sorry. Could we go back one page there?

3 : 5 8 P M 14 No, go to that file, please. I'm sorry.

3 : 5 8 P M 15 BY MR. CERNICH:

3 : 5 8 P M 16 Q. And it also identifies "an overreliance on the slurry

3 : 5 8 P M 17 design to mitigate problems, believing the cement slurry can

3 : 5 8 P M 18 mitigate any risks."

3 : 5 8 P M 19 Did I read that correctly?

3 : 5 8 P M 20 A. Yes, sir, you did. Again, this is echoing chemistry can't

3 : 5 8 P M 21 overcome physics; you have to have both. There's not an

3 : 5 8 P M 22 additive that will let that cement move over into that

3 : 5 8 P M 23 non-flowing area.

3 : 5 8 P M 24 MR. CERNICH: Can we go to the next page of this

3 : 5 8 P M 25 document?

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3 : 5 8 P M 1 **BY MR. CERNICH:**

3 : 5 8 P M 2 **Q.** Okay. And at the top of this page, do you see where it

3 : 5 8 P M 3 says "Fundamental Principles"?

3 : 5 8 P M 4 **A.** Yes, sir, I do.

3 : 5 8 P M 5 **Q.** And we've highlighted here "casing centralization." Do

3 : 5 8 P M 6 you see that?

3 : 5 8 P M 7 **A.** Yes, sir.

3 : 5 8 P M 8 **Q.** And it says: "Pipe eccentricity in the wellbore creates

3 : 5 8 P M 9 differential fluid velocities on the wide and narrow side of

3 : 5 9 P M 10 the eccentric pipe. This results in channeling and compromises

3 : 5 9 P M 11 the quality of cement placement. Use of casing centralizers to

3 : 5 9 P M 12 provide standoff is critical in achieving cement placement to

3 : 5 9 P M 13 provide zonal isolation."

3 : 5 9 P M 14 Did I read that correctly?

3 : 5 9 P M 15 **A.** Yes, sir, you did.

3 : 5 9 P M 16 **Q.** And is that consistent with the opinions in your report?

3 : 5 9 P M 17 **A.** Yes, sir.

3 : 5 9 P M 18 **MR. CERNICH:** If we could go down to the bottom of

3 : 5 9 P M 19 that page. If we could pull the fly-out back.

3 : 5 9 P M 20 **BY MR. CERNICH:**

3 : 5 9 P M 21 **Q.** And down at the bottom of that page, it says: "Annular

3 : 5 9 P M 22 velocity."

3 : 5 9 P M 23 What does this mean, Mr. Bengé?

3 : 5 9 P M 24 **A.** Well, annular velocity is energy, how fast are those

3 : 5 9 P M 25 fluids flowing in that annulus. And so as annular velocity

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3:59 PM 1 increases -- as you put energy into the well, you can clean it  
4:00 PM 2 better and you can get things moving.

4:00 PM 3 If you've got oil on your hand and you just stick it  
4:00 PM 4 in a bucket of water, it's not going to become very clean. The  
4:00 PM 5 more energy you put into it, if you can swish it around, you're  
4:00 PM 6 adding energy.

4:00 PM 7 The way we do that in cementing is through pump  
4:00 PM 8 rates. So if I can pump faster, if I can get better annular  
4:00 PM 9 velocity, I can clean and I can displace that mud bank.

4:00 PM 10 Q. We will get to that a little bit further in your  
4:00 PM 11 presentation; but while we're on this document, I just wanted  
4:00 PM 12 to look at that quickly.

4:00 PM 13 MR. CERNICH: Could we go to page 6 of the document?

4:00 PM 14 BY MR. CERNICH:

4:00 PM 15 Q. This section is Section 3, and it's entitled "Risks." Do  
4:00 PM 16 you see that?

4:00 PM 17 A. Yes, sir, I do.

4:00 PM 18 Q. Are the risks identified here consistent with the risks  
4:00 PM 19 you identify in your report?

4:00 PM 20 A. Yes, they are.

4:00 PM 21 Q. And can you tell the Court a little bit about these risks?

4:01 PM 22 A. Well, these risks are, you know -- and if I look up at the  
4:01 PM 23 very top right before this, it says "hole conditions." Do I  
4:01 PM 24 have a washed-out hole? Is it nice and straight the way those  
4:01 PM 25 artists always draw it, or is it washed out? And I think in

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4:01PM 1 this case we know that it was washed out based on caliper data.

4:01PM 2 Failure to achieve zonal isolation is a risk. And it

4:01PM 3 has mitigation factors, you know, centralization, optimization

4:01PM 4 of rheologies.

4:01PM 5 Density profiles, in other words, how do I design my

4:01PM 6 fluids, how do I put them into the well? Do I have thicker

4:01PM 7 fluid, thinner fluid? Do they weigh more or less?

4:01PM 8 In this case we have a subsea wellhead system, and so

4:01PM 9 pipe movement is off the table. That's one of the limiting

4:01PM 10 factors. We would not be able to -- because of the design of

4:01PM 11 all subsea wells, nobody can move pipe. So that's not even a

4:01PM 12 consideration in this case.

4:02PM 13 Q. Can you use centralizer in subsea wells?

4:02PM 14 A. Yes, you can. I've used that. BP has used those in this

4:02PM 15 well.

4:02PM 16 MR. CERNICH: Could we go to page 17 of this

4:02PM 17 document? Just one last item here.

4:02PM 18 BY MR. CERNICH:

4:02PM 19 Q. And this section refers to centralization. Do you see

4:02PM 20 that?

4:02PM 21 A. Yes, sir, I do.

4:02PM 22 Q. And this says: "Good pipe centralization is critical to

4:02PM 23 achieving reliable cement placement and zonal isolation."

4:02PM 24 Did I read that correctly?

4:02PM 25 A. Yes, sir, you did.



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4 : 0 2 P M 1 Q. Do you agree with that statement?

4 : 0 2 P M 2 A. Yes, sir, I do.

4 : 0 2 P M 3 Q. And then at the bottom it says: "Centralizers themselves  
4 may not always deliver the performance desired, but the  
5 benefits of centralization for zonal isolation are  
6 unquestionable."

4 : 0 2 P M 7 Would you agree with that statement?

4 : 0 2 P M 8 A. Yes, sir, I do. That's -- this is an important statement  
9 in this case because centralizers just -- those are bow  
10 springs. So they are springs. And so -- and I don't want to  
11 misrepresent. I put that up as a centralizer getting that pipe  
12 perfectly in the middle. That has no lateral force, or no  
13 pushing force on the side of it that would force that spring to  
14 collapse. That's what they're designed to do.

4 : 0 3 P M 15 This well spirals and so there's a -- because of  
16 gravity, as it pulls it down, it forces that pipe over to the  
17 side. So I don't wish to represent in any way that that  
18 picture -- just because there's a centralizer there, you have  
19 to run the program to calculate what that force is because it  
20 may not be right in the middle. We'll draw it that way; but  
21 without running the program to know what those forces are, we  
22 don't know how far in that spring moves.

4 : 0 3 P M 23 So I just want to make sure -- I didn't want to just  
24 miss -- misidentify that.

4 : 0 3 P M 25 **THE COURT:** In other words, the pipe or casing is not

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4 : 0 3 P M 1 always perfectly in the middle?

4 : 0 3 P M 2 THE WITNESS: It's not always --

4 : 0 3 P M 3 THE COURT: Even with the centralizer?

4 : 0 4 P M 4 THE WITNESS: Even with the centralizer because it's  
4 : 0 4 P M 5 going to squish that spring so much. That's why we've got all  
4 : 0 4 P M 6 those programs.

4 : 0 4 P M 7 THE COURT: All right.

4 : 0 4 P M 8 BY MR. CERNICH:

4 : 0 4 P M 9 Q. And I believe we talked earlier. The hole isn't straight  
4 : 0 4 P M 10 either?

4 : 0 4 P M 11 A. No, sir, it's -- it spirals. And you can tell that from  
4 : 0 4 P M 12 the survey data.

4 : 0 4 P M 13 Q. And how are centralizers installed?

4 : 0 4 P M 14 A. Two or three different ways. In this particular case,  
4 : 0 4 P M 15 there were two types of centralizers. One was an integral that  
4 : 0 4 P M 16 is basically a piece of pipe with threads on either end so they  
4 : 0 4 P M 17 come out preassembled.

4 : 0 4 P M 18 MR. CERNICH: Could we go to page 16 of Exhibit 5990  
4 : 0 4 P M 19 of Mr. Bengé's report?

4 : 0 4 P M 20 We have a couple photos, Your Honor.

4 : 0 4 P M 21 BY MR. CERNICH:

4 : 0 4 P M 22 Q. Well, we'll just -- okay. I'm sorry. It's going to be --  
4 : 0 5 P M 23 well, we'll just move on.

4 : 0 5 P M 24 A. I can describe it. The integral centralizers are  
4 : 0 5 P M 25 pre-installed. They're in a small piece of casing --

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4:05 PM 1 THE COURT: You have a picture of them in your  
4:05 PM 2 report.

4:05 PM 3 THE WITNESS: I've got a picture of them in my  
4:05 PM 4 report.

4:05 PM 5 THE COURT: I've seen them. They're pictures that  
4:05 PM 6 are pretty good --

4:05 PM 7 THE WITNESS: Yeah. They're there. You screw it  
4:05 PM 8 together, works great. The other one is a bow spring, like was  
4:05 PM 9 in the video.

4:05 PM 10 THE COURT: The integral one is basically a sub, a  
4:05 PM 11 piece of pipe threaded on each end and you just thread it on to  
4:05 PM 12 the pipe, on to the casing?

4:05 PM 13 THE WITNESS: Yeah. You run it just like a pup  
4:05 PM 14 joint, a little bitty pup joint. But they're about 3, 4 feet  
4:05 PM 15 long.

4:05 PM 16 THE COURT: And it has the centralizer built on it?

4:05 PM 17 THE WITNESS: Right. It's pre-installed. It's  
4:05 PM 18 manufactured that way. And then you've also got the ones, like  
4:06 PM 19 we saw in the video, that slide on the bottom of the pipe and  
4:06 PM 20 then you attach them that way.

4:06 PM 21 THE COURT: Okay.

4:06 PM 22 BY MR. CERNICH:

4:06 PM 23 Q. Mr. Bengé, how do you determine what is adequate  
4:06 PM 24 centralization?

4:06 PM 25 A. It will depend on the actual job itself. So you have to

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4 : 0 6 P M 1 look at -- you have to look at what are your objectives and  
4 : 0 6 P M 2 also the programs. Weatherford has programs, Halliburton,  
4 : 0 6 P M 3 everybody does, on how -- what's the effect of centralization  
4 : 0 6 P M 4 on the success or the potential success of that job.

4 : 0 6 P M 5 Q. Was a program used for the Macondo well?

4 : 0 6 P M 6 A. Yes, sir. That would have been Halliburton's OptiCem, has  
4 : 0 6 P M 7 a module in it that looks at centralization.

4 : 0 6 P M 8 Q. All right. Did you review the OptiCem modeling in this  
4 : 0 6 P M 9 case?

4 : 0 6 P M 10 A. Yes, sir, I did.

4 : 0 6 P M 11 Q. What did you take away from that modeling?

4 : 0 6 P M 12 A. In each case, as you increased the number of centralizers,  
4 : 0 6 P M 13 you improved the cementing results. As you're centralizing  
4 : 0 6 P M 14 that pipe, your ECD, your pressures, actually go down with  
4 : 0 7 P M 15 improved centralization because you're not getting the  
4 : 0 7 P M 16 channeling involved.

4 : 0 7 P M 17 Q. So are you saying that centralization actually reduces  
4 : 0 7 P M 18 ECDs?

4 : 0 7 P M 19 A. Yes. And that was acknowledged -- that was acknowledged  
4 : 0 7 P M 20 by BP in some communications as well.

4 : 0 7 P M 21 Q. And how many centralizers were ultimately used on the  
4 : 0 7 P M 22 Macondo production spring?

4 : 0 7 P M 23 A. There were six integral centralizers running.

4 : 0 7 P M 24 Q. Is that how many were planned?

4 : 0 7 P M 25 A. No, originally there were 21 to be run.

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4:07 PM 1 Q. And what kind of centralizers were those?

4:07 PM 2 A. Well, you'll have the original six integral centralizers

4:07 PM 3 at the top of this picture; and then you'll have an additional

4:07 PM 4 15 of the bow spring centralizers with a stop collar.

4:07 PM 5 Q. And were all of these centralizers bow spring

4:07 PM 6 centralizers?

4:07 PM 7 A. Yes. All of these are bow spring, it's just how they're

4:07 PM 8 attached to the pipe. They're all those springs.

4:08 PM 9 Q. Do you know why BP decided not to run the additional

4:08 PM 10 centralizers?

4:08 PM 11 A. Yes. I think that's identified in some e-mails, due to

4:08 PM 12 fear of getting stuck in the wellhead.

4:08 PM 13 MR. CERNICH: Can we go to Exhibit 137.

4:08 PM 14 BY MR. CERNICH:

4:08 PM 15 Q. Do you recognize this document, Mr. Bengé?

4:08 PM 16 A. Yes, sir, I do.

4:08 PM 17 MR. CERNICH: If you could pull out the bottom half

4:08 PM 18 of that.

4:08 PM 19 BY MR. CERNICH:

4:08 PM 20 Q. And the bottom e-mail is an e-mail from Greg Walz to John

4:08 PM 21 Guide, dated April 16th, 2010; is that right?

4:08 PM 22 A. Yes, sir.

4:08 PM 23 Q. Do you know who Mr. Walz was?

4:08 PM 24 A. Yes, he's the engineering leader for the drill team.

4:08 PM 25 Q. So did Mr. Morel and Mr. Hafle and Mr. Cocalés report to

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4 : 0 8 P M 1 Mr. Walz?

4 : 0 8 P M 2 A. Yes. He was the engineering -- engineering lead.

4 : 0 8 P M 3 Q. And who was Mr. Guide?

4 : 0 9 P M 4 A. Mr. Guide's the operations superintendent or supervisor, I  
4 : 0 9 P M 5 guess, for this -- I'm not sure of the -- I know what it is in  
4 : 0 9 P M 6 ExxonMobil. I can't remember what it is in BP.

4 : 0 9 P M 7 Q. Okay. And what did Mr. Walz have to say to Mr. Guide  
4 : 0 9 P M 8 about centralizers?

4 : 0 9 P M 9 A. Well, again, this echos what I just got through saying;  
4 : 0 9 P M 10 and without going through all of this, it says that the model  
4 : 0 9 P M 11 with -- up at the top, the model with six centralizers, the ECD  
4 : 0 9 P M 12 was up above 15.06 pounds per gallon.

4 : 0 9 P M 13 When you ran more centralizers, the ECD was actually  
4 : 0 9 P M 14 reduced, in this case to 14.65 pounds per gallon, which is  
4 : 0 9 P M 15 consistent. You're placing cement all the way around, you  
4 : 0 9 P M 16 don't have the channeling, your pressures will come down.

4 : 0 9 P M 17 So centralization actually reduced the ECD on the  
4 : 0 9 P M 18 well, which is what was the goal to make sure that lost  
4 : 0 9 P M 19 circulation didn't occur.

4 : 1 0 P M 20 **MR. REGAN:** Your Honor, if I just might impose an  
4 : 1 0 P M 21 objection for clarity here? The witness has not run any models  
4 : 1 0 P M 22 himself. He's reading about models run by others. But I just  
4 : 1 0 P M 23 don't want -- and I think it's clear --

4 : 1 0 P M 24 **THE COURT:** What he just said he was essentially  
4 : 1 0 P M 25 reading or summarizing what he construed this e-mail to say?

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4 : 1 0 P M 1 MR. REGAN: From other people's models, not from --  
4 : 1 0 P M 2 his opinions on centralization, he has done nothing independent  
4 : 1 0 P M 3 other than looking at other models.

4 : 1 0 P M 4 So I object if we go beyond the scope. I  
4 : 1 0 P M 5 thought we might have got a little over -- across the line  
4 : 1 0 P M 6 there, but perhaps we didn't.

4 : 1 0 P M 7 MR. CERNICH: Your Honor, I can ask Mr. Benge what  
4 : 1 0 P M 8 he's reviewed, if that would help you.

4 : 1 0 P M 9 THE COURT: Well, let's just clarify. He didn't run  
4 : 1 0 P M 10 any of these models himself; right?

4 : 1 0 P M 11 MR. CERNICH: That's correct, Your Honor.

4 : 1 0 P M 12 BY MR. CERNICH:

4 : 1 0 P M 13 Q. Mr. Benge, did you run any modeling yourself?

4 : 1 0 P M 14 A. No, sir.

4 : 1 0 P M 15 THE WITNESS: As you've noted, Your Honor, I was  
4 : 1 0 P M 16 noting, as he said, when he ran more centralizers, as it's  
4 : 1 0 P M 17 printed there on the e-mail. I did not run any models.

4 : 1 0 P M 18 BY MR. CERNICH:

4 : 1 0 P M 19 Q. Did you review the modeling that was done prior to the  
4 : 1 1 P M 20 Macondo production casing --

4 : 1 1 P M 21 A. Yes, sir, I did.

4 : 1 1 P M 22 Q. And did you review any modeling that was performed after  
4 : 1 1 P M 23 the Macondo production casing?

4 : 1 1 P M 24 A. Yes, sir, I did.

4 : 1 1 P M 25 Q. And did that modeling include modeling that was performed

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4 : 11 PM 1 by a company called CSI related to the Bly report?

4 : 11 PM 2 A. Yes, sir.

4 : 11 PM 3 Q. And you cite that in your --

4 : 11 PM 4 A. Yes, sir, I do.

4 : 11 PM 5 Q. -- in your report?

4 : 11 PM 6 Okay. And all of that modeling you've reviewed, what  
4 : 11 PM 7 did you take away from it?

4 : 11 PM 8 A. Well, all that modeling shows the same thing, that as you  
4 : 11 PM 9 increase the number of centralizers, that the quality of the  
4 : 11 PM 10 cement job improved, ECD goes down, as it says in this -- as it  
4 : 11 PM 11 says in this e-mail.

4 : 11 PM 12 Q. And is that consistent with your 36 years of experience in  
4 : 11 PM 13 the oil field?

4 : 11 PM 14 A. Yes, it's completely consistent with -- the physics is the  
4 : 11 PM 15 physics; it doesn't change.

4 : 11 PM 16 Q. Thank you.

4 : 12 PM 17 And so we were talking about this. And Mr. Walz  
4 : 12 PM 18 writes: "David was still here in the office, and I discussed  
4 : 12 PM 19 this with him, and he agreed that we needed to be consistent  
4 : 12 PM 20 with honoring the model."

4 : 12 PM 21 Do you see that?

4 : 12 PM 22 A. Yes, sir.

4 : 12 PM 23 Q. And do you believe that BP should have honored the  
4 : 12 PM 24 modeling that they had in front of them?

4 : 12 PM 25 A. Yes, sir. And thus the reason I identified it as a risk



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4 : 12 PM 1 that there was inadequate centralization.

4 : 12 PM 2 Q. How many centralizers did BP ultimately run?

4 : 12 PM 3 A. Six.

4 : 12 PM 4 Q. And did BP ever ask Halliburton to run an OptiCem model

4 : 12 PM 5 with six centralizers?

4 : 12 PM 6 A. No, sir.

4 : 12 PM 7 Q. And did BP ever ask Halliburton to run an OptiCem model

4 : 12 PM 8 with the six centralizers placed in the locations where BP

4 : 12 PM 9 placed those centralizers?

4 : 12 PM 10 A. No, sir.

4 : 12 PM 11 And to be perfectly clear, that was before the job;

4 : 13 PM 12 is that correct?

4 : 13 PM 13 Q. That's correct.

4 : 13 PM 14 A. Yes.

4 : 13 PM 15 Q. That's what I'm talking about, before the job.

4 : 13 PM 16 In your opinion, should BP have looked at an OptiCem

4 : 13 PM 17 with the six centralizers placed where BP ultimately chose to

4 : 13 PM 18 place those centralizers before pumping the cement job?

4 : 13 PM 19 A. Yes, sir. Because without running that model, you don't

4 : 13 PM 20 know how much that spring has squished in, so you don't know

4 : 13 PM 21 what the effectiveness of your centralizer placement is without

4 : 13 PM 22 running that model.

4 : 13 PM 23 Q. The Court heard some testimony yesterday regarding

4 : 13 PM 24 guidance from wellhead manufacturers regarding centralizers.

4 : 13 PM 25 In your years of experience in cementing, have you ever looked

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

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4 : 15 PM 1 A. That's the caliper log from the Macondo well. And as  
4 : 15 PM 2 people will show -- and I will apologize, first of all, for the  
4 : 15 PM 3 scale on this. The X axis -- those are 200 feet apart. So  
4 : 15 PM 4 between the major divisions there is the distance of the  
4 : 15 PM 5 building next door.

4 : 15 PM 6 The Y axis going to the right is inches. So it's  
4 : 15 PM 7 the -- the decoration on the plates, if you will. So as it  
4 : 15 PM 8 gets larger -- so the scale on this is very difficult.

4 : 15 PM 9 But this is -- this is what we call a washed-out  
4 : 15 PM 10 hole. And it's a symbol of a -- of a very fragile wellbore.  
4 : 15 PM 11 And we see this quite often in cementing, where you've got very  
4 : 16 PM 12 close pore pressures and frac gradients. And wellbore  
4 : 16 PM 13 instability will cause this.

4 : 16 PM 14 But the Xs on here, the red Xs, there's still one  
4 : 16 PM 15 further down at the float -- at the reamer shoe -- sorry. But  
4 : 16 PM 16 those Xs will designate where those centralizers were placed.

4 : 16 PM 17 Q. Does the placement of these centralizers change your  
4 : 16 PM 18 opinion on the adequacy of the centralization on the Macondo  
4 : 16 PM 19 casing?

4 : 16 PM 20 A. No. These centralizers -- and to the engineers' credit,  
4 : 16 PM 21 they tried to -- they had centralizers that we were going to  
4 : 16 PM 22 try to put them somewhere. But there's not any modeling work.  
4 : 16 PM 23 This is just kind of "I guess we'll try to put them here and  
4 : 16 PM 24 hope for the best."

4 : 16 PM 25 THE COURT: So am I reading that right? All the six

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4 : 16 PM 1 centralizers that were used were placed between 17,880 feet and  
4 : 16 PM 2 18,200 -- almost 280 feet?

4 : 16 PM 3 **THE WITNESS:** Yes, sir. There's one more that's not  
4 : 17 PM 4 shown. It's at the very bottom. It's right at the reamer  
4 : 17 PM 5 shoe. So it would be a TD.

4 : 17 PM 6 **THE COURT:** But this only shows five?

4 : 17 PM 7 **THE WITNESS:** Right, that only shows five. But that  
4 : 17 PM 8 pretty much shows where they were placed in there.

4 : 17 PM 9 **THE COURT:** Okay.

4 : 17 PM 10 **THE WITNESS:** And those are all about -- again, the  
4 : 17 PM 11 scale's bad because the X is a whole lot bigger than what the  
4 : 17 PM 12 centralizer is. It's only about 3-foot long.

4 : 17 PM 13 **THE COURT:** I see.

4 : 17 PM 14 **BY MR. CERNICH:**

4 : 17 PM 15 **Q.** And would you expect the pipe to rest against the sides of  
4 : 17 PM 16 hole between those centralizers?

4 : 17 PM 17 **A.** Oh, yes, sir. Pipe's pretty flexible. That hole is  
4 : 17 PM 18 spiraling. So, again -- yeah, between those centralizers, that  
4 : 17 PM 19 pipe will be up against the wall.

4 : 17 PM 20 **Q.** And can you describe what this caliper log told you about  
4 : 17 PM 21 the -- about the bottom of the hole?

4 : 18 PM 22 **A.** Well, I see this in cementing all the time. That's a  
4 : 18 PM 23 symbol of a washed out -- or hole instability. It doesn't  
4 : 18 PM 24 really wash out. That's a poor oilfield term, and I'll  
4 : 18 PM 25 apologize for it. It gives you the impression that it's

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4 : 18 PM 1 washing because of the mud flowing back in behind there.

4 : 18 PM 2 That's actually instability. The hole's actually falling.

4 : 18 PM 3 Some material's coming in on you.

4 : 18 PM 4 It's just hole instability. And that's what that --

4 : 18 PM 5 this is very typical of a fragile, unstable situation.

4 : 18 PM 6 Q. And so the hole is bigger in some places and smaller in

4 : 18 PM 7 other places?

4 : 18 PM 8 A. Yes, sir.

4 : 18 PM 9 Q. Did BP acknowledge the risk of the inadequate

4 : 18 PM 10 centralization?

4 : 18 PM 11 A. Yes, sir, they did.

4 : 18 PM 12 Q. Do you recall where, specifically?

4 : 18 PM 13 A. Well, there's an e-mail that has been seen of "I hope

4 : 18 PM 14 we'll get a good cement job." There's a series of e-mails

4 : 18 PM 15 associated with that where that's an acknowledged risk of

4 : 19 PM 16 "We'll see how this works versus the model."

4 : 19 PM 17 MR. CERNICH: Could we go to Exhibit 1367.

4 : 19 PM 18 BY MR. CERNICH:

4 : 19 PM 19 Q. And we looked at this, so I won't spend additional time on

4 : 19 PM 20 it. But is this the document to which you're referring,

4 : 19 PM 21 Mr. Bengé?

4 : 19 PM 22 A. Yes, sir.

4 : 19 PM 23 Q. What's the result of inadequate centralization?

4 : 19 PM 24 A. Well, you won't get cement placement all the way around

4 : 19 PM 25 the pipe, and you'll leave a channel. So you'll have a flow

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4 : 19 PM 1 path in the well. And that was shown in the video that we had.

4 : 19 PM 2 Q. What's the effect of having a channel in the well?

4 : 19 PM 3 A. Well, you don't have a barrier in the well. You've -- you  
4 : 19 PM 4 have a flow path for hydrocarbons or fluids either up or down  
4 : 19 PM 5 in the well.

4 : 19 PM 6 MR. CERNICH: Could we go to Exhibit 1, the Bly  
4 : 19 PM 7 report. I'd like to go to page 65 of that document.

4 : 20 PM 8 Could I go to the next page, please. Can I go  
4 : 20 PM 9 back two pages.

4 : 20 PM 10 My apologies, Your Honor. We'll try to come  
4 : 20 PM 11 back to that later on.

4 : 20 PM 12 BY MR. CERNICH:

4 : 20 PM 13 Q. Have you ever designed a cement job with poor  
4 : 20 PM 14 centralization?

4 : 20 PM 15 A. Yes, sir, I have.

4 : 20 PM 16 Q. Can you describe those circumstances?

4 : 20 PM 17 A. Again, we start with what's the operating envelope for  
4 : 20 PM 18 that well. And in some cases, because of limitations, those  
4 : 20 PM 19 bow springs, they go both ways. They push -- you can push them  
4 : 20 PM 20 in, but they also are pushing back. And so that gives a drag  
4 : 21 PM 21 force. That's described in API as well, in the technical  
4 : 21 PM 22 report on centralizers, that sometimes you can't run as many  
4 : 21 PM 23 because that bow spring's trying to come out. You just can't  
4 : 21 PM 24 push them in the well.

4 : 21 PM 25 So sometimes you have to sacrifice that just to get

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4 : 2 1 P M 1 the pipe to bottom.

4 : 2 1 P M 2 Q. Can slurry design overcome a lack of centralization?

4 : 2 1 P M 3 A. No. There's not a 5-gallon bucket for that.

4 : 2 1 P M 4 Q. And this is from the Bly report. I'm reading from the  
4 : 2 1 P M 5 trial transcript the other day.

4 : 2 1 P M 6 "The decision to not use 21 centralizers increased  
4 : 2 1 P M 7 the possibility of channeling above the main hydrocarbon zones,  
4 : 2 1 P M 8 but it likely did not contribute to the cement's failure to  
4 : 2 1 P M 9 isolate the main hydrocarbon zones or to the failure of the  
4 : 2 2 P M 10 shoe track cement."

4 : 2 2 P M 11 And that was trial transcript 1203, line 7 to 11.

4 : 2 2 P M 12 Do you agree with that statement, Mr. Benge?

4 : 2 2 P M 13 A. No, I do not.

4 : 2 2 P M 14 Q. Why not?

4 : 2 2 P M 15 A. Well, I -- I'm going to design the cement job for  
4 : 2 2 P M 16 isolation. And the lack of centralization down in the bottom  
4 : 2 2 P M 17 part of this well, just because I have a centralizer there,  
4 : 2 2 P M 18 again, doesn't mean it's centralized. I haven't looked at the  
4 : 2 2 P M 19 model work on it to know -- you can't make that statement  
4 : 2 2 P M 20 without running the model work.

4 : 2 2 P M 21 And the hole is spiraling. We see that, again, from  
4 : 2 2 P M 22 the survey data.

4 : 2 2 P M 23 Q. And I think you testified earlier there was no -- BP had  
4 : 2 2 P M 24 no modeling of that scenario before the cement job was --

4 : 2 2 P M 25 A. Prior to the cement job, no, that's correct.

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4 : 2 2 P M 1           **MR. REGAN:** Your Honor, I'm going to object to  
4 : 2 2 P M 2 further opinions from the witness on centralization. His  
4 : 2 3 P M 3 opinion is there was no model run that could tell how much  
4 : 2 3 P M 4 centralization took place. And now he's taking that and  
4 : 2 3 P M 5 saying, "Therefore, I've concluded there was inadequate  
4 : 2 3 P M 6 centralization."

4 : 2 3 P M 7                   I'm happy to have him describe the models that  
4 : 2 3 P M 8 existed.

4 : 2 3 P M 9           **THE COURT:** That sounds like a good question for  
4 : 2 3 P M 10 cross-examination.

4 : 2 3 P M 11           **MR. REGAN:** Fair enough, Your Honor.

4 : 2 3 P M 12           **THE COURT:** Okay.

4 : 2 3 P M 13           **MR. REGAN:** Tomorrow.

4 : 2 3 P M 14           **THE WITNESS:** Oh, really?

4 : 2 3 P M 15 **BY MR. CERNICH:**

4 : 2 3 P M 16 **Q.** Mr. Bengé, do you need a model to know whether there was  
4 : 2 3 P M 17 adequate centralization at the bottom of the well?

4 : 2 3 P M 18 **A.** I need a model to know what degree of centralization; but  
4 : 2 3 P M 19 in looking at this, there was not adequate centralization.

4 : 2 3 P M 20 **Q.** And that's based on?

4 : 2 3 P M 21 **A.** That's based on 36 years of looking at wells like this.

4 : 2 3 P M 22 **Q.** Thank you.

4 : 2 3 P M 23           **MR. CERNICH:** All right. Could we go to the next  
4 : 2 3 P M 24 slide, please. Slide 18, please.  
25



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4 : 2 3 P M 1 **BY MR. CERNICH:**

4 : 2 3 P M 2 **Q.** You identified problems with the float collar conversion  
4 : 2 3 P M 3 as a risk?

4 : 2 3 P M 4 **A.** Yes, sir, I did. That was an additional risk on the well.

4 : 2 4 P M 5 **MR. CERNICH:** Your Honor, I know you've heard a lot  
4 : 2 4 P M 6 about float collars. Tell me to refrain if we're re-covering  
4 : 2 4 P M 7 old ground.

4 : 2 4 P M 8 Can we go to that image from the Bly report that  
4 : 2 4 P M 9 was just up a moment ago.

4 : 2 4 P M 10 **BY MR. CERNICH:**

4 : 2 4 P M 11 **Q.** What is a float collar, Mr. Bengé?

4 : 2 4 P M 12 **A.** Well, that's a check valve in the well that prevents flow  
4 : 2 4 P M 13 back. Once it's activated, that check valve comes in, and you  
4 : 2 4 P M 14 can no longer flow for reverse flow in the well.

4 : 2 4 P M 15 **Q.** Why do you use a float collar?

4 : 2 4 P M 16 **A.** The fluids -- when you're through with cementing, the  
4 : 2 4 P M 17 fluids on the annulus, on the outside of that plate, are going  
4 : 2 4 P M 18 to weigh more than what's on the inside.

4 : 2 4 P M 19 We call it "U-tubing." Those tend to try to come  
4 : 2 4 P M 20 back up into the well. The design of those check valves, that  
4 : 2 4 P M 21 flapper comes up and keeps that from flowing.

4 : 2 4 P M 22 **Q.** And as you're running that casing into the hole, have  
4 : 2 4 P M 23 those valves opened?

4 : 2 5 P M 24 **A.** Well, in this particular case, this was an auto-fill. You  
4 : 2 5 P M 25 have a plastic tube that's in there -- I'm not sure it's

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4 : 2 5 P M 1 plastic. You have a tube that's in there that holds those  
4 : 2 5 P M 2 valves in the open position, and then that's -- the design for  
4 : 2 5 P M 3 that is to eject that and let those valves slump.

4 : 2 5 P M 4 Q. Why do you have that tube in there?

4 : 2 5 P M 5 A. It allows fluid to flow inside the pipe. It lowers what  
4 : 2 5 P M 6 we call the surge pressure. It lowers the pressure on the well  
4 : 2 5 P M 7 as you're running casing in the well.

4 : 2 5 P M 8 Q. Did BP attempt to convert the float collar on the Macondo  
4 : 2 5 P M 9 production casing?

4 : 2 5 P M 10 A. Yes, sir. It took nine attempts to establish circulation  
4 : 2 5 P M 11 on this well, each attempt at a higher pressure.

4 : 2 5 P M 12 Q. And you said "establish circulation." What do you mean by  
4 : 2 5 P M 13 that?

4 : 2 5 P M 14 A. Where you're beginning to pump into the well and come back  
4 : 2 5 P M 15 out, that you can circulate. It allows you to pump into the  
4 : 2 5 P M 16 well. You can actually circulate fluids down to the bottom and  
4 : 2 5 P M 17 back up.

4 : 2 5 P M 18 Q. Did that process concern you in any way?

4 : 2 5 P M 19 A. Yes, it did because that -- the fact that it took over  
4 : 2 6 P M 20 3,000 psi for the -- for them to establish -- for the well to  
4 : 2 6 P M 21 establish circulation shows me that the hole wasn't clean;  
4 : 2 6 P M 22 there was debris in the well. And it was plugging -- as shown  
4 : 2 6 P M 23 here and has been shown, that either the reamer shoe or the  
4 : 2 6 P M 24 collar, somewhere in there had a lot of debris, and it was  
4 : 2 6 P M 25 causing a problem.

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4 : 2 6 P M 1 Q. Do you know whether the float collar converted?

4 : 2 6 P M 2 A. No, I don't, and I state so in my report.

4 : 2 6 P M 3 Q. And why don't you know?

4 : 2 6 P M 4 A. Because there was no tests to demonstrate whether it

4 : 2 6 P M 5 converted or not.

4 : 2 6 P M 6 Q. Why are float collar conversion problems -- why do you

4 : 2 6 P M 7 identify them as a risk?

4 : 2 6 P M 8 A. Well, I identify it as a risk -- and this is one of the

4 : 2 6 P M 9 bigger risks. And it was acknowledged that whenever that

4 : 2 6 P M 10 3,100-odd psi -- when it suddenly released, that's a big

4 : 2 6 P M 11 concern -- that's a big risk because at that point you do not

4 : 2 7 P M 12 know where in the well you're circulating. You've got a sudden

4 : 2 7 P M 13 pressure surge, and pressures were much lower, showing that

4 : 2 7 P M 14 some restriction that you used to have isn't there anymore.

4 : 2 7 P M 15 MR. CERNICH: Could we go to Exhibit 2586, please.

4 : 2 7 P M 16 BY MR. CERNICH:

4 : 2 7 P M 17 Q. Can you identify this document?

4 : 2 7 P M 18 A. Yes, sir. That's some communication between Bryan

4 : 2 7 P M 19 Clawson, who's with Weatherford, and Brian Morel with BP.

4 : 2 7 P M 20 Q. Okay. We'll focus on the bottom of this for just a

4 : 2 7 P M 21 moment. So that's an e-mail from Brian Morel to Bryan Clawson

4 : 2 7 P M 22 on April 19th, 2010?

4 : 2 7 P M 23 A. Yes, sir.

4 : 2 7 P M 24 Q. With the subject "Circulation"?

4 : 2 7 P M 25 A. Yes, sir.

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4 : 2 7 P M 1 Q. If we could go to the e-mail itself.

4 : 2 7 P M 2 At the bottom there, Mr. Clawson wrote an e-mail to

4 : 2 7 P M 3 Mr. Morel on April 19th, at 5:30 p.m., "Subject: Circulation."

4 : 2 7 P M 4 He writes: "Brian. Any progress, Brian?"

4 : 2 8 P M 5 And Mr. Morel replied: "Yeah, we blew it at 3140,

4 : 2 8 P M 6 still not sure what we blew yet."

4 : 2 8 P M 7 Was this the e-mail you were referring to?

4 : 2 8 P M 8 A. Yes, sir, it is.

4 : 2 8 P M 9 Q. Do you know whether BP ever determined what it blew?

4 : 2 8 P M 10 A. No, sir, I do not. The whole issue of what was blown, the

4 : 2 8 P M 11 lower circulation pressures following the job was never

4 : 2 8 P M 12 resolved prior to the job.

4 : 2 8 P M 13 Q. Was there any way to investigate whether the float collar

4 : 2 8 P M 14 had, in fact, converted?

4 : 2 8 P M 15 A. Yes, sir. You could have attempted to reverse, circulate

4 : 2 8 P M 16 the pump down the annulus and back -- you could have tried to

4 : 2 8 P M 17 do that. If you couldn't pump, then it's an indication that

4 : 2 8 P M 18 those valves are working.

4 : 2 8 P M 19 Q. And would that have taken additional time?

4 : 2 8 P M 20 A. Yes, sir.

4 : 2 8 P M 21 Q. Okay. And was it BP's decision to move forward after the

4 : 2 8 P M 22 attempted float collar conversion?

4 : 2 8 P M 23 A. Yes, sir, it was.

4 : 2 9 P M 24 Q. Would you have moved forward -- or would a prudent

4 : 2 9 P M 25 operator have moved forward with the cement job without further

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4 : 2 9 P M 1 investigation?

4 : 2 9 P M 2 A. This -- and I identify a number of risks. This one was  
4 : 2 9 P M 3 pretty risky for me. Because if you broke something and the  
4 : 2 9 P M 4 circulating pressure is lower, you're not really sure of where  
4 : 2 9 P M 5 you're circulating.

4 : 2 9 P M 6 Now, in this case BP got lucky because the positive  
4 : 2 9 P M 7 pressure test after the job showed that you didn't have a  
4 : 2 9 P M 8 broach from at least the float collar up.

4 : 2 9 P M 9 But this one was a pretty big risk. Operationally  
4 : 2 9 P M 10 you could have had a break in that well somewhere, and you're  
4 : 2 9 P M 11 circulating at a much higher point.

4 : 2 9 P M 12 Q. At what point would you have figured that out?

4 : 2 9 P M 13 A. Well, you could run fluid calipers. You could run -- put  
4 : 2 9 P M 14 something in there and say, I've got a volume. I'm going to  
4 : 2 9 P M 15 pump all the way around and check if that volume matches what  
4 : 2 9 P M 16 it should, if you're circulating at the bottom. And that's one  
4 : 2 9 P M 17 way to make sure you're circulating the entire hole. If that  
4 : 3 0 P M 18 caliper comes back way early, it means you're circulating from  
4 : 3 0 P M 19 a different point.

4 : 3 0 P M 20 Q. Once you went to pump the cement job, would you have found  
4 : 3 0 P M 21 out in any way?

4 : 3 0 P M 22 A. Yeah. You would have found out when you tried to do your  
4 : 3 0 P M 23 positive test. You may have found out -- and again, depending  
4 : 3 0 P M 24 on where that broach was, you would have found out through lift  
4 : 3 0 P M 25 pressures and such.

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4:30 PM 1 Q. But you didn't offer any opinion as to whether or not  
4:30 PM 2 there was --

4:30 PM 3 A. Oh, no. No, sir, not at all.

4:30 PM 4 MR. CERNICH: Okay. Can we go to the next slide,  
4:30 PM 5 please.

4:30 PM 6 BY MR. CERNICH:

4:30 PM 7 Q. You also identified limited pre-job circulation as a risk.  
4:30 PM 8 What is "pre-job circulation"?

4:30 PM 9 A. That's circulating the well prior to -- prior to the  
4:30 PM 10 cement job. And that's an additive risk, along with the other.  
4:30 PM 11 You had -- one of the functions of pre-job circulation is to  
4:30 PM 12 clean debris out of the well and to break up the gels in the  
4:30 PM 13 mud. Mud tends to gel up a little bit. And so you put  
4:31 PM 14 energy -- you get that fluid circulating in the well.

4:31 PM 15 The other thing the pre-job circulation does, it  
4:31 PM 16 allows you to see what condition that mud is that's been  
4:31 PM 17 sitting static at the bottom of the well for several days.

4:31 PM 18 So getting -- the industry and BP in their documents  
4:31 PM 19 recommend two bottoms-up, but that's taking the mud that's at  
4:31 PM 20 the very bottom the well, bringing it all the way to surface so  
4:31 PM 21 you can look at it and you can check it for "Is it the same  
4:31 PM 22 mud? Has it deteriorated? Is there hydrocarbon influx? Is  
4:31 PM 23 there debris?"

4:31 PM 24 Pre-job circulation does a lot of things for that  
4:31 PM 25 well.

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4 : 3 1 P M 1 Q. Was a full bottoms-up run on the Macondo well?

4 : 3 1 P M 2 A. No, sir, not at all.

4 : 3 1 P M 3 Q. And is a full bottoms-up a best practice?

4 : 3 1 P M 4 A. Yes, sir, and that's identified throughout the industry.

4 : 3 1 P M 5 Q. Have you run a full bottoms-up on every well you've

4 : 3 1 P M 6 cemented?

4 : 3 1 P M 7 A. No, sir, I have not.

4 : 3 2 P M 8 Q. What are some reasons why you wouldn't run a full

4 : 3 2 P M 9 bottoms-up?

4 : 3 2 P M 10 A. One of the things is if you're losing circulation, you're

4 : 3 2 P M 11 pumping fluid in and you're not getting full returns out, if

4 : 3 2 P M 12 you try to run a full bottoms-up, you'll run out of fluid,

4 : 3 2 P M 13 because that fluid, instead of coming up the annulus, is

4 : 3 2 P M 14 spilling off the plate; it's going out into the formation. So

4 : 3 2 P M 15 if you don't have full returns, you can't run a full

4 : 3 2 P M 16 bottoms-up.

4 : 3 2 P M 17 Q. Did you see any reason not to run a full bottoms-up on the

4 : 3 2 P M 18 Macondo well?

4 : 3 2 P M 19 A. I didn't. There were no indications of problems prior to

4 : 3 2 P M 20 the cement job that would have limited that. And, in fact,

4 : 3 2 P M 21 because of the debris in the well that was seen with the float

4 : 3 2 P M 22 collar, that's an added risk and that's a -- I would have

4 : 3 2 P M 23 wanted to circulate that out.

4 : 3 2 P M 24 Q. While BP was conducting its pre-job circulation, did it

4 : 3 2 P M 25 lose any returns?

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4 : 3 2 P M 1 A. No, sir.

4 : 3 2 P M 2 Q. Would a full bottoms-up have taken additional time?

4 : 3 3 P M 3 A. Yes. A full bottoms-up on this well was about

4 : 3 3 P M 4 2400 barrels. So it would have taken -- at 4 barrels a minute,

4 : 3 3 P M 5 that's about 10 hours.

4 : 3 3 P M 6 MR. CERNICH: If we could go to the next slide,

4 : 3 3 P M 7 please.

4 : 3 3 P M 8 BY MR. CERNICH:

4 : 3 3 P M 9 Q. You identified low cement volume as a risk?

4 : 3 3 P M 10 A. Yes. Again, it's a risk, but it's one of the limitations

4 : 3 3 P M 11 of the well. We said top of cement at a particular level, and

4 : 3 3 P M 12 so you're not going to have -- you don't have a lot of cement

4 : 3 3 P M 13 to deal with. So because of that, it's one of those additional

4 : 3 3 P M 14 risks that you've got to be very careful with everything else.

4 : 3 3 P M 15 By itself, a low cement volume, you can do that. But

4 : 3 3 P M 16 a low cement volume in this particular case carries with it two

4 : 3 3 P M 17 risks. One, you have to get everything else exactly right.

4 : 3 3 P M 18 But also, this was a foam cement job, and foam cement jobs with

4 : 3 3 P M 19 a very low cement volume are even more complex and more

4 : 3 4 P M 20 difficult.

4 : 3 4 P M 21 MR. CERNICH: Could we go to Exhibit 225, please.

4 : 3 4 P M 22 And this is Exhibit 225.

4 : 3 4 P M 23 BY MR. CERNICH:

4 : 3 4 P M 24 Q. Do you recognize this document, Mr. Bengé?

4 : 3 4 P M 25 A. Yes, sir, I do.



## GLEN BENGE - DIRECT

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

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4 : 3 5 P M 1 A. Yes, sir, I do. In a foam cement operation, when you're  
4 : 3 5 P M 2 doing the job, you have to bring the cement -- you have to  
4 : 3 5 P M 3 start pumping the cement first; then you turn on the nitrogen.

4 : 3 5 P M 4 So the question here is: Is that a cap slurry? Is  
4 : 3 5 P M 5 that a plan volume or is that just a volume of the cement that  
4 : 3 5 P M 6 I bring up to weight and start moving it before I bring on the  
4 : 3 5 P M 7 nitrogen?

4 : 3 5 P M 8 So is it planned, or is it just -- every foam cement  
4 : 3 5 P M 9 job, you have to have some cement ahead because you don't start  
4 : 3 6 P M 10 pumping nitrogen until that line's full of cement. You don't  
4 : 3 6 P M 11 want raw nitrogen going in there.

4 : 3 6 P M 12 Q. And was it BP's decision to use a low cement volume?

4 : 3 6 P M 13 A. Yes, sir. It was driven by the top of cement.

4 : 3 6 P M 14 Q. Is there a relationship between low cement volume and the  
4 : 3 6 P M 15 other components of a cement job?

4 : 3 6 P M 16 A. Well, again, because there's not a lot of cement volume,  
4 : 3 6 P M 17 it puts more onus on the overall risk. In and of itself, you  
4 : 3 6 P M 18 have jobs with low cement volume, but it has an additive  
4 : 3 6 P M 19 effect.

4 : 3 6 P M 20 Q. So does it mean you have to be more careful?

4 : 3 6 P M 21 A. Right. You have to be more careful with the other things  
4 : 3 6 P M 22 on the job.

4 : 3 6 P M 23 MR. CERNICH: If we could go to the next slide.

4 : 3 6 P M 24 BY MR. CERNICH:

4 : 3 6 P M 25 Q. Did you identify low pump rates as a risk?

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4 : 3 6 P M 1 A. Yes, sir, I did.

4 : 3 6 P M 2 Q. How are they a risk?

4 : 3 6 P M 3 A. Again, putting energy into the well. This was a very  
4 : 3 7 P M 4 fragile formation, a very fragile well. And so you -- BP was  
4 : 3 7 P M 5 limited in the pump rates because of ECD constraints or the  
4 : 3 7 P M 6 fracture gradient constraints.

4 : 3 7 P M 7 Again, in and of itself, low pump -- you can do a  
4 : 3 7 P M 8 cement job with low pump rates. But you have to plan for that,  
4 : 3 7 P M 9 and it's an added risk, coupled with all of the other things  
4 : 3 7 P M 10 that low pump rates will give you. You're just not putting  
4 : 3 7 P M 11 energy into that well.

4 : 3 7 P M 12 MR. CERNICH: If we could go to the next slide,  
4 : 3 7 P M 13 please.

4 : 3 7 P M 14 BY MR. CERNICH:

4 : 3 7 P M 15 Q. So these are nine risks that you identified?

4 : 3 7 P M 16 A. Yes, sir, they are.

4 : 3 7 P M 17 Q. And are there ways to mitigate those risks?

4 : 3 7 P M 18 A. Yes, sir, there are, and those are found in a number of  
4 : 3 7 P M 19 places.

4 : 3 7 P M 20 MR. CERNICH: Could we go to slide 23, please.

4 : 3 7 P M 21 THE WITNESS: There's mitigating risks found both --  
4 : 3 7 P M 22 industry best practices, you know, limited volume of pre-job  
4 : 3 8 P M 23 circulation. And industry and BP best practices and  
4 : 3 8 P M 24 Halliburton best practices show that, you know, circulate  
4 : 3 8 P M 25 bottoms-up, that eliminates that risk.

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4 : 3 8 P M 1 So there's a lot of the best practices in there  
4 : 3 8 P M 2 that directly address the risks.

4 : 3 8 P M 3 **BY MR. CERNICH:**

4 : 3 8 P M 4 **Q.** And we've looked at some of BP's best practices earlier  
4 : 3 8 P M 5 today?

4 : 3 8 P M 6 **A.** Yes, sir, we did. We looked at a few of those.

4 : 3 8 P M 7 **Q.** Or "recommended practices," I think was the title.

4 : 3 8 P M 8 **A.** Okay, yes. I believe that is. And I believe the industry  
4 : 3 8 P M 9 will say "industry-recommended practices," as well.

4 : 3 8 P M 10 **Q.** And what are some of the industry best practices?

4 : 3 8 P M 11 **A.** Industry best practices are circulate prior to cementing,  
4 : 3 8 P M 12 design properly, have goals. But all of those are found in the  
4 : 3 8 P M 13 API documents.

4 : 3 8 P M 14 **Q.** And it's some of the documents that you prepared?

4 : 3 8 P M 15 **A.** Right, in some of the documents of all of us that are on  
4 : 3 8 P M 16 the API subcommittee that's -- that's the work of that  
4 : 3 8 P M 17 committee -- or subcommittee, I'm sorry.

4 : 3 9 P M 18 **Q.** Did you observe whether BP followed best practices on the  
4 : 3 9 P M 19 Macondo well?

4 : 3 9 P M 20 **A.** Yes -- well, I did observe that a lot of best practices  
4 : 3 9 P M 21 were not followed.

4 : 3 9 P M 22 **Q.** And then I'd like to move on -- we're nearing the end  
4 : 3 9 P M 23 here -- to the cement job execution.

4 : 3 9 P M 24 So now the cement job is designed and planned, and  
4 : 3 9 P M 25 then you move to the execution stage?

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4 : 3 9 P M 1 A. Yes, sir.

4 : 3 9 P M 2 Q. Did you consider the execution of the cement job?

4 : 3 9 P M 3 A. Yes, sir, I did. I looked at all of the available -- all

4 : 3 9 P M 4 of the data from the actual pumping of the cement job that came

4 : 3 9 P M 5 from location.

4 : 3 9 P M 6 Q. And did you have any opinions on the cement job?

4 : 3 9 P M 7 A. Yes, sir, I did. I thought the crew, in the job that was

4 : 3 9 P M 8 pumped, the cement was mixed properly. I found no issues with

4 : 4 0 P M 9 the pumping of the cement job.

4 : 4 0 P M 10 Q. And then we looked at the animation earlier, and we saw

4 : 4 0 P M 11 the cement job -- the idealized cement job pumped.

4 : 4 0 P M 12 And then there were two plugs. There was a bottom

4 : 4 0 P M 13 plug and then a top plug. And the top plug hit the bottom

4 : 4 0 P M 14 plug. That's the plug was bumped?

4 : 4 0 P M 15 A. Yes. That's what we call "bumping the plug." That's the

4 : 4 0 P M 16 end of the cement job.

4 : 4 0 P M 17 Q. And then what happened immediately after the plug was

4 : 4 0 P M 18 bumped?

4 : 4 0 P M 19 A. Immediately after that -- and I've got a stick drawing in

4 : 4 0 P M 20 my report -- there's a float check.

4 : 4 0 P M 21 MR. CERNICH: Can we go to page 27 of Exhibit 5990,

4 : 4 0 P M 22 Mr. Bengé's report.

4 : 4 0 P M 23 THE WITNESS: And you can tell that the artist here

4 : 4 0 P M 24 was me because it's -- my artist renditions are a little

4 : 4 0 P M 25 simpler.

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4 : 4 0 P M 1                    During the cement job, on the section here of A,  
4 : 4 0 P M 2                    you're pumping the cement job. The yellow square there  
4 : 4 1 P M 3                    signifies the top plug.

4 : 4 1 P M 4                    So at the end of the job, that bumps up on  
4 : 4 1 P M 5                    the -- excuse me, it bumps on top. It bumps on the float  
4 : 4 1 P M 6                    collar. And your float check, because the fluids in the  
4 : 4 1 P M 7                    annulus weigh more than what's inside, they'll tend to try to  
4 : 4 1 P M 8                    push back. That's the -- that's the U-tube effect.

4 : 4 1 P M 9                    And if the valves are closed and everything's  
4 : 4 1 P M 10                    working fine, then you won't get any flow back.

4 : 4 1 P M 11                    If you do get flow back, it's an indication that  
4 : 4 1 P M 12                    the floats aren't holding, is what we call that. Now, in the  
4 : 4 1 P M 13                    Macondo production cement job, the float check was inconclusive  
4 : 4 1 P M 14                    because there's -- that yellow square, that top plug is a  
4 : 4 1 P M 15                    forced fit; you have to push it in place. It's a big rubber  
4 : 4 1 P M 16                    plug that to push it back up takes -- takes over 100 psi.

4 : 4 1 P M 17                    Q. So it's wedged --

4 : 4 1 P M 18                    A. It's wedged in there.

4 : 4 1 P M 19                    And the pressure available -- the pressure available  
4 : 4 2 P M 20                    to push that back up, that U-tube pressure at the end of this  
4 : 4 2 P M 21                    job was more in the range of 50 to 60 psi. So that float check  
4 : 4 2 P M 22                    is inconclusive. You don't know the difference in my diagram  
4 : 4 2 P M 23                    between B and C, whether or not that -- those flow valves are  
4 : 4 2 P M 24                    holding or not. That test is inconclusive.

4 : 4 2 P M 25                    Q. So based on this test, you wouldn't have known whether the

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4 : 4 2 P M 1 valves in the float collar were closed?

4 : 4 2 P M 2 A. That's correct. And I stated that in my report, that I

4 : 4 2 P M 3 don't know what the condition of the float equipment was at the

4 : 4 2 P M 4 end of this job.

4 : 4 2 P M 5 Q. After this cement job, did BP run a cement bond log?

4 : 4 2 P M 6 A. No, sir, they did not.

4 : 4 2 P M 7 Q. And then there was a positive pressure test?

4 : 4 2 P M 8 A. Yes, sir. Later on, there was a 5,000-psi positive

4 : 4 2 P M 9 pressure test where you're attempting to pressure up that inner

4 : 4 2 P M 10 pipe. So you'll pressure up against that plug, and that will

4 : 4 3 P M 11 test from that plug all the way back up to the rig floor. It

4 : 4 3 P M 12 doesn't test anything below the plug or in the annulus.

4 : 4 3 P M 13 Q. So it tells you whether the casing's intact?

4 : 4 3 P M 14 A. It tells you if the casing's intact. That's where you

4 : 4 3 P M 15 know that you have casing integrity from that float equipment

4 : 4 3 P M 16 back up, but nothing below it and nothing in the annulus.

4 : 4 3 P M 17 Q. And then did BP conduct a negative pressure test at some

4 : 4 3 P M 18 point after the positive pressure test?

4 : 4 3 P M 19 A. Yes, sir, they did.

4 : 4 3 P M 20 Q. And the Court's heard a great deal of testimony over the

4 : 4 3 P M 21 actual conduct of that negative pressure test. But from a

4 : 4 3 P M 22 cementing perspective, what does a negative pressure test test?

4 : 4 3 P M 23 A. It tests the entire system. So if it -- if, for example,

4 : 4 3 P M 24 the negative pressure test passes, you don't know if it passes

4 : 4 3 P M 25 because the valves are closed or holding or if it's the cement.

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4 : 4 3 P M 1 If it fails, you know you don't have a barrier in the  
4 : 4 4 P M 2 well, that the total system has failed; but it doesn't test  
4 : 4 4 P M 3 individual components. It tests everything that's there.

4 : 4 4 P M 4 Q. So the -- all right. I'll move on.

4 : 4 4 P M 5 In this case, do you know whether the negative  
4 : 4 4 P M 6 pressure test actually tested the cement?

4 : 4 4 P M 7 A. Yes, it did because it showed that the cement did not form  
4 : 4 4 P M 8 a barrier in the well.

4 : 4 4 P M 9 Q. And so did the system fail?

4 : 4 4 P M 10 A. The system failed, yes.

4 : 4 4 P M 11 Q. And where was the cement during the negative pressure  
4 : 4 4 P M 12 test?

4 : 4 4 P M 13 A. I'm sorry. I didn't quite hear you.

4 : 4 4 P M 14 Q. During the negative pressure test, where was the cement?

4 : 4 4 P M 15 A. Well, the cement --

4 : 4 4 P M 16 Q. Was there cement in the shoe track?

4 : 4 4 P M 17 A. Yes, there was cement in the shoe track and in the annulus  
4 : 4 4 P M 18 up some distance.

4 : 4 4 P M 19 Q. And did you ultimately reach an opinion as to whether or  
4 : 4 4 P M 20 not the cement was actually set at the time of the negative  
4 : 4 4 P M 21 pressure test?

4 : 4 4 P M 22 A. Yes, sir. In my opinion, the cement was not set at the  
4 : 4 4 P M 23 time of the negative test.

4 : 4 5 P M 24 Q. And what is the basis of that opinion?

4 : 4 5 P M 25 A. The basis of that opinion was looking at what data was



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4 : 4 5 P M 1 available to BP prior to the cement job as well as subsequent  
4 : 4 5 P M 2 laboratory testing by Chevron and by OT&C. And I looked at the  
4 : 4 5 P M 3 sensitivity of that system, if you will, to temperature.

4 : 4 5 P M 4 **MR. CERNICH:** Can we go to Exhibit 5937?

4 : 4 5 P M 5 **BY MR. CERNICH:**

4 : 4 5 P M 6 **Q.** Is this the OT&C testing to which you referred?

4 : 4 5 P M 7 **A.** Yes, sir, it is.

4 : 4 5 P M 8 **MR. CERNICH:** And if we can go to the next page,  
4 : 4 5 P M 9 please.

4 : 4 5 P M 10 **BY MR. CERNICH:**

4 : 4 5 P M 11 **Q.** And is this specifically the data to which you refer?

4 : 4 5 P M 12 **A.** Yes, sir, it is. And in particular, UCA2 and UCA2-B are  
4 : 4 6 P M 13 tests that are performed during this series on the -- on a  
4 : 4 6 P M 14 cement system that had the same components as what was pumped  
4 : 4 6 P M 15 in the Macondo well.

4 : 4 6 P M 16 **MR. CERNICH:** Could we go to page 35 of Mr. Benge's  
4 : 4 6 P M 17 report, please? If we could pull out the top half of that  
4 : 4 6 P M 18 page.

4 : 4 6 P M 19 **BY MR. CERNICH:**

4 : 4 6 P M 20 **Q.** Does this summarize some of the data that you reviewed?

4 : 4 6 P M 21 **A.** It does, yes, sir. All I've done is I've pulled those two  
4 : 4 6 P M 22 lines out of that table and have reproduced them in my report.  
4 : 4 6 P M 23 This is a fairly important point, in particular, here because  
4 : 4 6 P M 24 cement -- the way cement sets, it's a chemical reaction and  
4 : 4 6 P M 25 chemical reactions are governed by temperature. And so how

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4 : 4 6 P M 1 quickly you get to temperature, how fast that occurs will let  
4 : 4 7 P M 2 you know how fast the cement can set.

4 : 4 7 P M 3 There's a reason that Betty Crocker makes you preheat  
4 : 4 7 P M 4 your oven, because they know that if you put it in a hot oven,  
4 : 4 7 P M 5 it will make the cake in a certain period of time. If you put  
4 : 4 7 P M 6 it in and that oven heats very slowly, then they can't tell you  
4 : 4 7 P M 7 when the cake is done. The same thing we're seeing happening  
4 : 4 7 P M 8 here.

4 : 4 7 P M 9 How quickly does that cement heat up? How quickly do  
4 : 4 7 P M 10 those reactions occur? And that will determine how fast that  
4 : 4 7 P M 11 cement can set. And that's a risk that's identified by BP in  
4 : 4 7 P M 12 their SRP.

4 : 4 7 P M 13 **MR. CERNICH:** Could we go to Exhibit 6233, please?

4 : 4 7 P M 14 **BY MR. CERNICH:**

4 : 4 7 P M 15 **Q.** Is this the SRP to which you were referring to?

4 : 4 7 P M 16 **A.** Yes, that's the cement testing laboratory section of the  
4 : 4 7 P M 17 SRP 4.1.

4 : 4 7 P M 18 **MR. CERNICH:** Can we go to page 5, please?

4 : 4 8 P M 19 **BY MR. CERNICH:**

4 : 4 8 P M 20 **Q.** Is this the portion of this SRP to which you refer?

4 : 4 8 P M 21 **A.** Yes, sir. And this is in my report. It's a table that's  
4 : 4 8 P M 22 in the SRP that shows risks and, basically, consequences -- or  
4 : 4 8 P M 23 mitigations steps. And the risk that's identified on the left  
4 : 4 8 P M 24 is "Testing at the wrong temperature (and/or pressure) has  
4 : 4 8 P M 25 resulted in cementing failures" is basically what that says and

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4 : 4 8 P M 1 that you have to come back and do a remedial operation.

4 : 4 8 P M 2 The mitigating steps for that and its particular  
4 : 4 8 P M 3 application in selection for deviated wells, HTHP, and  
4 : 4 8 P M 4 deepwater wells, and the mitigating step says don't use the API  
4 : 4 8 P M 5 ramping schedule, use a ramping schedule that's simulating  
4 : 4 8 P M 6 what's happening in the well.

4 : 4 8 P M 7 Now, the API ramping schedule takes it from bottom  
4 : 4 9 P M 8 hole circulating temperature, the temperature when I'm pumping  
4 : 4 9 P M 9 everything, to static -- so I'm not pumping and that well heats  
4 : 4 9 P M 10 up -- in four hours. The simulation work shows -- and the well  
4 : 4 9 P M 11 cap simulation that was run by Halliburton shows it takes  
4 : 4 9 P M 12 considerably longer than four hours to get up to 210 degrees.

4 : 4 9 P M 13 **MR. CERNICH:** Could we go to Exhibit 7882, please?

4 : 4 9 P M 14 **BY MR. CERNICH:**

4 : 4 9 P M 15 **Q.** Can you identify this document, Mr. Bengé?

4 : 4 9 P M 16 **A.** Yes, sir. That is a Halliburton laboratory report.

4 : 4 9 P M 17 **MR. CERNICH:** And for the record, this is the same  
4 : 4 9 P M 18 exhibit as Exhibit 1709 but this one is -- that one wasn't in  
4 : 4 9 P M 19 color. So we're going to use this one.

4 : 4 9 P M 20 And if we could go to page 4 of that.

4 : 4 9 P M 21 **BY MR. CERNICH:**

4 : 4 9 P M 22 **Q.** Can you tell the Court what this is?

4 : 4 9 P M 23 **A.** Yes, sir. This is the output from what's called a UCA,  
4 : 5 0 P M 24 ultrasonic cement analyzer. The way that works is there's an  
4 : 5 0 P M 25 ultrasonic signal sent through a known volume -- it measures

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4 : 5 0 P M 1 the speed. So as cement sets, the time it takes for that  
4 : 5 0 P M 2 signal to travel changes, and that's then converted into  
4 : 5 0 P M 3 strength.

4 : 5 0 P M 4 And what we see here is this curve that comes down,  
4 : 5 0 P M 5 that's how fast that signal goes. So as it sets, here's your  
4 : 5 0 P M 6 compressive strength curve that comes up. So you can see that  
4 : 5 0 P M 7 as time changes, you start gaining strength.

4 : 5 0 P M 8 This line shows you your temperature. So going  
4 : 5 0 P M 9 from -- and it's hard to see on this graph, I apologize. But  
4 : 5 0 P M 10 going over to the left, it's going from bottom hole circulating  
4 : 5 0 P M 11 temperature up to the test temperature in a period of four  
4 : 5 0 P M 12 hours.

4 : 5 0 P M 13 So that's the standard that's used in API 10B-2.  
4 : 5 1 P M 14 That's the standard API ramping schedule is four hours.

4 : 5 1 P M 15 Q. And did the OT&C testing use a ramp that was different  
4 : 5 1 P M 16 from this one?

4 : 5 1 P M 17 A. Yes, sir, it did. It used a ramp that was developed from  
4 : 5 1 P M 18 the well cap temperature simulator that was recommended by --  
4 : 5 1 P M 19 that would be recommended by the -- in BP's SRP. Used a  
4 : 5 1 P M 20 simulator to change that ramp.

4 : 5 1 P M 21 And I've discussed that ramp in my report. It was  
4 : 5 1 P M 22 considerably different than what a four-hour heat up rate is.  
4 : 5 1 P M 23 And actually, the one that was used by OT&C was more aggressive  
4 : 5 1 P M 24 than what the -- what the well cap run shows.

4 : 5 1 P M 25 Q. Was the OT&C -- I'm sorry. What pressure was the OT&C

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4 : 5 1 P M 1 testing conducted at?

4 : 5 1 P M 2 A. That testing was conducted at 3,000 psi. This particular

4 : 5 1 P M 3 testing was done at 14 -- 14,000 and change.

4 : 5 2 P M 4 Q. And what difference would that make?

4 : 5 2 P M 5 A. Pressure will have an impact on cement. It will tend to

4 : 5 2 P M 6 make the cement set faster. This cement slurry had SCR,

4 : 5 2 P M 7 synthetic cement retarder. That's a very high-tech -- that's

4 : 5 2 P M 8 why just a little bit makes that difference. It's a high-tech

4 : 5 2 P M 9 additive. That's actually less sensitive to pressure changes,

4 : 5 2 P M 10 but there will be some difference because of pressure.

4 : 5 2 P M 11 Q. Is the effect -- how does the effect of pressure compare

4 : 5 2 P M 12 to the effect of temperature?

4 : 5 2 P M 13 A. Temperature is, by far, the most important -- it's a

4 : 5 2 P M 14 chemical reaction. It's, by far, more important than pressure.

4 : 5 2 P M 15 Temperature is -- will control cement reactions.

4 : 5 2 P M 16 Q. And is temperature of critical importance?

4 : 5 2 P M 17 A. Yes. We always say the number one thing that will affect

4 : 5 2 P M 18 cement setting is temperature.

4 : 5 2 P M 19 Q. Do other experts agree with you on that?

4 : 5 2 P M 20 A. That's a well known -- yes, that's a well known fact.

4 : 5 3 P M 21 Q. Did any of the other experts in this case agree with you

4 : 5 3 P M 22 that the cement was not set at the time of the negative

4 : 5 3 P M 23 pressure test?

4 : 5 3 P M 24 A. Yes, sir.

4 : 5 3 P M 25 Q. And who was that?

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4 : 5 3 P M 1 A. That would be Jerry Calvert -- it will say "David  
4 : 5 3 P M 2 Calvert," but he goes by "Jerry."

4 : 5 3 P M 3 Q. And you know Mr. Calvert?

4 : 5 3 P M 4 A. I know Mr. Calvert very well. He's a -- again, great  
4 : 5 3 P M 5 respect. He's a world-class man.

4 : 5 3 P M 6 Q. Did you work with him for a number of years?

4 : 5 3 P M 7 A. I've worked with him my entire career.

4 : 5 3 P M 8 MR. CERNICH: Can we go to Exhibit 7836.

4 : 5 3 P M 9 BY MR. CERNICH:

4 : 5 3 P M 10 Q. Is this the report of Mr. Calvert?

4 : 5 3 P M 11 A. Yes, that's Jerry's expert report.

4 : 5 3 P M 12 MR. CERNICH: Could we go to page 6 of that report?

4 : 5 4 P M 13 We have a page with a -- do you have the rest of  
4 : 5 4 P M 14 the pages of the report? There we go.

4 : 5 4 P M 15 BY MR. CERNICH:

4 : 5 4 P M 16 Q. Mr. Calvert writes: "The negative pressure test was  
4 : 5 4 P M 17 conducted before the cement reached compressive strength."

4 : 5 4 P M 18 Does that mean the cement wasn't set?

4 : 5 4 P M 19 A. Yes, that's another way of saying the cement wasn't set.

4 : 5 4 P M 20 Q. And Mr. Calvert cited to Footnote 41 there, Oilfield  
4 : 5 4 P M 21 Testing & Consulting report dated August 1st, 2011; is that  
4 : 5 4 P M 22 right?

4 : 5 4 P M 23 A. Yes, sir.

4 : 5 4 P M 24 Q. And is that some of the same data that you relied upon to  
4 : 5 4 P M 25 form your opinion that the cement wasn't set?

## GLEN BERGE - DIRECT

4 : 5 4 P M 1 A. That's the same report, yes, sir.

4 : 5 4 P M 2 Q. And did you look at additional data to that as well?

4 : 5 5 P M 3 A. Yes, I did because I'm never satisfied with looking at  
4 : 5 5 P M 4 only one data set. So I tried to look at what was available to  
4 : 5 5 P M 5 the engineers at the time of the -- at the time of Macondo  
4 : 5 5 P M 6 cement job. Because this is all after the fact, everything  
4 : 5 5 P M 7 else. What was available to those engineers?

4 : 5 5 P M 8 So if we can go back to the Halliburton laboratory  
4 : 5 5 P M 9 report for the rig samples of the cement that was pumped on the  
4 : 5 5 P M 10 well.

4 : 5 5 P M 11 MR. CERNICH: All right. Could we go to  
4 : 5 5 P M 12 Exhibit 7882, please?

4 : 5 5 P M 13 THE WITNESS: Again, there is the -- this is the  
4 : 5 5 P M 14 laboratory report. And on the next page, it will show some --  
4 : 5 5 P M 15 some compressive strength data.

4 : 5 5 P M 16 Now, in this particular case, this is the  
4 : 5 5 P M 17 crushed compressive strength for the foam cement system. I've  
4 : 5 5 P M 18 got to caution, this isn't the -- this is run at atmospheric  
4 : 5 6 P M 19 pressure because you can't test foam at pressure. We know that  
4 : 5 6 P M 20 has an effect.

4 : 5 6 P M 21 But it also shows two things: One, that prior  
4 : 5 6 P M 22 to the cement job, it shows that -- the compressive strength  
4 : 5 6 P M 23 of -- at 24 hours of the foam cement was zero.

4 : 5 6 P M 24 Now, this is run at 180 degrees. Again, how  
4 : 5 6 P M 25 quickly does that well heat up? But also at atmospheric

## GLEN BERGE - CROSS

4 : 5 6 P M 1 pressure. It shows the system is very sensitive to temperature  
4 : 5 6 P M 2 and that, at the time of the negative test, this is showing  
4 : 5 6 P M 3 that that cement was not set.

4 : 5 6 P M 4 **BY MR. CERNICH:**

4 : 5 6 P M 5 **Q.** And where specifically is it showing that?

4 : 5 6 P M 6 **A.** It's showing: "Time, 24 hours. Strength, 0."

4 : 5 6 P M 7 **MR. CERNICH:** Thank you, Your Honor. That's all we  
4 : 5 6 P M 8 have.

4 : 5 6 P M 9 **THE COURT:** All right. Do the private plaintiffs  
4 : 5 7 P M 10 have any questions of this witness?

4 : 5 7 P M 11 **MR. STERBCOW:** Yes, Your Honor.

4 : 5 7 P M 12 **THE COURT:** Okay.

4 : 5 7 P M 13 Are you okay, or do you need a break?

4 : 5 7 P M 14 **THE WITNESS:** I'm doing fine.

4 : 5 7 P M 15 **THE COURT:** Okay.

4 : 5 7 P M 16 **THE WITNESS:** Getting tired of hearing myself talk,  
4 : 5 7 P M 17 but that's all right.

4 : 5 7 P M 18 **CROSS-EXAMINATION**

4 : 5 7 P M 19 **BY MR. STERBCOW:**

4 : 5 7 P M 20 **Q.** Good afternoon, Mr. Benge. Paul Sterbcow, representing  
4 : 5 7 P M 21 the Plaintiffs Steering Committee.

4 : 5 7 P M 22 **MR. STERBCOW:** Your Honor, our interests and the U.S.  
4 : 5 7 P M 23 are not exactly aligned on this issue. It's the one issue that  
4 : 5 7 P M 24 we're not because the U.S. didn't sue Halliburton and, of  
4 : 5 8 P M 25 course, we did. So against that background -- and I won't be



## GLEN BENGE - CROSS

4 : 5 8 P M 1 long.

4 : 5 8 P M 2 THE COURT: Okay.

4 : 5 8 P M 3 BY MR. STERBCOW:

4 : 5 8 P M 4 Q. In reviewing your CV, Mr. Benge, I notice that you

4 : 5 8 P M 5 authored, I think, in July of 2001, an article with Ron Crook

4 : 5 8 P M 6 and Ronnie Faul; is that correct?

4 : 5 8 P M 7 A. That is correct.

4 : 5 8 P M 8 Is that the "Eight Ways" article?

4 : 5 8 P M 9 Q. Yes.

4 : 5 8 P M 10 A. Yes, sir.

4 : 5 8 P M 11 Q. So you've known Mr. Faul for a long time?

4 : 5 8 P M 12 A. Oh, yes. I've known -- the cementing group's a pretty

4 : 5 8 P M 13 small organization. We know each other.

4 : 5 8 P M 14 Q. That's what it appears to be.

4 : 5 8 P M 15 Are you aware that Mr. Faul works for Halliburton and

4 : 5 8 P M 16 has for some time?

4 : 5 8 P M 17 A. Yes, sir, I do.

4 : 5 8 P M 18 Q. And do you know that four days before the blowout, he

4 : 5 8 P M 19 became Jesse Gagliano's supervisor at Halliburton?

4 : 5 8 P M 20 A. I was aware of that, yes, sir.

4 : 5 8 P M 21 Q. Did you have any discussions with Mr. Faul in your work in

4 : 5 8 P M 22 preparing your report?

4 : 5 8 P M 23 A. No, sir, none at all.

4 : 5 8 P M 24 Q. And none with Mr. Gagliano either?

4 : 5 8 P M 25 A. No, sir.

## GLEN BENGE - CROSS

4 : 5 8 P M 1 Q. And let me point something out while we're on that.

4 : 5 8 P M 2 Your report's dated August 26th, 2011, and your

4 : 5 9 P M 3 deposition was given on November 17th, 2011. So during the

4 : 5 9 P M 4 time you did your extensive work, prepared your report, and

4 : 5 9 P M 5 then gave your sworn testimony, you did not have the benefit of

4 : 5 9 P M 6 a deposition for Mr. Gagliano, did you?

4 : 5 9 P M 7 A. No, sir, I did not.

4 : 5 9 P M 8 Q. At that time, he was taking the Fifth Amendment; correct?

4 : 5 9 P M 9 A. Yes, sir.

4 : 5 9 P M 10 Q. Are you aware of the fact that he subsequently changed his

4 : 5 9 P M 11 mind and gave a deposition on December 7th of 2012?

4 : 5 9 P M 12 A. Yes, sir.

4 : 5 9 P M 13 Q. Did you read that deposition?

4 : 5 9 P M 14 A. Yes, sir, I did.

4 : 5 9 P M 15 Q. Did you amend your report based on anything in that

4 : 5 9 P M 16 deposition?

4 : 5 9 P M 17 A. No, sir, I did not.

4 : 5 9 P M 18 Q. So the information that you gleaned from him had no effect

4 : 5 9 P M 19 whatsoever on what you've said today and the work you've done

4 : 5 9 P M 20 up until now?

4 : 5 9 P M 21 A. No, sir, I did not change anything.

4 : 5 9 P M 22 Q. Let me point out a few things.

4 : 5 9 P M 23 You were critical of the use of the leftover Kodiak 2

4 : 5 9 P M 24 blend?

4 : 5 9 P M 25 A. Yes, sir.

## GLEN BENGE - CROSS

4:59 PM 1 Q. One of your criticisms?

4:59 PM 2 A. Yes, sir.

4:59 PM 3 Q. Do you recall seeing where it was actually Mr. Gagliano  
4 who recommended that blend to BP?

4:59 PM 5 A. I don't recall seeing who selected that cement blend.

5:00 PM 6 Q. And he'll testify eventually. But if I were to represent  
7 to you that he's testified that he did, you have no reason to  
8 disagree?

5:00 PM 9 A. I have no reason to argue with him, no, sir.

5:00 PM 10 Q. And also that Mr. Gagliano was actually the one that  
11 designed the Kodiak 2 blend for use at the Kodiak well, do you  
12 have any idea?

5:00 PM 13 A. I didn't have any idea.

5:00 PM 14 Q. Having said that, though, your criticism, if I understand  
15 it correctly, is based on the fact that there is a defoamer in  
16 that blend that is incompatible with the Macondo job; is that  
17 fair?

5:00 PM 18 A. Well, it's fair from the standpoint this is a leftover  
19 slurry that wasn't originally intended to be foam. And because  
20 of that, you've got materials in there that you wouldn't put in  
21 a foam cement job.

5:00 PM 22 Q. And if I recall from your report, you actually cited  
23 Halliburton's own foam cement operations manuals, Table 2.1,  
24 that specifically says a defoamed cement should not be used in  
25 a foamed job -- or a cement with a defoaming agent should not

## GLEN BENGE - CROSS

5:00 PM 1 be used at a cement job?

5:00 PM 2 A. You don't want to use a defoamer in with a foamer, right.

5:01 PM 3 Q. Would you agree with me that the choice of foam cement --

5:01 PM 4 use of foam cement at Macondo complicated the job?

5:01 PM 5 A. Yes, sir, it did.

5:01 PM 6 Q. And you note that the risks associated with the use of

5:01 PM 7 foam cement went unrecognized by both BP and Halliburton;

5:01 PM 8 correct?

5:01 PM 9 A. Yes, sir. I believe it did.

5:01 PM 10 Q. Again, do you recall reading in Mr. Gagliano's deposition

5:01 PM 11 where he actually recommended foam cement to BP in this

5:01 PM 12 situation?

5:01 PM 13 A. Yes, sir, I remember that in his deposition.

5:01 PM 14 Q. So he played a significant role in using a cement that you

5:01 PM 15 feel unnecessarily complicated this job?

5:01 PM 16 A. Yes.

5:01 PM 17 Q. And when we say "complication," are we really saying that

5:01 PM 18 that choice -- both the choice of using the Kodiak 2 blend and

5:01 PM 19 the choice of using a foam cement in Macondo conditions -- both

5:01 PM 20 created and increased risks inherent in this job?

5:02 PM 21 A. Well, I think that's in concert with what I've reported.

5:02 PM 22 Those are added risks. Each one is a risk. They're not

5:02 PM 23 stand-alone. They complicate each other.

5:02 PM 24 Q. Right. It's cumulative?

5:02 PM 25 A. There you go. I knew there would be a good word for that.

## GLEN BENGE - CROSS

5:02 PM 1 Q. In that respect and given Mr. Gagliano, in particular, his  
5:02 PM 2 intimate involvement in this decision-making and his  
5:02 PM 3 recommendations, wouldn't it be incumbent upon him and  
5:02 PM 4 Halliburton, just as it is on BP, to recognize, address, and  
5:02 PM 5 mitigate the risks as much as they could prior to execution of  
5:02 PM 6 this job?

5:02 PM 7 A. And that's in concert with what's in my report, yes, sir.

5:02 PM 8 Q. All right. Also, you were critical of using foam cement  
5:02 PM 9 in a well containing synthetic oil-based mud for the reasons  
5:02 PM 10 you've talked about?

5:02 PM 11 A. Yes, sir.

5:02 PM 12 Q. Are you aware that -- or have you looked into the fact  
5:02 PM 13 that Halliburton has used -- recommended and used foam cement  
5:02 PM 14 in synthetic oil-based mud jobs before Macondo?

5:03 PM 15 A. Oh, yes, sir. And I testified to that earlier. It is  
5:03 PM 16 done in the industry, not just Halliburton, but Baker,  
5:03 PM 17 Schlumberger, all use it in oil-based mud.

5:03 PM 18 Q. And you just don't think that that's a good idea for the  
5:03 PM 19 reasons you articulated?

5:03 PM 20 A. It's an added risk, and if you can not use that, why take  
5:03 PM 21 the risk?

5:03 PM 22 Q. Again, like using Kodiak 2 and recommending Kodiak 2, like  
5:03 PM 23 recommending and then using foam -- using foam in synthetic  
5:03 PM 24 oil-based mud wells increases risks, complicates the job, and  
5:03 PM 25 both companies -- BP and Halliburton -- have a duty to mitigate

## GLEN BENGE - CROSS

5 : 0 3 P M 1 that?

5 : 0 3 P M 2 A. Yes, and that was a recognized risk, as noted.

5 : 0 3 P M 3 Q. You also recognize -- and I think this is specific to

5 : 0 3 P M 4 Halliburton -- that there were no standard suite of tests or

5 : 0 3 P M 5 minimum testing requirements that you could find. Do you

5 : 0 3 P M 6 recall that?

5 : 0 3 P M 7 A. That's correct.

5 : 0 3 P M 8 Q. And testing of the slurry is a Halliburton function;

5 : 0 3 P M 9 correct?

5 : 0 3 P M 10 A. Yes. But, Counselor, I also want to note, within the

5 : 0 3 P M 11 contract, there are certain -- there's a table for minimum

5 : 0 4 P M 12 requirements of testing in BP. So there's really -- I didn't

5 : 0 4 P M 13 want to misspeak.

5 : 0 4 P M 14 There's some minimum testing requirements within that

5 : 0 4 P M 15 contract. But also, within the Halliburton lab, there's not

5 : 0 4 P M 16 a -- there's not a likewise set. If you're going to have a

5 : 0 4 P M 17 foam cement slurry, for example, we'll always run these tests.

5 : 0 4 P M 18 Q. There's no manual that a Halliburton lab worker or manager

5 : 0 4 P M 19 could go to, published by Halliburton, that says: If we're

5 : 0 4 P M 20 going to try to -- if you're going to test a foam cement in

5 : 0 4 P M 21 this particular situation, you need to make sure you follow

5 : 0 4 P M 22 these rules?

5 : 0 4 P M 23 A. That's correct. There's not a -- there's not, "Every

5 : 0 4 P M 24 time, we're going to do X, Y and Z."

5 : 0 4 P M 25 Q. And the Halliburton/BP contract specifies tests that BP

## GLEN BERGE - CROSS

5 : 0 4 P M 1 requires Halliburton to run; is that fair?

5 : 0 4 P M 2 A. That's fair.

5 : 0 4 P M 3 Q. Did Halliburton run all of those tests?

5 : 0 4 P M 4 A. And as noted in my report, there was one test that was not

5 : 0 4 P M 5 run. I believe that was the free fluid or free water test.

5 : 0 5 P M 6 Q. And do you consider, in this job, that to be an important

5 : 0 5 P M 7 test?

5 : 0 5 P M 8 A. Yes. I always want to check the stability; and that

5 : 0 5 P M 9 checks really the stability of the unfoamed that --

5 : 0 5 P M 10 Q. That's what I was going to ask you.

5 : 0 5 P M 11 A. Yeah, it's the unfoamed slurry that you're looking at in

5 : 0 5 P M 12 that particular respect.

5 : 0 5 P M 13 Q. And in this case, that particular test required by the

5 : 0 5 P M 14 contract that wasn't run would have tested the stability of

5 : 0 5 P M 15 shoe track cement, the unfoamed cement that was in the shoe

5 : 0 5 P M 16 track?

5 : 0 5 P M 17 A. Well, it would give you an indication of -- I don't want

5 : 0 5 P M 18 to say that a free water test is the only thing you would run

5 : 0 5 P M 19 for stability, but that would give you an indication of that,

5 : 0 5 P M 20 yes.

5 : 0 5 P M 21 Q. And if you have an influx of hydrocarbons -- if your foam

5 : 0 5 P M 22 cement does not achieve zonal isolation and your hydrocarbons

5 : 0 5 P M 23 get into the annulus and if, in fact, the theory is correct

5 : 0 5 P M 24 that there was a U-tube and the hydrocarbons came up through

5 : 0 5 P M 25 the cases, would that -- from a cement standpoint, would that

## GLEN BENGE - CROSS

5 : 0 5 P M 1 shoe track cement then give you your last line of defense to  
5 : 0 5 P M 2 the hydrocarbons fouling up the well?  
5 : 0 5 P M 3 A. Yes, the shoe track cement did have the potential -- and  
5 : 0 5 P M 4 I've stated that in my report, it had the potential to form a  
5 : 0 6 P M 5 barrier.  
5 : 0 6 P M 6 Q. And that's the cement that would pertain to this free  
5 : 0 6 P M 7 fluid test that was not done?  
5 : 0 6 P M 8 A. That's correct.  
5 : 0 6 P M 9 Q. Okay. You also noted that the testing reports themselves  
5 : 0 6 P M 10 from Halliburton -- I think you used the terms "inconsistent"  
5 : 0 6 P M 11 and "confusing"?  
5 : 0 6 P M 12 A. Yes, sir.  
5 : 0 6 P M 13 Q. All right. So if you had your say, you would revise the  
5 : 0 6 P M 14 format in which they report what they're doing and how they do  
5 : 0 6 P M 15 it?  
5 : 0 6 P M 16 A. Yes, sir, I would.  
5 : 0 6 P M 17 Q. And why is that?  
5 : 0 6 P M 18 A. Well, there's a couple of things. One, when you --  
5 : 0 6 P M 19 without having -- I want to be able to grab a report, look at  
5 : 0 6 P M 20 it and not have to talk to anybody. I want to be able to say,  
5 : 0 6 P M 21 "Yes, this has the information in there."  
5 : 0 6 P M 22 And within the report, within just the last report  
5 : 0 6 P M 23 that we looked the at, there's actually two slurries that are  
5 : 0 6 P M 24 reported there. You note that -- I found that out because  
5 : 0 6 P M 25 there's a slash and a number in there that tells you that it's



## GLEN BENGE - CROSS

5 : 0 6 P M 1 a different test series.

5 : 0 7 P M 2 But also -- and I'm quasi bilingual when it comes to  
5 : 0 7 P M 3 metric or U.S. or normal units; but reporting things in  
5 : 0 7 P M 4 specific gravity where everything else is in pounds per gallon,  
5 : 0 7 P M 5 it just -- you know, I sit there and I always go, "Dang it,"  
5 : 0 7 P M 6 and I got to go get my calculator and convert for myself and  
5 : 0 7 P M 7 then I write out to the side what it is.

5 : 0 7 P M 8 So it's inconsistent in the units that are used and  
5 : 0 7 P M 9 it just adds confusion. There's not a -- you can fix that very  
5 : 0 7 P M 10 easily.

5 : 0 7 P M 11 Q. And it's confusing to the point that even somebody with  
5 : 0 7 P M 12 the extent of expertise, one of the leading cement experts in  
5 : 0 7 P M 13 the world needed to take time to digest those reports. You  
5 : 0 7 P M 14 couldn't just, like you said, pick them up, read them, and know  
5 : 0 7 P M 15 what they say?

5 : 0 7 P M 16 A. No, sir, I had to -- I had to look around.

5 : 0 7 P M 17 Q. All right. In your experience in this industry -- well,  
5 : 0 7 P M 18 let me back up and say I think I understood what you said.

5 : 0 7 P M 19 You relied on post-accident testing of OT&C to  
5 : 0 8 P M 20 conclude that the cement didn't set?

5 : 0 8 P M 21 A. In part. And I looked at what data was available to BP  
5 : 0 8 P M 22 prior to pumping the job. And then the OT&C data told me that  
5 : 0 8 P M 23 that cement system is very sensitive to temperature. And so  
5 : 0 8 P M 24 it's a combination; but, yes, I did rely on that data.

5 : 0 8 P M 25 Q. Did you see any effort by Halliburton to actually test

## GLEN BENGE - CROSS

5:08 PM 1 slurry that was pumped into the Macondo well following the  
5:08 PM 2 accident?

5:08 PM 3 A. No, sir, I didn't consider that in my report.

5:08 PM 4 Q. You saw no evidence that that occurred, did you?

5:08 PM 5 A. No, sir.

5:08 PM 6 Q. From your standpoint, would the most accurate forensic  
5:08 PM 7 test of the foam slurry or the slurry -- cement slurry pumped  
5:08 PM 8 into this well, wouldn't it have to come from a direct sample  
5:08 PM 9 of the slurry pumped into the well? That gives you your  
5:08 PM 10 best -- your best --

5:08 PM 11 A. That's going to give you your best data, yes, sir.

5:08 PM 12 Q. And nobody, nothing you read, nothing you were told  
5:09 PM 13 indicated to you that there was any effort whatsoever on the  
5:09 PM 14 part of the company that designed and tested the cement to see  
5:09 PM 15 post-accident whether anything was wrong with their design or  
5:09 PM 16 their tests; correct?

5:09 PM 17 A. There weren't any tests performed, no, sir.

5:09 PM 18 Q. And I think you mentioned you know David Calvert. You  
5:09 PM 19 would agree that he's a foremost expert on the well cement?

5:09 PM 20 A. Yes, I know Jerry very well.

5:09 PM 21 Q. I'm sorry, Jerry. David Jerry Calvert.  
5:09 PM 22 And you would agree to his qualifications?

5:09 PM 23 A. Yes, sir. None of us cementers go by our first names.

5:09 PM 24 Q. All right. And finally, would you know of any reason that  
5:09 PM 25 a cement contractor would conduct tests, cement tests, either

## GLEN BENGE - CROSS

5:09 PM 1 for a job or after a job to evaluate it and not release those  
5:09 PM 2 test results to the public?

5:09 PM 3 A. No, sir.

5:09 PM 4 Q. And the point of all of this, like you testified at the  
5:09 PM 5 beginning, the reason you got involved in this case was to look  
5:10 PM 6 into what happened from the cement standpoint to try to do what  
5:10 PM 7 you could to make sure this never happens again; correct?

5:10 PM 8 A. That's the reason I'm here, sir.

5:10 PM 9 Q. And if post-accident testing is done to try to determine  
5:10 PM 10 if the cement slurry itself ever had a chance of working, if  
5:10 PM 11 we're going to accomplish the goal of making sure this never  
5:10 PM 12 happens again, wouldn't you agree with me that the results of  
5:10 PM 13 those tests should at least be published to your industry?

5:10 PM 14 A. Yes, sir.

5:10 PM 15 MR. STERBCOW: No further questions.

5:10 PM 16 THE COURT: Alabama?

5:10 PM 17 MR. MAZE: No questions.

5:10 PM 18 THE COURT: Louisiana?

5:10 PM 19 MR. KANNER: No questions, Your Honor.

5:10 PM 20 THE COURT: Are you still doing all right?

5:10 PM 21 THE WITNESS: I'm still doing all right. Are you  
5:10 PM 22 doing all right?

5:10 PM 23 THE COURT: I'm okay.

5:10 PM 24 THE WITNESS: You get to be the boss, so I'm going to  
5:10 PM 25 defer to you.

## GLEN BENGE - CROSS

5 : 10 PM 1           **THE COURT:** Well, I don't know about all these  
5 : 10 PM 2 lawyers out here.

5 : 10 PM 3           **THE WITNESS:** Well, if they don't use plastic plates,  
5 : 10 PM 4 I don't really care.

5 : 10 PM 5           **THE COURT:** Let's see. Transocean's up next.

5 : 11 PM 6                           **CROSS-EXAMINATION**

5 : 11 PM 7 **BY MR. MILLER:**

5 : 11 PM 8 **Q.** Good afternoon, Mr. Bengé.

5 : 11 PM 9 **A.** Good afternoon.

5 : 11 PM 10 **Q.** I'm Kerry Miller. It's nice to meet you.

5 : 11 PM 11 **A.** Nice to meet you.

5 : 11 PM 12 **Q.** I have you on cross-examination.

5 : 11 PM 13           Mr. Bengé, I have a lot of material to cover with  
5 : 11 PM 14 you, so I'm going to bounce around a little bit. I'm going to  
5 : 11 PM 15 try not to ask you redundant questions.

5 : 11 PM 16           **MR. MILLER:** Pull up page 7 of his report.

5 : 11 PM 17 **BY MR. MILLER:**

5 : 11 PM 18 **Q.** You talked about, with Mr. Cernich, the role of the  
5 : 12 PM 19 operator in the cement job. Do you recall that testimony,  
5 : 12 PM 20 Mr. Bengé?

5 : 12 PM 21 **A.** Yes, sir, I do.

5 : 12 PM 22 **Q.** And at page 7, I'm going to go ahead and highlight some  
5 : 12 PM 23 language and ask you a quick question and move on.

5 : 12 PM 24           You state that "they," meaning BP, "were the final  
5 : 12 PM 25 decision makers and were empowered to accept or reject the

## GLEN BENGE - CROSS

5 : 12 PM 1 advice of both BP's internal cementing expert and Halliburton."

5 : 12 PM 2 A. Yes, sir.

5 : 12 PM 3 Q. And when you say "they," you are talking about BP;

5 : 12 PM 4 correct?

5 : 12 PM 5 A. Yes.

5 : 12 PM 6 Q. Specifically you're talking about the wells team at BP?

5 : 12 PM 7 A. Right, the BP drilling wells team.

5 : 12 PM 8 Q. And then we saw some references in your report and in some

5 : 12 PM 9 of the e-mails that Mr. Cernich covered with you, specifically

5 : 12 PM 10 the individuals that would be within that wells team and were

5 : 12 PM 11 the final decision makers. Were they Mr. Hafle?

5 : 12 PM 12 A. Yes, sir.

5 : 12 PM 13 Q. Mr. Morel?

5 : 12 PM 14 A. Yes, sir.

5 : 12 PM 15 Q. Mr. Greg Walz?

5 : 12 PM 16 A. Yes, sir.

5 : 12 PM 17 Q. Mr. Brett Cocalles?

5 : 12 PM 18 A. Yes, sir.

5 : 12 PM 19 Q. And Mr. John Guide?

5 : 13 PM 20 A. Yes, sir.

5 : 13 PM 21 Q. Okay. Let's move on to the design of the cement slurry.

5 : 13 PM 22 **MR. MILLER:** Before we do that, pull up TREN-45036.

5 : 13 PM 23 **BY MR. MILLER:**

5 : 13 PM 24 Q. And in terms of the objectives on the cement job, you

5 : 13 PM 25 mentioned the term "zonal isolation."

## GLEN BENGE - CROSS

5 : 13 PM 1 A. Yes, sir.

5 : 13 PM 2 Q. Is that one of the ultimate objectives of the cement job?

5 : 13 PM 3 A. For a primary cement job, yes, sir, it is.

5 : 13 PM 4 MR. MILLER: Let's go ahead and put that back up.

5 : 13 PM 5 BY MR. MILLER:

5 : 13 PM 6 Q. That document on the screen, it goes back to 2009. Do you

5 : 13 PM 7 see that, Mr. Benge?

5 : 13 PM 8 A. Yes, sir, I do.

5 : 13 PM 9 Q. And that's a BP risk register document? It's actually

5 : 13 PM 10 dated June 20th, 2009. Do you see that?

5 : 14 PM 11 A. Yes, sir, it is -- oh, thank you. You're pointing to it.

5 : 14 PM 12 Yes, sir.

5 : 14 PM 13 Q. Right here.

5 : 14 PM 14 And does this BP risk register identify the risk of a

5 : 14 PM 15 good cement job on the production string as a risk that BP

5 : 14 PM 16 faced with Macondo?

5 : 14 PM 17 A. Yes, sir.

5 : 14 PM 18 Q. Again, that's June 20th, 2009; correct?

5 : 14 PM 19 A. Yes, sir.

5 : 14 PM 20 Q. Okay. Let's talk about the design a little bit, what you

5 : 14 PM 21 called the "leftover Kodiak slurry"; correct, sir?

5 : 14 PM 22 A. Yes, sir.

5 : 14 PM 23 Q. As I understood your testimony earlier, it's basically

5 : 14 PM 24 setting forth two reasons why BP uses a particular slurry

5 : 14 PM 25 design. As I understand your testimony and your report, one

## GLEN BENGE - CROSS

5 : 14 PM 1 reason why was because of economic reasons; that is, they had  
5 : 14 PM 2 the Kodiak slurry on board the *Deepwater Horizon*. And I think  
5 : 15 PM 3 you testimony was it made good business sense to try to use it  
5 : 15 PM 4 again. Correct?

5 : 15 PM 5 A. Yes, sir. Any time you can use up inventory, it makes  
5 : 15 PM 6 sense.

5 : 15 PM 7 Q. The second reason -- I want to make sure I understand your  
5 : 15 PM 8 testimony -- is it relates to margin and frac gradient issues,  
5 : 15 PM 9 as I appreciate it.

5 : 15 PM 10 You weren't in court last week when Dr. Huffman  
5 : 15 PM 11 testified, were you, Mr. Benge?

5 : 15 PM 12 A. No, sir, not last week, no. I'm trying to think where I  
5 : 15 PM 13 was.

5 : 15 PM 14 Q. If you had still been living in New Orleans, maybe you  
5 : 15 PM 15 would have been here, huh?

5 : 15 PM 16 A. That's true.

5 : 15 PM 17 Q. But Dr. Huffman was a geophysicist who testified last week  
5 : 15 PM 18 about pore pressure, frac gradient, margins, and ECD issues.

5 : 15 PM 19 A. Yes, sir.

5 : 15 PM 20 Q. And as I understand it -- and I want to ask if you agree  
5 : 15 PM 21 with me -- there is a strong relationship between those margin  
5 : 15 PM 22 issues that an operator faces and the cement design?

5 : 15 PM 23 A. Oh, yes, sir. That drives the cement design.

5 : 15 PM 24 Q. And so as I understand it, the second reason for BP  
5 : 16 PM 25 choosing this particular design, in addition to economic

## GLEN BENGE - CROSS

5 : 16 PM 1 reasons, was that this particular design accomplished the  
5 : 16 PM 2 margin issues that BP faced, the tight margin issues that BP  
5 : 16 PM 3 faced.

5 : 16 PM 4 Do you agree with that, Mr. Benge?

5 : 16 PM 5 A. Yes, sir.

5 : 16 PM 6 Q. I saw somewhere -- I think it was in your testimony -- you  
5 : 16 PM 7 said that the leftover Kodiak blend, when hit with the nitrogen  
5 : 16 PM 8 gas -- and so basically when I think of a cement job -- I'm a  
5 : 16 PM 9 landlubber -- I think of the premixed cement and mixing it with  
5 : 16 PM 10 water and coming out of the chute.

5 : 16 PM 11 But, in essence, the way it's being pumped offshore  
5 : 16 PM 12 is you have a premix, there's water, and then it's hit with  
5 : 16 PM 13 nitrogen gas; correct?

5 : 16 PM 14 A. Well, when you say "premix," I'm going to mix that -- I'm  
5 : 16 PM 15 going to mix that slurry and so that slurry is then being  
5 : 16 PM 16 pumped and the nitrogen's injected downstream of that cement  
5 : 16 PM 17 pump.

5 : 16 PM 18 Q. And it's the injection of the nitrogen that made this  
5 : 16 PM 19 particular leftover slurry from Kodiak lighter; correct?

5 : 17 PM 20 A. Yes, sir.

5 : 17 PM 21 Q. As I understand it, the Kodiak cement hadn't been used as  
5 : 17 PM 22 a conventional cement, and it could have been used as a  
5 : 17 PM 23 conventional cement. Correct?

5 : 17 PM 24 A. Yes, sir.

5 : 17 PM 25 Q. As a conventional cement, it would have had a density of



## GLEN BENGE - CROSS

5 : 17 PM 1 the 16.5 ppg; correct?

5 : 17 PM 2 A. That was the original design density for that slurry, yes,

5 : 17 PM 3 sir.

5 : 17 PM 4 Q. And the effect of injecting nitrogen in it reduced the ppg

5 : 17 PM 5 from 16.5 to approximately 14.5; correct?

5 : 17 PM 6 A. Yes, sir.

5 : 17 PM 7 Q. And that is an ECD that BP needed to maintain; correct?

5 : 17 PM 8 A. That's correct.

5 : 17 PM 9 **MR. MILLER:** Let's pull up a document that you

5 : 17 PM 10 referred to in your testimony with Mr. Cernich, that MOC memo,

5 : 17 PM 11 51165.

5 : 17 PM 12 **BY MR. MILLER:**

5 : 17 PM 13 Q. This is a document dated April 15th, 2010. Do you see

5 : 17 PM 14 that, Mr. Bengé?

5 : 17 PM 15 A. Barely.

5 : 18 PM 16 Q. Yeah, it's a pretty tough document to read. Let's go

5 : 18 PM 17 ahead and pull this part up.

5 : 18 PM 18 Mr. Bengé, this is a document I think you were

5 : 18 PM 19 referring to. What this document sets forth is -- again, this

5 : 18 PM 20 is a BP MOC memo; correct?

5 : 18 PM 21 A. Yes, sir, it is.

5 : 18 PM 22 Q. Management of change; correct?

5 : 18 PM 23 A. That's correct.

5 : 18 PM 24 Q. This is during BP's implementation of the cement job at

5 : 18 PM 25 Macondo; correct?

## GLEN BENGE - CROSS

5 : 18 PM 1 A. Yes, sir.

5 : 18 PM 2 Q. And the verifier is Mark Hafle; correct?

5 : 18 PM 3 A. Yes, sir.

5 : 18 PM 4 Q. He's one of the members of the BP wells team; right?

5 : 18 PM 5 A. That's correct. He's the senior engineer on the wells

5 : 18 PM 6 team.

5 : 18 PM 7 Q. One of the guys calling the slots on the cement job;

5 : 18 PM 8 correct?

5 : 18 PM 9 A. Yes, sir.

5 : 18 PM 10 Q. And it states here that "the cement job has been designed

5 : 18 PM 11 to minimize the ECD as low as practical." Do you see that?

5 : 18 PM 12 A. Yes, sir.

5 : 18 PM 13 Q. "Foam cement, lightweight spacer, and a small base oil

5 : 18 PM 14 spacer, along with low pump rates, will be used together to

5 : 18 PM 15 keep ECD below an acceptable level."

5 : 19 PM 16 Is that correct?

5 : 19 PM 17 A. Yes, sir.

5 : 19 PM 18 Q. And that level they are trying to keep this below was this

5 : 19 PM 19 14.5 arbitrary frac gradient; correct?

5 : 19 PM 20 A. Yes, sir.

5 : 19 PM 21 Q. So BP could not have used the leftover Kodiak blend as a

5 : 19 PM 22 conventional cement because it would have been above the frac

5 : 19 PM 23 gradient; right?

5 : 19 PM 24 A. That's right. It was too heavy to have been used.

5 : 19 PM 25 Q. And it could have fractured the formation had they used

## GLEN BENGE - CROSS

5 : 19 PM 1 the 16.5 ppg conventional cement; correct?

5 : 19 PM 2 A. Yes, sir.

5 : 19 PM 3 Q. Sir, I saw in -- right when Mr. Cernich began, the article

5 : 19 PM 4 you wrote when you first used foam cement in Mobile Bay. This

5 : 19 PM 5 was actually when you were living in New Orleans; correct?

5 : 19 PM 6 A. Yes, sir, it was.

5 : 19 PM 7 Q. And there was a reference to a Halliburton facility on

5 : 19 PM 8 that document from Houma, Louisiana; correct?

5 : 19 PM 9 A. Yes, sir.

5 : 19 PM 10 Q. Sir, as I appreciate it, Halliburton has a facility in

5 : 19 PM 11 Houma, Louisiana where they actually do the premixes, they

5 : 19 PM 12 manufacture the premix material for use offshore. Are you

5 : 19 PM 13 aware of that, sir?

5 : 19 PM 14 A. The bulk blending plant?

5 : 19 PM 15 Q. Yes.

5 : 19 PM 16 A. That's where they put the dry powder -- the dry part

5 : 19 PM 17 together, yes, sir.

5 : 19 PM 18 Q. Sir, I'm from the area, as you might have picked up from

5 : 20 PM 19 my accent. Houma's real close to Fourchon, isn't it,

5 : 20 PM 20 Mr. Bengé?

5 : 20 PM 21 A. Yes, sir.

5 : 20 PM 22 Q. It's about an hour's drive away?

5 : 20 PM 23 A. It's right around the corner.

5 : 20 PM 24 Q. You get on Highway 90 and you turn right on LA 1, don't

5 : 20 PM 25 you?

## GLEN BENGE - CROSS

5 : 2 0 P M 1 A. Yes, sir, you do.

5 : 2 0 P M 2 Q. And you drive till there's no road; correct?

5 : 2 0 P M 3 A. You drive until you get there and you can't go no further.

5 : 2 0 P M 4 Q. So that cement would have been on a truck; correct,

5 : 2 0 P M 5 Mr. Benge?

5 : 2 0 P M 6 A. Yes, sir, it was.

5 : 2 0 P M 7 Q. And that truck would have put cement on a boat in

5 : 2 0 P M 8 Fourchon; correct?

5 : 2 0 P M 9 A. Yes, sir.

5 : 2 0 P M 10 Q. And that boat would have taken that cement from Fourchon

5 : 2 0 P M 11 to Macondo; correct?

5 : 2 0 P M 12 A. Yes, sir.

5 : 2 0 P M 13 Q. And the cement that I'm talking about, that could have

5 : 2 0 P M 14 gotten on that truck and on that boat, could have been a

5 : 2 0 P M 15 conventional cement with an ECD of 14.35 or below; correct?

5 : 2 0 P M 16 A. Yes, sir. I think that's as noted even by Erick

5 : 2 0 P M 17 Cunningham.

5 : 2 0 P M 18 Q. So you didn't have to use a foam cement to get it to an

5 : 2 0 P M 19 ECD of 14.5 or below; correct?

5 : 2 0 P M 20 A. No, sir, you did not.

5 : 2 0 P M 21 Q. But in order for BP to have used a conventional cement

5 : 2 0 P M 22 which would have had an ECD of 14.5 or below, they would have

5 : 2 0 P M 23 had to have bought new cement; correct?

5 : 2 1 P M 24 A. That's correct.

5 : 2 1 P M 25 Q. But in this case BP opted not to buy new cement; correct?

## GLEN BENGE - CROSS

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

## GLEN BENGE - CROSS

5 : 2 2 P M 1 industry, is it?

5 : 2 2 P M 2 A. No, sir.

5 : 2 2 P M 3 Q. You talked with Mr. Cernich about this notion about the

5 : 2 2 P M 4 premix containing the D-Air.

5 : 2 2 P M 5 MR. MILLER: Let's look TREX-01703.

5 : 2 2 P M 6 BY MR. MILLER:

5 : 2 2 P M 7 Q. I'm going to ask you some questions while they're pulling

5 : 2 2 P M 8 up.

5 : 2 2 P M 9 There we go. Do you recognize that document, the

5 : 2 2 P M 10 foam cementing operations manual?

5 : 2 2 P M 11 A. Yes, sir, I do.

5 : 2 2 P M 12 MR. MILLER: Let's go to the fly-out, please.

5 : 2 2 P M 13 BY MR. MILLER:

5 : 2 2 P M 14 Q. Do you see this information, Table 2.1, "Additives

5 : 2 3 P M 15 Incompatible with Foam Cement"?

5 : 2 3 P M 16 A. Yes, sir.

5 : 2 3 P M 17 Q. What does it say there?

5 : 2 3 P M 18 A. It says "defoamers and D-Air."

5 : 2 3 P M 19 Q. I know you said the cement community is a relatively small

5 : 2 3 P M 20 one, but the drilling engineers and operators around the world

5 : 2 3 P M 21 who are familiar with cement are numerous; correct?

5 : 2 3 P M 22 A. Yes, sir.

5 : 2 3 P M 23 Q. Sir, is it well known that you should not use or you

5 : 2 3 P M 24 shouldn't inject into a premix nitrogen gas that contained a

5 : 2 3 P M 25 defoamer?

## GLEN BENGE - CROSS

5 : 2 3 P M 1 A. Those would be counter. You'd know that D-Air wouldn't  
5 : 2 3 P M 2 normally be designed in a foam job.

5 : 2 3 P M 3 Q. Was that prudent, to use leftover cement that contained as  
5 : 2 3 P M 4 an additive -- as one of the ingredients of the mix D-Air and  
5 : 2 3 P M 5 then inject it with nitrogen on the rig?

5 : 2 3 P M 6 A. Well, that definitely adds a risk.

5 : 2 3 P M 7 Q. And that's a risk -- the decision to do that was BP's  
5 : 2 3 P M 8 decision; correct?

5 : 2 4 P M 9 A. The decision to ultimately use the foam on this well, yes,  
5 : 2 4 P M 10 sir.

5 : 2 4 P M 11 Q. To inject foam into a premix that had a defoamer in it was  
5 : 2 4 P M 12 BP's; correct?

5 : 2 4 P M 13 A. Yes. They were aware of that. Yes, sir.

5 : 2 4 P M 14 Q. I'm jumping around a little bit. As Mr. Brock said  
5 : 2 4 P M 15 yesterday, it's a good sound when you hear a lawyer flipping  
5 : 2 4 P M 16 pages.

5 : 2 4 P M 17 Let's talk a little bit about the testing.

5 : 2 4 P M 18 I'll tell you what, before we do that, let's talk  
5 : 2 4 P M 19 about -- briefly on the centralizers.

5 : 2 4 P M 20 **MR. MILLER:** Let's pull up TREX-04575.

5 : 2 4 P M 21 **BY MR. MILLER:**

5 : 2 4 P M 22 Q. As I understood your testimony, Mr. Bengé, what you said,  
5 : 2 5 P M 23 in response to Mr. Cernich's questions, was Halliburton never  
5 : 2 5 P M 24 ran an OptiCem model with the six centralizers in the locations  
5 : 2 5 P M 25 where BP ultimately placed them. Correct?

## GLEN BENGE - CROSS

5 : 2 5 P M 1 A. That's correct. Prior -- it hasn't been in an as-run  
5 : 2 5 P M 2 situation.

5 : 2 5 P M 3 Q. As-run situation.

5 : 2 5 P M 4 But before it was decided where to put the six  
5 : 2 5 P M 5 centralizers, Halliburton did do an OptiCem model for the  
5 : 2 5 P M 6 Macondo slurry, did it not?

5 : 2 5 P M 7 A. Yes, sir.

5 : 2 5 P M 8 Q. And are you familiar with this document?

5 : 2 5 P M 9 A. Yes, sir, I am.

5 : 2 5 P M 10 MR. MILLER: Let's go to the fly-out.

5 : 2 5 P M 11 BY MR. MILLER:

5 : 2 5 P M 12 Q. And this is a document dated -- the date is April 18th,  
5 : 2 5 P M 13 2010. Maybe it's up here. And the cement job was run on  
5 : 2 5 P M 14 April 19th, 2010; correct, Mr. Benge?

5 : 2 5 P M 15 A. Yes, sir.

5 : 2 5 P M 16 Q. So this particular document was generated only one day  
5 : 2 5 P M 17 before the cement was pumped; correct?

5 : 2 6 P M 18 A. That's correct.

5 : 2 6 P M 19 Q. And Halliburton, the service contractor, was telling BP,  
5 : 2 6 P M 20 "This well" -- and we're talking about Macondo in this  
5 : 2 6 P M 21 document; correct, Mr. Benge?

5 : 2 6 P M 22 A. Yes, sir, they are.

5 : 2 6 P M 23 Q. -- "is considered to have a severe gas flow problem."  
5 : 2 6 P M 24 Do you see that?

5 : 2 6 P M 25 A. Yes, sir.



## GLEN BENGE - CROSS

5:26 PM 1 Q. And this particular model was run on seven or less  
5:26 PM 2 centralizers; correct?

5:26 PM 3 A. I believe this one was run on seven centralizers, yes,  
5:26 PM 4 sir.

5:26 PM 5 Q. Seven centralizers.

5:26 PM 6 So BP had an OptiCem report with seven centralizers  
5:26 PM 7 in its hands the day before it ran the job, which said this  
5:26 PM 8 well is considered to have a severe gas flow potential and the  
5:26 PM 9 very next day ran the cement job with six centralizers?

5:26 PM 10 A. Yes, sir.

5:26 PM 11 THE COURT: Mr. Miller, I don't think you identified  
5:26 PM 12 the fly-out number.

5:26 PM 13 MR. MILLER: It's TREX-04575 at 18.

5:26 PM 14 THE COURT: 18, yes, okay.

5:26 PM 15 MR. WITTMANN: At 18.

5:27 PM 16 THE COURT: Thank you.

5:27 PM 17 BY MR. MILLER:

5:27 PM 18 Q. Moving right along, as they say. Let's talk a little bit  
5:27 PM 19 about testing and what the BP internal documents say about BP's  
5:27 PM 20 obligation to test cement. Let me get to the right page here.

5:27 PM 21 MR. MILLER: Okay. Let's pull up -- I think this is  
5:27 PM 22 one of the documents that Scott showed you -- TREX-00634.

5:27 PM 23 And this is -- let's go to the fly-out at  
5:27 PM 24 page 10 of this document -- hold on, let's take a look at it.  
5:27 PM 25 It's Gulf of Mexico SPU.

## GLEN BENGE - CROSS

5 : 2 7 P M 1 BY MR. MILLER:

5 : 2 7 P M 2 Q. This is BP's recommended practices for cement design and  
5 : 2 8 P M 3 operations in the Gulf of Mexico; correct?

5 : 2 8 P M 4 A. Yes. That would be the deepwater Gulf of Mexico.

5 : 2 8 P M 5 Q. Deepwater Gulf of Mexico. And we know this was a  
5 : 2 8 P M 6 deepwater project, if nothing else, after a week and a half.  
5 : 2 8 P M 7 You know that; right?

5 : 2 8 P M 8 A. I bet you all do.

5 : 2 8 P M 9 Q. Let's go to page 10 of that document. Let's see what BP's  
5 : 2 8 P M 10 internal document says about testing cement.

5 : 2 8 P M 11 It says: "The purpose of this manual is to guide  
5 : 2 8 P M 12 drilling personnel through the cement" -- "drilling personnel"  
5 : 2 8 P M 13 meaning the BP drilling engineers who were on this project;  
5 : 2 8 P M 14 correct?

5 : 2 8 P M 15 A. That would be my interpretation, yes, sir.

5 : 2 8 P M 16 Q. -- "through the cement design process and to identify  
5 : 2 8 P M 17 minimal requirements and standards of cement design and  
5 : 2 8 P M 18 operations. It is imperative" -- that's a pretty strong word,  
5 : 2 8 P M 19 is it not, Mr. Benge?

5 : 2 8 P M 20 A. Yes, sir.

5 : 2 8 P M 21 Q. -- "that all the requirements are met."

5 : 2 8 P M 22 And let's look at this. "Responsible parties for  
5 : 2 8 P M 23 cement slurries and spacer tests." Now, we're talking about  
5 : 2 9 P M 24 tests on a cement slurry used at Macondo; correct?

5 : 2 9 P M 25 A. Yes, sir.

## GLEN BENGE - CROSS

5 : 2 9 P M 1 Q. And it says: "Drilling engineers" -- again, it's  
5 : 2 9 P M 2 Mr. Morel, Mr. Hafle, Mr. Cocalles, and Mr. Guide -- "are  
5 : 2 9 P M 3 responsible for overseeing the implementation and required  
5 : 2 9 P M 4 specifications of all tests."

5 : 2 9 P M 5 Do you see that, Mr. Bengé?

5 : 2 9 P M 6 A. Yes, sir, I do.

5 : 2 9 P M 7 Q. And do you agree that that is a good practice on the part  
5 : 2 9 P M 8 of an operator?

5 : 2 9 P M 9 A. Yes, sir.

5 : 2 9 P M 10 Q. Let's look at another BP internal document about testing  
5 : 2 9 P M 11 slurries before they're actually implemented.

5 : 2 9 P M 12 MR. MILLER: Pull up TREX-03773.

5 : 2 9 P M 13 Let's look at this document -- I'm sorry, 03773.  
5 : 2 9 P M 14 Is that it? Let's go to page 6.

5 : 3 0 P M 15 BY MR. MILLER:

5 : 3 0 P M 16 Q. Sir, this document is the "BP Exploration Production  
5 : 3 0 P M 17 Segment-Recommended Practice." And it states: "Laboratory  
5 : 3 0 P M 18 testing is a critical element in successful well cementing."

5 : 3 0 P M 19 Do you see that?

5 : 3 0 P M 20 A. Yes, sir.

5 : 3 0 P M 21 Q. Do you agree with that statement, Mr. Bengé?

5 : 3 0 P M 22 A. Yes, sir, I do.

5 : 3 0 P M 23 Q. "Cement chemical additives and well conditions are never  
5 : 3 0 P M 24 entirely consistent or predictable." Do you see that?

5 : 3 0 P M 25 A. Yes, sir.

## GLEN BENGE - CROSS

5:30 PM 1 Q. Do you agree with that, Mr. Benge?

5:30 PM 2 A. Yes, sir. Mother Nature's never kind to us.

5:30 PM 3 Q. "Therefore, the testing of field-representative samples is  
5:30 PM 4 critical to ensure the slurry has the properties to meet the  
5:30 PM 5 cementing objectives."

5:30 PM 6 Do you see that, Mr. Benge?

5:30 PM 7 A. Yes, sir.

5:30 PM 8 Q. Now, who -- or isn't it the case -- isn't it your opinion,  
5:30 PM 9 Mr. Benge, that ultimately the BP drilling engineers are  
5:30 PM 10 responsible to make sure this gets done before that slurry gets  
5:30 PM 11 implemented?

5:30 PM 12 A. Yes, sir.

5:31 PM 13 **MR. MILLER:** Let's pull up TREX-5801.

5:31 PM 14 **BY MR. MILLER:**

5:31 PM 15 Q. Sir, this is an e-mail from Brian Morel to Jesse Gagliano.  
5:31 PM 16 Do you see that, sir?

5:31 PM 17 A. Yes, sir, I do.

5:31 PM 18 Q. And copied on the e-mail are two of Mr. Morel's cohorts,  
5:31 PM 19 Mark Hafle and Brett Cocalles. Do you see that?

5:31 PM 20 A. Yes, sir.

5:31 PM 21 Q. And the date is April 1, 2010. Do you see that, sir?

5:31 PM 22 A. Yes, sir.

5:31 PM 23 Q. And so this would have been 19 days before the tragic  
5:31 PM 24 accident; correct?

5:31 PM 25 A. That's correct.

## GLEN BENGE - CROSS

5 : 3 1 P M 1 Q. And Brian is writing to Jesse. Jesse works as a  
5 : 3 1 P M 2 Halliburton service provider; correct?  
5 : 3 1 P M 3 A. Yes, sir.  
5 : 3 1 P M 4 Q. "Can you start running some tests on the nitrogen job?  
5 : 3 1 P M 5 This is an important job, and we need to have the data well in  
5 : 3 1 P M 6 advance to make the correct decisions on this job."  
5 : 3 1 P M 7 Do you see that, Mr. Bengé?  
5 : 3 1 P M 8 A. Yes, sir, I do.  
5 : 3 1 P M 9 Q. Okay. Do you agree that the Macondo job was an important  
5 : 3 1 P M 10 cement job?  
5 : 3 1 P M 11 A. Yes, sir, it was.  
5 : 3 1 P M 12 Q. And do you also agree that BP should have had test data  
5 : 3 2 P M 13 well in advance to make correct decisions on this job?  
5 : 3 2 P M 14 A. Yes, sir.  
5 : 3 2 P M 15 Q. Sir, did BP, in fact, have adequate industry-standard  
5 : 3 2 P M 16 testing data on the Macondo slurry before it pumped that cement  
5 : 3 2 P M 17 into the well?  
5 : 3 2 P M 18 A. I don't believe that they had adequate data to pump the  
5 : 3 2 P M 19 job on the well.  
5 : 3 2 P M 20 Q. Let's fast-forward to another e-mail involving the same  
5 : 3 2 P M 21 individuals. That's TREN-1390.  
5 : 3 2 P M 22 Sir, this is an e-mail from Mr. Morel to Mr. Hafle,  
5 : 3 2 P M 23 talking about Mr. Gagliano. Okay?  
5 : 3 2 P M 24 MR. REGAN: Your Honor, I think we already had this  
5 : 3 2 P M 25 e-mail presented in globo.

## GLEN BENGE - CROSS

5 : 3 2 P M 1 MR. MILLER: Let me just ask this question.

5 : 3 2 P M 2 BY MR. MILLER:

5 : 3 2 P M 3 Q. Does this e-mail indicate to you that BP had --

5 : 3 2 P M 4 MR. MILLER: Oh, finish your objection.

5 : 3 2 P M 5 MR. REGAN: My objection is that the document, even

5 : 3 3 P M 6 the highlight is cumulative in terms of what's happened on the

5 : 3 3 P M 7 direct exam. This is just another direct exam.

5 : 3 3 P M 8 THE COURT: Well, there have been a lot of documents

5 : 3 3 P M 9 that have been used more than once. It depends what he's going

5 : 3 3 P M 10 to use it for.

5 : 3 3 P M 11 MR. REGAN: Fair enough.

5 : 3 3 P M 12 BY MR. MILLER:

5 : 3 3 P M 13 Q. I'm harkening back to the April 1st e-mail where they're

5 : 3 3 P M 14 asking for test data well in advance, Mr. Bengé, just to

5 : 3 3 P M 15 reorient you. Okay?

5 : 3 3 P M 16 A. Yes, sir.

5 : 3 3 P M 17 Q. Is this document, this e-mail, where Mr. Morel is talking

5 : 3 3 P M 18 to Mr. Hafle, indicate to you that two days before the cement

5 : 3 3 P M 19 was pumped -- this e-mail is April 17th, 2010 -- that BP had

5 : 3 3 P M 20 discharged its responsibilities to make sure it had adequate

5 : 3 3 P M 21 test data on the slurry that was used in Macondo?

5 : 3 3 P M 22 A. That's correct. That's what that says.

5 : 3 3 P M 23 Q. This e-mail looks like they're still scratching their

5 : 3 3 P M 24 heads. Do you agree with that?

5 : 3 3 P M 25 A. They're not getting the test results in a timely fashion.

## GLEN BENGE - CROSS

5 : 3 3 P M 1 Q. Let's look at TREX-1395. Again, the same guys. This is  
5 : 3 4 P M 2 an e-mail from Jesse Gagliano to Morel, Hafle, Walz, and  
5 : 3 4 P M 3 Cocalles.

5 : 3 4 P M 4 And it says -- let's look at this. It's dated  
5 : 3 4 P M 5 April 18th at 6:50. Okay. But when it's sent, that's roughly  
5 : 3 4 P M 6 24 hours before the cement job began; correct?

5 : 3 4 P M 7 A. That's correct.

5 : 3 4 P M 8 Q. And it says, "Brian" -- Jesse Gagliano at Halliburton is  
5 : 3 4 P M 9 writing to Brian Morel at BP; correct?

5 : 3 4 P M 10 A. Yes, sir.

5 : 3 4 P M 11 Q. And it says: "Has a decision been made yet if you are  
5 : 3 4 P M 12 going with the 8-gallons or 9-gallons of retarder?"

5 : 3 4 P M 13 A. Yes, sir.

5 : 3 4 P M 14 Q. Does this e-mail indicate to you, 24 hours before they  
5 : 3 4 P M 15 pump the cement, that BP had test data in advance that  
5 : 3 4 P M 16 justified and showed that this cement was going to work?

5 : 3 4 P M 17 A. No, sir, they did not.

5 : 3 4 P M 18 Q. They just decided -- they just decided what slurry they  
5 : 3 4 P M 19 were going to use; correct?

5 : 3 5 P M 20 A. This was a last-minute decision, yes, sir.

5 : 3 5 P M 21 Q. A last-minute decision. So they're making this  
5 : 3 5 P M 22 last-minute decision. After this decision was made -- it  
5 : 3 5 P M 23 appears that the decision was made when? At midnight at  
5 : 3 5 P M 24 April 18th; correct?

5 : 3 5 P M 25 A. Yes, sir.

## GLEN BENGE - CROSS

5 : 3 5 P M 1 Q. That's 16 hours before the cement job began; correct?

5 : 3 5 P M 2 A. Yes, sir.

5 : 3 5 P M 3 Q. So now's the time to run tests; correct?

5 : 3 5 P M 4 A. No, sir. They should have already had these run.

5 : 3 5 P M 5 Q. But did they have tests in on the actual slurry?

5 : 3 5 P M 6 A. On the actual slurry, no, sir.

5 : 3 5 P M 7 Q. No tests on the actual slurry?

5 : 3 5 P M 8 A. No. That's not entirely correct, sir. They did have the

5 : 3 5 P M 9 thickening time test. Because in the previous part of this,

5 : 3 5 P M 10 they had that, and had some compressive strength data that was

5 : 3 5 P M 11 ongoing.

5 : 3 5 P M 12 Q. We'll cover that in a second.

5 : 3 5 P M 13 But in your opinion did they have the suite of tests

5 : 3 5 P M 14 that you would have expected to have seen from a prudent

5 : 3 5 P M 15 operator in the industry before proceeding with the cement job

5 : 3 5 P M 16 on the night of April 19th?

5 : 3 5 P M 17 A. No, sir.

5 : 3 6 P M 18 Q. Let's talk about the suite of tests that BP usually

5 : 3 6 P M 19 requires.

5 : 3 6 P M 20 **MR. MILLER:** Let's look at TREX-634. TREX-634.

5 : 3 6 P M 21 **BY MR. MILLER:**

5 : 3 6 P M 22 Q. And this, again, is a Gulf of Mexico SPU. This is BP's

5 : 3 6 P M 23 "Recommended Practices for Cement Design and Operations in the

5 : 3 6 P M 24 Deepwater Gulf of Mexico." So this is the document at BP with

5 : 3 6 P M 25 respect to what to do here; right?



## GLEN BENGE - CROSS

5 : 3 6 P M 1 A. Yes, sir.

5 : 3 6 P M 2 MR. MILLER: Let's go to page 39.

5 : 3 6 P M 3 BY MR. MILLER:

5 : 3 6 P M 4 Q. It says "Foam cement systems" -- that's what we're dealing  
5 with here, right, foam cement systems?

5 : 3 6 P M 6 A. Yes, sir.

5 : 3 6 P M 7 Q. -- "shall be mixed and tested in the laboratory according  
5 : 3 6 P M 8 to the most recent version of ISO 10426-4. According to that  
5 : 3 6 P M 9 document, the following tests shall be conducted on the  
5 : 3 6 P M 10 unfoamed base cement slurry."

5 : 3 7 P M 11 Okay. This is the leftover cement that they must  
5 : 3 7 P M 12 test; correct?

5 : 3 7 P M 13 A. Yes.

5 : 3 7 P M 14 Q. Thickening time?

5 : 3 7 P M 15 A. Yes, sir.

5 : 3 7 P M 16 Q. Rheology?

5 : 3 7 P M 17 A. Yes, sir.

5 : 3 7 P M 18 Q. Fluid loss?

5 : 3 7 P M 19 A. Yes, sir.

5 : 3 7 P M 20 Q. Free fluid.

5 : 3 7 P M 21 A. And free fluid, yes, sir.

5 : 3 7 P M 22 Q. "In addition," it says, "the following test shall" --  
5 : 3 7 P M 23 that's a nice lawyer word there, isn't it?

5 : 3 7 P M 24 A. Yes, sir, it is.

5 : 3 7 P M 25 Q. It means you've got to do it, though, even in engineering;

## GLEN BENGE - CROSS

5 : 3 7 P M 1 right?

5 : 3 7 P M 2 A. Yes, sir.

5 : 3 7 P M 3 Q. -- "be conducted on the foam cement slurry." Okay?

5 : 3 7 P M 4 A. Yes, sir.

5 : 3 7 P M 5 Q. That's the actual stuff that went down the hole; right?

5 : 3 7 P M 6 A. That's the foam cement, yes, sir.

5 : 3 7 P M 7 Q. And they must have done compressive strength and foam

5 : 3 7 P M 8 stability; correct?

5 : 3 7 P M 9 A. Yes, sir.

5 : 3 7 P M 10 Q. Let's look at another source document that talks about

5 : 3 7 P M 11 what the required testing is.

5 : 3 7 P M 12 MR. MILLER: Let's pull up TREX-640. I'm pulling up

5 : 3 7 P M 13 the Halliburton/BP contract that was in effect.

5 : 3 7 P M 14 BY MR. MILLER:

5 : 3 7 P M 15 Q. I think that's a document that you reviewed in connection

5 : 3 7 P M 16 with your report?

5 : 3 7 P M 17 A. I reviewed the cement portion of it. I did not review the

5 : 3 7 P M 18 entire document, sir.

5 : 3 7 P M 19 Q. We're going to go right to the cement portion. Let's go

5 : 3 8 P M 20 to the fly-out.

5 : 3 8 P M 21 A. Thank you, sir.

5 : 3 8 P M 22 Q. Again, this sets forth the minimum testing for cementing

5 : 3 8 P M 23 operations. Is that a portion of the report that you reviewed,

5 : 3 8 P M 24 Mr. Bengé?

5 : 3 8 P M 25 A. Yes, sir, it is.

## GLEN BENGE - CROSS

5 : 3 8 P M 1 Q. And it sets forth that: All testing is required on rig  
5 : 3 8 P M 2 samples and to be submitted to company wells team 24 hours  
5 : 3 8 P M 3 prior to the cement operations commence.  
5 : 3 8 P M 4 The company wells team, that's the BP wells team;  
5 : 3 8 P M 5 correct?  
5 : 3 8 P M 6 A. Yes, sir, it is.  
5 : 3 8 P M 7 Q. And we know, from the review of e-mails, they didn't get  
5 : 3 8 P M 8 this full suite of testing 24 hours before the cement job  
5 : 3 8 P M 9 commenced; correct?  
5 : 3 8 P M 10 A. No, sir, they did not.  
5 : 3 8 P M 11 Q. They never got some of these tests; right?  
5 : 3 8 P M 12 A. That's correct.  
5 : 3 8 P M 13 Q. And some of the additional testing that must be done  
5 : 3 8 P M 14 particularly for slurries placed for control of shallow flows  
5 : 3 8 P M 15 or where gas migration risk is high -- we knew that was high at  
5 : 3 8 P M 16 Macondo; right?  
5 : 3 8 P M 17 A. Yes, sir.  
5 : 3 8 P M 18 Q. You talked about the OptiCem report that came out on  
5 : 3 8 P M 19 April 18th; correct?  
5 : 3 8 P M 20 A. Yes, sir.  
5 : 3 8 P M 21 Q. -- "must have static gel strength" -- that's a test;  
5 : 3 9 P M 22 correct?  
5 : 3 9 P M 23 A. Yes, sir.  
5 : 3 9 P M 24 Q. -- "transition time" -- that's a test; right?  
5 : 3 9 P M 25 A. Yes, sir.

## GLEN BENGE - CROSS

5 : 3 9 P M 1 Q. -- "zero gel time" -- that's another test; right?

5 : 3 9 P M 2 A. Yes, sir.

5 : 3 9 P M 3 Q. "In addition, company settlement tests must be run in  
5 : 3 9 P M 4 these situations," and it sets forth specific requirements.

5 : 3 9 P M 5 That is a little chart which tried to combine the  
5 : 3 9 P M 6 tests required under the Halliburton/BP contract and under the  
5 : 3 9 P M 7 BP deepwater Gulf of Mexico cementing operations. I just want  
5 : 3 9 P M 8 to go over it with you.

5 : 3 9 P M 9 A. Okay.

5 : 3 9 P M 10 MR. MILLER: Let's pull that up. This is  
5 : 3 9 P M 11 Demonstrative 6630.

5 : 3 9 P M 12 BY MR. MILLER:

5 : 3 9 P M 13 Q. In this column, sir, what I have is the various types of  
5 : 3 9 P M 14 tests that were identified in the BP/HESI contract we just  
5 : 3 9 P M 15 looked at?

5 : 3 9 P M 16 A. Yes, sir.

5 : 3 9 P M 17 Q. What I have in this column is the various types of tests  
5 : 3 9 P M 18 that were identified in the BP recommended practice document we  
5 : 3 9 P M 19 looked at a minute ago?

5 : 3 9 P M 20 A. Yes, sir.

5 : 3 9 P M 21 Q. And what I have here is whether or not those particular  
5 : 3 9 P M 22 tests that were required by these two documents were done on  
5 : 4 0 P M 23 the actual slurry used in Macondo. Are you with me, sir?

5 : 4 0 P M 24 A. Yes, I sure am.

5 : 4 0 P M 25 Q. Foam stability, that was actually required by the BP

## GLEN BENGE - CROSS

5 : 4 0 P M 1 recommended practice?

5 : 4 0 P M 2 A. Yes, sir.

5 : 4 0 P M 3 Q. Was that done on Macondo?

5 : 4 0 P M 4 A. Not on the .09 gallons per sack, sir.

5 : 4 0 P M 5 Q. And that's the actually slurry. That's the one you have

5 : 4 0 P M 6 to test; right?

5 : 4 0 P M 7 A. Yes.

5 : 4 0 P M 8 Q. What about the compressive strength? That was required by

5 : 4 0 P M 9 both the BP/HESI contract and the BP recommended practices

5 : 4 0 P M 10 document; correct?

5 : 4 0 P M 11 A. Yes, sir.

5 : 4 0 P M 12 Q. Was that done on the actual -- you got to do that one on

5 : 4 0 P M 13 the foam; right? Do you remember the BP document, compressive

5 : 4 0 P M 14 strength?

5 : 4 0 P M 15 A. Yes. For the foam it was not done; it was for the base

5 : 4 0 P M 16 slurry.

5 : 4 0 P M 17 Q. But you've got to that on the foam, so --

5 : 4 0 P M 18 A. But it says in that for the foam.

5 : 4 0 P M 19 Q. Both of these documents make clear you've got to do it on

5 : 4 0 P M 20 the foam, you've got to do it in the right condition. That was

5 : 4 0 P M 21 your testimony earlier; correct?

5 : 4 0 P M 22 A. Yes, sir. I know the recommended practice requires it for

5 : 4 0 P M 23 the foam. I don't believe that the contract really addresses

5 : 4 0 P M 24 foam.

5 : 4 0 P M 25 Q. I'll take a pass on that one.

## GLEN BENGE - CROSS

5 : 4 1 P M 1 Fluid loss, that's not in the contract, but it is in  
5 : 4 1 P M 2 the BP recommended practice; correct?  
5 : 4 1 P M 3 A. Yes, sir.  
5 : 4 1 P M 4 Q. If you know. We can go back and look.  
5 : 4 1 P M 5 A. I have to think a minute because I know that it also said  
5 : 4 1 P M 6 that fluid loss will be run for systems that have a fluid loss  
5 : 4 1 P M 7 additive in there. While I took one checkmark away from you, I  
5 : 4 1 P M 8 may give you a check back on that one.  
5 : 4 1 P M 9 Q. Was fluid loss done on the actual slurry pumped into  
5 : 4 1 P M 10 Macondo?  
5 : 4 1 P M 11 A. No, sir.  
5 : 4 1 P M 12 Q. Rheology, that was required by both documents; correct?  
5 : 4 1 P M 13 A. Yes, sir.  
5 : 4 1 P M 14 Q. Was that done on the Macondo slurry?  
5 : 4 1 P M 15 A. No, sir, not as pumped.  
5 : 4 1 P M 16 Q. Sir, you've never seen this chart before; correct?  
5 : 4 1 P M 17 A. No, sir.  
5 : 4 1 P M 18 Q. Free fluid, that was a test required by both the contract  
5 : 4 1 P M 19 and the BP recommended practice document; correct?  
5 : 4 1 P M 20 A. Yes, sir.  
5 : 4 1 P M 21 Q. Was that done on Macondo?  
5 : 4 1 P M 22 A. No, it was not.  
5 : 4 1 P M 23 Q. Static gel strength transition time, I have it as only  
5 : 4 1 P M 24 being under the contract and not in the recommended best  
5 : 4 2 P M 25 practices?

## GLEN BENGE - CROSS

5 : 4 2 P M 1 A. That's correct.

5 : 4 2 P M 2 Q. Okay. But was it done on the actual slurry?

5 : 4 2 P M 3 A. No, it was not.

5 : 4 2 P M 4 Q. Okay. Zero gel time, I have that as being required under

5 : 4 2 P M 5 the contract but not in the recommended practice. Was it done

5 : 4 2 P M 6 on the actual slurry?

5 : 4 2 P M 7 A. No, it was not.

5 : 4 2 P M 8 Q. Company settlement test, that's required under the

5 : 4 2 P M 9 contract. Was it done on the actual slurry?

5 : 4 2 P M 10 A. No, sir, it was not.

5 : 4 2 P M 11 Q. Finally, thickening time, we got checks in all boxes for

5 : 4 2 P M 12 that one; right?

5 : 4 2 P M 13 A. Yes, sir.

5 : 4 2 P M 14 Q. And you agree it was done on the Macondo slurry?

5 : 4 2 P M 15 A. Yes, sir, it was.

5 : 4 2 P M 16 Q. And this is generally called in the industry a "suite" of

5 : 4 2 P M 17 tests. Would you call it that?

5 : 4 2 P M 18 A. Yes, sir.

5 : 4 2 P M 19 Q. And that's because you have one, two, three, four, five,

5 : 4 2 P M 20 six, seven, eight -- nine of them; correct?

5 : 4 2 P M 21 A. Yes, sir.

5 : 4 2 P M 22 Q. Is it true, sir, that eight of the nine tests in the suite

5 : 4 2 P M 23 of tests that come from either the contract or the BP

5 : 4 2 P M 24 recommended practices weren't done on the Macondo slurry?

5 : 4 2 P M 25 A. Not on the .09-gallons, yes, sir.

## GLEN BENGE - CROSS

5 : 4 3 P M 1 Q. And the decision not to run those tests on the Macondo  
5 : 4 3 P M 2 slurry were made by the BP wells team; correct? The ultimate  
5 : 4 3 P M 3 decision --

5 : 4 3 P M 4 A. The ultimate decision, yes, sir.

5 : 4 3 P M 5 Well, that's a bit difficult because those tests are  
5 : 4 3 P M 6 requested by the engineer, by Mr. Gagliano, as well. So  
5 : 4 3 P M 7 it's -- again, I started out that this is an iterative  
5 : 4 3 P M 8 technique or iterative response where both parties would be  
5 : 4 3 P M 9 involved.

5 : 4 3 P M 10 Q. But you're not saying that BP was not obligated under its  
5 : 4 3 P M 11 own internal documents, under industry best practices, to make  
5 : 4 3 P M 12 sure those tests were run; correct?

5 : 4 3 P M 13 A. That's not what I'm saying, no, sir.

5 : 4 3 P M 14 Q. BP was required to make sure those tests were run;  
5 : 4 3 P M 15 correct?

5 : 4 3 P M 16 A. Yes, sir.

5 : 4 3 P M 17 Q. And now what you're saying is perhaps Halliburton was also  
5 : 4 3 P M 18 obligated, but that wasn't the question I asked you.

5 : 4 3 P M 19 A. I apologize. Thank you, sir.

5 : 4 3 P M 20 UNIDENTIFIED SPEAKER: You can ask him.

5 : 4 3 P M 21 MR. MILLER: I'll let Mr. Godwin ask you that  
5 : 4 3 P M 22 question.

5 : 4 3 P M 23 THE WITNESS: Yeah.

5 : 4 3 P M 24 MR. MILLER: He's dying to ask you that.  
25



## GLEN BENGE - CROSS

5 : 4 4 P M 1 **BY MR. MILLER:**

5 : 4 4 P M 2 **Q.** Okay. We covered responsibility. We covered slurry

5 : 4 4 P M 3 design. We covered testing. Let's talk about the

5 : 4 4 P M 4 implementation of the cement job.

5 : 4 4 P M 5 **MR. MILLER:** Scott had some nifty -- Mr. Cernich had

5 : 4 4 P M 6 some nifty demonstratives. I don't have anything so fancy.

5 : 4 4 P M 7 **THE WITNESS:** I can loan you my plate.

5 : 4 4 P M 8 **MR. MILLER:** Yeah. I'm a little bit better than

5 : 4 4 P M 9 that. I hope, anyway.

5 : 4 4 P M 10 **BY MR. MILLER:**

5 : 4 4 P M 11 **Q.** In terms of the implementation, the method by which the

5 : 4 4 P M 12 cement was pumped --

5 : 4 4 P M 13 **A.** Yes, sir.

5 : 4 4 P M 14 **Q.** -- the methods that BP ultimately utilized, do you agree

5 : 4 4 P M 15 with me, sir, that those methods were also driven by the

5 : 4 4 P M 16 margin, pore pressure and frac gradient issues BP was dealing

5 : 4 4 P M 17 with downhole at Macondo?

5 : 4 5 P M 18 **A.** Yes, sir.

5 : 4 5 P M 19 **Q.** And we know that by the time that they were cementing that

5 : 4 5 P M 20 production casing, BP had minimal, if any, drilling margin to

5 : 4 5 P M 21 deal with; correct?

5 : 4 5 P M 22 **A.** Yes, sir.

5 : 4 5 P M 23 **Q.** Base oil, I think that was the orange stuff?

5 : 4 5 P M 24 **A.** That was the purple stuff.

5 : 4 5 P M 25 **Q.** Purple stuff?

## GLEN BENGE - CROSS

5 : 4 5 P M 1 A. I am in Louisiana, sir.

5 : 4 5 P M 2 Q. Well, that's good.

5 : 4 5 P M 3 Let's switch to the ELMO real quick.

5 : 4 5 P M 4 I knew mine wasn't as good. I even took these from

5 : 4 5 P M 5 Mr. Bly's report, so . . .

5 : 4 5 P M 6 Can you see that, sir?

5 : 4 5 P M 7 A. Yes, sir.

5 : 4 5 P M 8 Q. Okay. And on the left-hand --

5 : 4 5 P M 9 **THE COURT:** Try to adjust your microphone because I

5 : 4 5 P M 10 think it's rubbing against your shirt or something.

5 : 4 5 P M 11 Something's causing the scratching sound.

5 : 4 6 P M 12 **MR. MILLER:** Okay. Hopefully that's better.

5 : 4 6 P M 13 **THE COURT:** Thank you.

5 : 4 6 P M 14 **BY MR. MILLER:**

5 : 4 6 P M 15 Q. Sir, this is a demonstrative we've seen a couple of times

5 : 4 6 P M 16 in this trial for different purposes. This is TREX-1. I think

5 : 4 6 P M 17 it's page 63, figure 3.

5 : 4 6 P M 18 And what this was was an attempt by Mr. Bly, BP's

5 : 4 6 P M 19 investigator -- lead investigator, to create some

5 : 4 6 P M 20 demonstratives. So I just wanted to use it for this purpose.

5 : 4 6 P M 21 And on this side was basically a snapshot of your

5 : 4 6 P M 22 nice animation, the cementing fluids being pumped down the

5 : 4 6 P M 23 drill pipe. And on the right side is what happened once it got

5 : 4 6 P M 24 back up. Can you see that, Mr. Bengé?

5 : 4 6 P M 25 A. Yes, sir.

## GLEN BENGE - CROSS

5 : 4 6 P M 1 Q. Okay. And you touched upon this, but -- these pictures  
5 : 4 6 P M 2 are great.

5 : 4 6 P M 3 But do you get this nice fluid column where  
5 : 4 6 P M 4 everything is separate in the real world?

5 : 4 6 P M 5 A. Oh, no, sir, you don't ever get that.

5 : 4 6 P M 6 Q. So the various fluid materials, the mud, the spacer, the  
5 : 4 7 P M 7 tail, the foam cement, the cap cement, the spacer, the base  
5 : 4 7 P M 8 oil, and the mud, I think the word you used is they get  
5 : 4 7 P M 9 "intermixed" to some degree.

5 : 4 7 P M 10 A. Yes, sir, they do.

5 : 4 7 P M 11 Q. And, sir, isn't it true that the reason why BP used base  
5 : 4 7 P M 12 oil in this particular mix or gumbo or whatever you want to  
5 : 4 7 P M 13 call it is because a base oil has very light properties;  
5 : 4 7 P M 14 correct?

5 : 4 7 P M 15 A. Yes, sir, it will reduce the ECD.

5 : 4 7 P M 16 Q. And it reduces the ECD because, again, BP had these tight  
5 : 4 7 P M 17 margin issues. They couldn't go above 14.5 ppg; correct?

5 : 4 7 P M 18 A. Yes, sir.

5 : 4 7 P M 19 Q. And the base oil of ECD was -- I think I saw from  
5 : 4 7 P M 20 Mr. Cernich's examination -- 6.7 ppg?

5 : 4 7 P M 21 A. I don't know that we covered it, but that is what base oil  
5 : 4 7 P M 22 weighs.

5 : 4 7 P M 23 Q. So the point of using the base oil in this mixture was to  
5 : 4 7 P M 24 lower the ECD; correct?

5 : 4 7 P M 25 A. Yes, sir.

## GLEN BENGE - CROSS

5 : 4 7 P M 1 Q. Lower the ECD such that it didn't fracture the well;  
5 : 4 7 P M 2 correct?

5 : 4 7 P M 3 A. Yes, sir.

5 : 4 7 P M 4 Q. But the problem with base oil is it really doesn't mix  
5 : 4 8 P M 5 well with cap cement, and it really doesn't mix well with the  
5 : 4 8 P M 6 foam cement; correct?

5 : 4 8 P M 7 A. No, sir, those are incompatible.

5 : 4 8 P M 8 Q. It literally is oil and water, is it not?

5 : 4 8 P M 9 A. Yes, sir.

5 : 4 8 P M 10 Q. And so what can happen here is that the base oil can leech  
5 : 4 8 P M 11 out. And as it leaches out, both when it is pumped down and  
5 : 4 8 P M 12 when it settles, that leaching out could cause what I think you  
5 : 4 8 P M 13 call contamination of the foam cement; correct?

5 : 4 8 P M 14 A. Well, yes, sir. But the weight -- you do have on the --  
5 : 4 8 P M 15 on the one on the left-hand side there, you do have that rubber  
5 : 4 8 P M 16 plug there.

5 : 4 8 P M 17 Q. Correct.

5 : 4 8 P M 18 A. So while it's being pumped, to that point, the chance of  
5 : 4 8 P M 19 contamination's pretty low.

5 : 4 8 P M 20 Q. Okay.

5 : 4 8 P M 21 A. But on the right-hand side, after it goes past that plug,  
5 : 4 8 P M 22 then's when the -- then's when the contamination can definitely  
5 : 4 8 P M 23 occur.

5 : 4 8 P M 24 Q. And so contamination can be depicted, in my crude way, if  
5 : 4 8 P M 25 base oil were to get down here, what it would do is it would

## GLEN BENGE - CROSS

5 : 4 9 P M 1 create pockets, if you will, of base oil in the foam cement;  
5 : 4 9 P M 2 correct?

5 : 4 9 P M 3 A. It's got that possibility or -- it would probably mix in  
5 : 4 9 P M 4 with it. It's pretty -- it will mix in pretty easily. I --  
5 : 4 9 P M 5 contamination will take a lot of different forms.

5 : 4 9 P M 6 Q. In any event, the base oil, when it mixes in with the foam  
5 : 4 9 P M 7 cement, can damage the stability and strength properties of  
5 : 4 9 P M 8 foam cement; correct?

5 : 4 9 P M 9 A. That's well documented, yes, sir.

5 : 4 9 P M 10 Q. Okay. On to the pre-job bottoms-up, mud circulation.  
5 : 4 9 P M 11 And I think your expert report says that best  
5 : 4 9 P M 12 practices calls for circulating at least a full bottoms-up --  
5 : 4 9 P M 13 one full bottoms-up prior to starting the cement job; correct?

5 : 4 9 P M 14 A. Yes, sir.

5 : 4 9 P M 15 Q. BP didn't do that in this case, did it?

5 : 5 0 P M 16 MR. REGAN: Your Honor, we -- I'm going to object.  
5 : 5 0 P M 17 We covered this bottoms-up topic directly.

5 : 5 0 P M 18 MR. MILLER: Pull the chart up. I'll cut right to  
5 : 5 0 P M 19 the chase.

5 : 5 0 P M 20 THE COURT: Yeah, we did cover this already.

5 : 5 0 P M 21 MR. MILLER: I just want to show the amounts on the  
5 : 5 0 P M 22 graph.

5 : 5 0 P M 23 BY MR. MILLER:

5 : 5 0 P M 24 Q. D-6632.  
5 : 5 0 P M 25 Sir, are you aware that the actual amount of

## GLEN BENGE - CROSS

5 : 5 0 P M 1 bottoms-up circulation material that BP circulated in the  
5 : 5 0 P M 2 pre-cement job was 111 barrels?

5 : 5 0 P M 3 MR. REGAN: Your Honor, I object to that  
5 : 5 0 P M 4 demonstrative as being inaccurate. I don't know what our  
5 : 5 0 P M 5 process is but --

5 : 5 0 P M 6 MR. MILLER: Sir, as of last night, it wasn't  
5 : 5 0 P M 7 objected to. I'm asking him.

5 : 5 0 P M 8 BY MR. MILLER:

5 : 5 0 P M 9 Q. Do you know what the actual amount was?

5 : 5 0 P M 10 A. Well, sir, I do.

5 : 5 0 P M 11 There was 111 barrels pumped at 4 barrels per minute.  
5 : 5 0 P M 12 But prior to that, there was an amount that was pumped. I want  
5 : 5 0 P M 13 to say that the -- I apologize, I'm going to get this number  
5 : 5 0 P M 14 wrong. I want to say it was around 300 or somewhere in that  
5 : 5 1 P M 15 rate, 250. There was an additional hundred -- I want to say  
5 : 5 1 P M 16 there was 150 barrels added to that. So your total -- for the  
5 : 5 1 P M 17 purpose of this, total would be about 260.

5 : 5 1 P M 18 Q. About 260.

5 : 5 1 P M 19 And a full bottoms-up -- my calculation was the way  
5 : 5 1 P M 20 to calculate a full bottoms-up is the volumetric capacity of  
5 : 5 1 P M 21 the riser and all of the casing down to the bottom of the hole;  
5 : 5 1 P M 22 correct?

5 : 5 1 P M 23 A. That's right. Get the fluid from the bottom of the well  
5 : 5 1 P M 24 all the way to the rig.

5 : 5 1 P M 25 Q. So the full bottoms-up would have been -- you said

## GLEN BENGE - CROSS

5 : 5 1 P M 1 2400 barrels; I calculated it at 2750.

5 : 5 1 P M 2 A. Yeah, I rounded.

5 : 5 1 P M 3 Q. Okay. So best practices -- or at least a full bottoms-up

5 : 5 1 P M 4 would have been 2400 barrels versus the 250 that BP actually

5 : 5 1 P M 5 used?

5 : 5 1 P M 6 A. Yes, sir.

5 : 5 1 P M 7 Q. So BP was 10 -- left uncirculated 10 times less volume

5 : 5 1 P M 8 than they were supposed to?

5 : 5 1 P M 9 A. About 10 percent, yes, sir.

5 : 5 1 P M 10 Q. 10 percent of what they were supposed to do?

5 : 5 1 P M 11 A. Yes, sir.

5 : 5 2 P M 12 Q. You were aware -- bear with me for a second.

5 : 5 2 P M 13 Let's go to that recommended practice document again,

5 : 5 2 P M 14 634. One more question on the bottoms-up, and then I'll move

5 : 5 2 P M 15 off of it. This was not covered by Scott -- Mr. Cernich.

5 : 5 2 P M 16 Let's go to 634, that's the recommended practice by

5 : 5 2 P M 17 BP, Gulf of Mexico. Let's go to page 19.

5 : 5 2 P M 18 You're familiar with this document, aren't you, sir?

5 : 5 2 P M 19 A. Yes, sir.

5 : 5 3 P M 20 Q. Page 19.

5 : 5 3 P M 21 Sir, I'll ask you and we'll see if it pops up.

5 : 5 3 P M 22 Were you aware, sir, that this document states,

5 : 5 3 P M 23 quote, "It is best to circulate a minimum of two bottoms-up

5 : 5 3 P M 24 before starting to pump the cement job or a minimum of 5 hours,

5 : 5 3 P M 25 whichever is greater"?

## GLEN BERGE - CROSS

5 : 5 3 P M 1 A. Yes, sir, I have read that in this document.

5 : 5 3 P M 2 Q. Do you agree that that is an industry best practice?

5 : 5 3 P M 3 A. Circulating bottoms-up is an industry best practice. Two

5 : 5 3 P M 4 bottoms-up is even better.

5 : 5 3 P M 5 Q. Here we go.

5 : 5 3 P M 6 "It is best to circulate a minimum of two bottoms-up

5 : 5 3 P M 7 before starting to pump the cement job or a minimum of

5 : 5 3 P M 8 5 hours."

5 : 5 3 P M 9 A. Yes, sir.

5 : 5 3 P M 10 Q. Did BP follow either of this criteria at Macondo?

5 : 5 3 P M 11 A. No.

5 : 5 3 P M 12 Q. And two bottoms-up would have been about 5,000-barrels;

5 : 5 4 P M 13 correct?

5 : 5 4 P M 14 A. Yes, sir.

5 : 5 4 P M 15 Q. And they were at 250 barrels, approximately?

5 : 5 4 P M 16 A. Yes, sir.

5 : 5 4 P M 17 Q. And they didn't pump five hours, did they?

5 : 5 4 P M 18 A. No, sir.

5 : 5 4 P M 19 Q. Do you know what time it was, the duration?

5 : 5 4 P M 20 A. No, sir, not off the top of my head.

5 : 5 4 P M 21 Q. But you know it was not five hours?

5 : 5 4 P M 22 A. I know it was less than five hours.

5 : 5 4 P M 23 Q. So BP didn't follow its own best practices in bottoms-up

5 : 5 4 P M 24 circulation?

5 : 5 4 P M 25 A. No, sir.



## GLEN BENGE - CROSS

5 : 5 4 P M 1 Q. Let's go to Demonstrative 6631.

5 : 5 4 P M 2 Sir, this is a document that I prepared. Have you

5 : 5 4 P M 3 seen this before?

5 : 5 4 P M 4 A. No, sir, I have not.

5 : 5 4 P M 5 Q. I took this table from your expert report. Do you

5 : 5 4 P M 6 recognize it?

5 : 5 4 P M 7 A. Oh, yes, sir, I do. I recognize the table.

5 : 5 4 P M 8 Q. And it maxed out the limits of my Excel capability, but I

5 : 5 5 P M 9 popped it into a bar chart.

5 : 5 5 P M 10 A. That's why I didn't put a bar chart.

5 : 5 5 P M 11 Q. What we know is, in terms of the volume of cement for

5 : 5 5 P M 12 Macondo, that BP used 60 barrels?

5 : 5 5 P M 13 A. Yes, sir.

5 : 5 5 P M 14 Q. And that's total. That's the foam cement and the tail

5 : 5 5 P M 15 cement; correct?

5 : 5 5 P M 16 A. Yes, sir.

5 : 5 5 P M 17 Q. And the cap cement?

5 : 5 5 P M 18 A. Right. That's all the cement.

5 : 5 5 P M 19 Q. For some of the other wells that BP drilled and cemented

5 : 5 5 P M 20 in temporary abandonment procedures in the Gulf of Mexico, they

5 : 5 5 P M 21 used 244 barrels at Isabella. Do you see that?

5 : 5 5 P M 22 A. Yes, sir.

5 : 5 5 P M 23 Q. That's 306 percent more than they used at Macondo;

5 : 5 5 P M 24 correct?

5 : 5 5 P M 25 A. I didn't bring my calculator, but 60 into 240 -- yes,

## GLEN BENGE - CROSS

5 : 5 5 P M 1 that's right in there.

5 : 5 5 P M 2 Q. Four times more?

5 : 5 5 P M 3 A. That's four times more.

5 : 5 5 P M 4 Q. At Na Kika, they used 135.3 barrels. That's more than

5 : 5 5 P M 5 twice as much?

5 : 5 5 P M 6 A. A little over double, yes, sir.

5 : 5 5 P M 7 Q. And at King South, 99.8 barrels or two-thirds more?

5 : 5 5 P M 8 A. One and a half times, yes, sir.

5 : 5 6 P M 9 Q. The thing is -- and I think you said, if you can summarize

5 : 5 6 P M 10 for us -- in terms of volume of cement, particularly when you

5 : 5 6 P M 11 have these other issues, being so low on the full bottoms-up,

5 : 5 6 P M 12 using the base or having the ECD issues, there's some

5 : 5 6 P M 13 additional volume, you can use some safety margin there?

5 : 5 6 P M 14 A. Yes, the small volume was a risk, yes, sir.

5 : 5 6 P M 15 Q. Was Macondo the one well, given the other facts and

5 : 5 6 P M 16 circumstances we went over, where you want it to be this low in

5 : 5 6 P M 17 terms of volume?

5 : 5 6 P M 18 A. That volume was driven by the top of cement, so that's an

5 : 5 6 P M 19 added risk. That means everything else has got to be done

5 : 5 6 P M 20 right.

5 : 5 6 P M 21 Q. And in terms of everything else has got to be done right,

5 : 5 6 P M 22 let's go back to the ELMO real quick.

5 : 5 6 P M 23 Let's look at this part of it. This shows what we

5 : 5 7 P M 24 have here on the fluid locations after the job. That shows

5 : 5 7 P M 25 what you term in your report "100 percent displacement

## GLEN BENGE - CROSS

5 : 5 7 P M 1 efficiency"; correct?

5 : 5 7 P M 2 A. Yes, sir.

5 : 5 7 P M 3 Q. Do you get that in the real world?

5 : 5 7 P M 4 A. Never.

5 : 5 7 P M 5 Q. And what displacement efficiency is, if I understand your

5 : 5 7 P M 6 testimony right, that is the ultimate physics of cementing;

5 : 5 7 P M 7 right?

5 : 5 7 P M 8 A. That's right.

5 : 5 7 P M 9 Q. Getting it to go exactly where you want it to go; correct?

5 : 5 7 P M 10 A. Yes.

5 : 5 7 P M 11 Q. Where you want to get it to go is -- what I'm putting in

5 : 5 7 P M 12 black is originally on the ELMO, but it didn't show up well on

5 : 5 7 P M 13 the ELMO.

5 : 5 7 P M 14 These are the hydrocarbon-bearing zones, what I have

5 : 5 7 P M 15 in black.

5 : 5 7 P M 16 A. Okay.

5 : 5 7 P M 17 Q. Do you recognize that, sir?

5 : 5 7 P M 18 A. I know those are about the locations of it. It's hard to

5 : 5 7 P M 19 see it on this particular one, but that's it.

5 : 5 7 P M 20 Q. And you need to have your cement -- this is, what I'm

5 : 5 7 P M 21 drawing right here, that is the zonal isolation that you talk

5 : 5 7 P M 22 about; right?

5 : 5 7 P M 23 A. Yes, sir.

5 : 5 7 P M 24 Q. You're isolating these hydrocarbon-bearing zones, these

5 : 5 7 P M 25 pay sands, from getting into the annulus; correct?

## GLEN BENGE - CROSS

5 : 5 8 P M 1 A. Yes, sir.

5 : 5 8 P M 2 Q. And in order to have an isolation, you have to have your  
5 : 5 8 P M 3 cement exactly against those hydrocarbon-bearing zones;  
5 : 5 8 P M 4 correct?

5 : 5 8 P M 5 A. Yes, sir.

5 : 5 8 P M 6 Q. And you're dealing with a low volume of cement here, a  
5 : 5 8 P M 7 very low volume of cement here; right?

5 : 5 8 P M 8 A. Yes, sir.

5 : 5 8 P M 9 Q. So you needed to get the low volume exactly where it  
5 : 5 8 P M 10 needed to be; correct?

5 : 5 8 P M 11 A. Yes, sir.

5 : 5 8 P M 12 Q. And without doing that, there's no zonal isolation;  
5 : 5 8 P M 13 correct?

5 : 5 8 P M 14 A. No, sir.

5 : 5 8 P M 15 Q. Wait on cement, sir.

5 : 5 8 P M 16 Your expert report says at page 37: "Industry  
5 : 5 8 P M 17 practice called for waiting until the cement hits 500 psi  
5 : 5 8 P M 18 strength before concluding the well operations."

5 : 5 8 P M 19 A. Yes, sir.

5 : 5 8 P M 20 Q. And, again, that's something that BP knew; correct?

5 : 5 8 P M 21 A. Yes, sir, and there's a number of regulations that require  
5 : 5 8 P M 22 that same thing.

5 : 5 8 P M 23 Q. Let's pull up TREX-569.

5 : 5 9 P M 24 Again, this is a BP document. Mr. Cernich showed the  
5 : 5 9 P M 25 cover page. Let's go to 569.

## GLEN BENGE - CROSS

5 : 5 9 P M 1 BP knew that; correct? They knew industry practice  
5 : 5 9 P M 2 here; right?  
5 : 5 9 P M 3 A. Yes, sir.  
5 : 5 9 P M 4 Q. "Review strength development indicated by laboratory  
5 : 5 9 P M 5 testing against time line for subsequent operations."  
5 : 5 9 P M 6 The time line is the "wait on cement"; right?  
5 : 5 9 P M 7 A. Yes, sir.  
5 : 5 9 P M 8 Q. And we know that BP pumped the cement the night of the  
5 : 5 9 P M 9 19th into the early morning of the 20th; correct?  
5 : 5 9 P M 10 A. Yes, sir.  
5 : 5 9 P M 11 Q. And we know that there was subsequent operations on the  
5 : 5 9 P M 12 20th; correct?  
5 : 5 9 P M 13 A. Yes, sir.  
5 : 5 9 P M 14 Q. There was a positive pressure test on the 20th?  
5 : 5 9 P M 15 A. Yes, sir.  
5 : 5 9 P M 16 Q. There was a negative pressure test on the 20th?  
5 : 5 9 P M 17 A. Yes, sir.  
5 : 5 9 P M 18 Q. And it says to discuss any wait on cement identified with  
5 : 5 9 P M 19 the cement company to discuss possible mitigations -- to assess  
5 : 5 9 P M 20 possible mitigations. Do you see that?  
5 : 5 9 P M 21 A. Yes, sir, I do.  
5 : 5 9 P M 22 Q. Sir, is there any evidence that this happened in this  
5 : 5 9 P M 23 case, that BP discussed possible mitigations with the cement  
5 : 5 9 P M 24 company with respect to this issue?  
6 : 0 0 P M 25 A. Not that I've found, sir.

## GLEN BENGE - CROSS

6:00 PM 1 Q. And given the other issues and challenges with the Macondo  
6:00 PM 2 cement, is that something, given your 36 years of experience,  
6:00 PM 3 that you would have expected to see?  
6:00 PM 4 A. Yes, sir.  
6:00 PM 5 Q. Getting back to this wait on cement topic, BP didn't have  
6:00 PM 6 compressive strength testing on the .09 retarder concentration  
6:00 PM 7 foam cement; correct?  
6:00 PM 8 A. No, sir, they did not.  
6:00 PM 9 Q. So BP couldn't look at it against a time line for  
6:00 PM 10 subsequent operations; correct?  
6:00 PM 11 A. That's correct.  
6:00 PM 12 Q. Instead, BP didn't have the data, but they plugged ahead  
6:00 PM 13 with the temporary abandonment procedure; correct?  
6:00 PM 14 A. They did not have that data, no, sir.  
6:00 PM 15 Q. And on the night of April 20th, there was a massive  
6:00 PM 16 blowout; correct?  
6:01 PM 17 A. Yes, sir, there was.  
6:01 PM 18 Q. Sir, in your 36 years in the industry, have you ever seen  
6:01 PM 19 an operator manage slurry design, cement testing, and cement  
6:01 PM 20 operations as poorly as BP managed it at Macondo?  
6:01 PM 21 A. Not and expect to get a barrier in the well, no, sir.  
6:01 PM 22 Q. How would you describe BP's conduct in managing the cement  
6:01 PM 23 job at Macondo, in your own words?  
6:01 PM 24 A. I would not have pumped that cement job as it was  
6:01 PM 25 designed.

## GLEN BENGE - CROSS

6:01PM 1 Q. Sir, your report in this case -- and I think you only  
6:01PM 2 issued one; correct?

6:01PM 3 A. Yes, sir.

6:01PM 4 Q. You don't mention -- you don't mention Transocean, do you,  
6:01PM 5 sir?

6:01PM 6 A. No, sir, not at all.

6:01PM 7 Q. And you didn't analyze any of Transocean's conduct at  
6:01PM 8 Macondo; correct?

6:01PM 9 A. No, sir, I did not.

6:01PM 10 MR. MILLER: Thank you, sir. No more questions.

6:01PM 11 THE COURT: All right. We're going to recess until  
6:01PM 12 tomorrow morning. However, before we leave, I want to go over  
6:02PM 13 the witnesses after Mr. Benge. There apparently have been some  
6:02PM 14 changes to the witness list.

6:02PM 15 Who are going to be the plaintiffs' witnesses  
6:02PM 16 tomorrow and in what order?

6:02PM 17 MR. ROY: Calvert will be first, Your Honor. After  
6:02PM 18 this witness.

6:02PM 19 THE COURT: Okay. David Calvert will be the next  
6:02PM 20 witness. He's an expert; right?

6:02PM 21 MR. ROY: Correct.

6:02PM 22 THE COURT: And then who after him?

6:02PM 23 MR. ROY: Mr. Davis.

6:02PM 24 THE COURT: Mr. Davis is also an expert?

6:02PM 25 MR. WILLIAMSON: He's an expert for the USA on the

## GLEN BERGE - CROSS

6 : 0 2 P M 1 BOP, Judge.

6 : 0 2 P M 2 MR. O'ROURKE: Except, Your Honor, if Mr. Davis

6 : 0 2 P M 3 doesn't start in time tomorrow, he may not be the next in

6 : 0 2 P M 4 order. If he goes to next week, we may have to refigure next

6 : 0 2 P M 5 week.

6 : 0 2 P M 6 THE COURT: But your current plan is Calvert and then

6 : 0 2 P M 7 Davis; correct?

6 : 0 2 P M 8 MR. WILLIAMSON: Correct.

6 : 0 2 P M 9 UNIDENTIFIED SPEAKER: Your Honor, could we ask if

6 : 0 2 P M 10 they decide not to put on Davis, who they would call instead?

6 : 0 2 P M 11 MR. O'ROURKE: Whoever was next after Davis. It's in

6 : 0 3 P M 12 the bulletin.

6 : 0 3 P M 13 UNIDENTIFIED SPEAKER: Who is that?

6 : 0 3 P M 14 MR. O'ROURKE: Probert.

6 : 0 3 P M 15 THE COURT: I've got Tim Probert on my list. Did you

6 : 0 3 P M 16 guys circulate this same list that I have?

6 : 0 3 P M 17 MR. HERMAN: Yes, Your Honor.

6 : 0 3 P M 18 THE COURT: The list keeps changing, and I know that

6 : 0 3 P M 19 can't be helped sometimes.

6 : 0 3 P M 20 So the plan is Calvert, Davis, and then Probert?

6 : 0 3 P M 21 Or Probert before Davis?

6 : 0 3 P M 22 Anything else before we recess?

6 : 0 3 P M 23 See everyone back at 8:00 a.m.

6 : 0 3 P M 24 THE DEPUTY CLERK: All rise.

6 : 0 3 P M 25 (WHEREUPON, the proceedings were concluded.)



## GLEN BERGE - CROSS

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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



<b>4</b>	75-barrels [1] 2260/17 75-barrels [1] 2262/8 7500 psi [1] 2198/20 75270 [1] 2170/10 7528 [1] 2173/7 7528.20.1 [2] 2194/17 2194/17 7528.20.2 [1] 2195/13 7528.20.3 [1] 2197/20 7528.21.2 [1] 2199/6 7528.21.3 [1] 2199/16 7528.21.7 [1] 2203/7 7528.4.5 [1] 2176/23 7611 [1] 2167/19 7651.1.2 [1] 2189/21 77002 [2] 2169/10 2170/17 77006 [1] 2167/7 77010 [2] 2170/5 2170/13 77098 [1] 2169/21 7717 [1] 2259/9 7780 [1] 2170/20 78257 [1] 2166/17 7836 [1] 2330/8 7882 [2] 2327/13 2331/12	2202/21 2202/14 2203/21 2205/2 2206/24 2208/6 2209/5 2209/10 2209/18 2210/14 2211/14 2212/12 2215/12 2216/8 2217/19 2221/13 2222/4 2224/2 2225/5 2225/19 2226/14 2231/3 2234/2 2238/9 2239/22 2240/13 2240/24 2244/1 2246/18 2246/18 2246/23 2248/23 2250/21 2254/10 2256/8 2257/3 2260/18 2261/8 2262/6 2262/12 2262/23 2265/7 2265/12 2266/18 2266/19 2267/25 2269/6 2272/18 2278/21 2281/12 2283/12 2283/15 2284/15 2286/3 2288/9 2291/21 2295/14 2298/8 2298/22 2300/17 2301/15 2304/10 2304/12 2304/20 2304/21 2309/6 2316/3 2316/5 2317/6 2337/10 2344/1 2344/18 2345/3 2345/6 2346/20 2347/18 2351/22 2352/13 2354/3 2354/3 2355/17 2355/19 2356/20 2357/19 2357/19 2358/10 2358/23 2359/10 2361/23 2364/18 2366/10 2367/18 2369/8 2373/3 2378/17 2378/18 2379/9 2380/12 2383/18 2383/22
<b>5</b>	8 8 gallons [4] 2265/2 2265/10 2265/22 2266/18 8-gallons [1] 2363/12 8.6 pounds [1] 2195/24 820 [1] 2165/23 8300 feet [1] 2220/10 8:00 a.m [1] 2388/23 8:30 a.m [1] 2283/11 8:52 [1] 2194/11	above [11] 2186/17 2205/1 2238/6 2257/9 2257/9 2258/22 2298/12 2307/7 2350/22 2375/17 2389/8 above-entitled [1] 2389/8 Abramson [1] 2166/5 absolutely [4] 2178/6 2188/17 2203/22 2276/2 accent [1] 2351/19 accept [4] 2233/23 2249/16 2251/2 2344/25 acceptable [4] 2181/22 2281/1 2350/15 2353/21 accepted [4] 2175/12 2213/16 2249/24 2255/13 access [2] 2204/6 2210/15 accident [7] 2202/2 2217/1 2341/19 2342/2 2342/15 2343/9 2360/24 accomplish [1] 2343/11 accomplished [2] 2201/4 2348/1 according [3] 2194/21 2365/7 2365/8 account [1] 2219/23 accountable [3] 2190/4 2190/19 2190/19 accounting [1] 2353/10 accurate [3] 2174/25 2210/8 2342/6 accurately [3] 2211/1 2211/11 2215/13 achieve [2] 2292/2 2339/22 achieving [2] 2290/12 2292/23 acknowledge [1] 2305/9 acknowledged [11] 2245/8 2245/10 2251/1 2254/15 2255/18 2266/7 2280/19 2296/19 2296/19 2305/15 2311/9 acknowledging [2] 2251/4 2266/5 acknowledgment [2] 2255/16 2280/18 across [3] 2242/12 2252/16 2299/5 act [1] 2260/11 acted [1] 2208/25 acting [1] 2242/13 action [7] 2187/9 2187/10 2187/24 2191/11 2207/2 2208/12 2208/14 activated [1] 2309/13 activities [3] 2189/15 2209/10 2210/24 actual [17] 2242/1 2270/13 2295/25 2321/4 2323/21 2364/5 2364/6 2364/7 2366/5 2368/23 2369/12 2370/9 2371/2 2371/6 2371/9 2377/25 2378/9 actually [48] 2173/18 2182/16 2184/18 2193/9 2196/16 2200/14 2202/11
<b>6</b>	<b>9</b> 9 gallons [2] 2268/13 2273/4 9-gallons [2] 2266/18 2363/12 9-inch [2] 2238/25 2239/4 9-inches [1] 2239/7 90 [1] 2351/24 90071 [1] 2169/14 93 [1] 2180/19 94005 [1] 2168/13 94102 [1] 2167/14 97.1.1 [1] 2218/1 987 [1] 2264/14 99.8 [1] 2382/7 9:01 [2] 2223/21 2224/4 9:31 [1] 2224/4 9:38 [2] 2223/21 2224/4 9th [1] 2166/13	
<b>7</b>	<b>A</b> a.m [2] 2283/11 2388/23 AADE [1] 2230/1 abandon [1] 2220/2 abandoned [1] 2219/21 abandonment [7] 2212/2 2215/21 2216/16 2216/22 2220/12 2381/20 2386/13 abdication [2] 2177/6 2177/12 ability [12] 2182/10 2183/10 2183/15 2193/9 2195/12 2209/14 2209/16 2209/20 2211/1 2211/6 2211/10 2389/6 able [12] 2192/13 2198/10 2209/24 2228/13 2242/12 2242/14 2260/19 2287/6 2287/6 2292/10 2340/19 2340/20 about [115] 2175/7 2175/17 2178/25 2179/18 2181/24 2182/15 2182/18 2187/15 2189/24 2190/25 2191/4 2191/7 2196/25 2197/3 2197/21	
<b>435 [1] 2166/19 4451 [1] 2252/2 450 [1] 2167/13 4500 [1] 2170/5 45036 [1] 2345/22 4536 [1] 2165/9</b>		
<b>5 1/2-hour [1] 2265/8 5 1/2-hours [2] 2265/11 2267/6 5 hours [1] 2380/8 5,000-barrels [1] 2380/12 5,000-psi [1] 2323/8 5-gallon [2] 2248/15 2307/3 50 [1] 2322/21 50 percent [1] 2267/7 500 [4] 2165/20 2168/9 2170/19 2384/17 500 feet [1] 2258/22 5000 [1] 2168/19 504 [1] 2170/20 51165 [1] 2349/11 5395 [1] 2167/13 546 [1] 2169/23 550 [1] 2206/16 556 [1] 2165/20 5590 [1] 2257/8 569 [3] 2274/6 2384/23 2384/25 5801 [1] 2360/13 589-7780 [1] 2170/20 5937 [1] 2325/4 5990 [3] 2226/2 2294/18 2321/21 5:30 p.m [1] 2312/3</b>		
<b>6.7 [1] 2375/20 60 [3] 2322/21 2381/12 2381/25 600 [3] 2166/10 2166/13 2169/17 601 [1] 2166/6 60654 [1] 2168/24 618 [1] 2167/3 6230 [1] 2287/9 6233 [2] 2275/3 2326/13 625 [1] 2281/8 63 [1] 2374/17 634 [4] 2364/20 2364/20 2379/14 2379/16 640 [1] 2366/12 65 [1] 2306/7 6630 [1] 2368/11 6631 [1] 2381/1 6632 [1] 2377/24 6:50 [1] 2363/5</b>		
<b>7 1/2 hours [1] 2267/7 7 inches [1] 2239/2 7-5395 [1] 2167/13 701 [2] 2168/16 2168/19 70113 [1] 2165/24 70130 [6] 2166/7 2166/13 2167/10 2168/17 2169/24 2170/19 70139 [1] 2168/20 70163 [1] 2169/7 70360 [1] 2166/20 70458 [1] 2166/23 70501 [1] 2169/18 70502 [1] 2165/21 70801 [1] 2167/4 70804 [1] 2168/13 75 [1] 2261/9</b>		

<p><b>A</b></p> <p>actually... 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2232/5 2233/16 2233/17 2233/18 2235/11 2235/13 2236/21 2236/22 2237/10 2241/5 2241/15 2241/19 2242/10 2243/14 2249/10 2249/12 2249/13 2250/11 2251/2 2251/18 2254/6 2254/8 2254/9 2254/11 2254/14 2255/11 2256/3 2265/10 2265/25 2266/22 2267/16 2269/11 2272/10 2273/16 2275/22 2276/2 2276/3 2276/3 2283/5 2283/6 2283/7 2283/8 2283/9 2292/10 2293/7 2293/13 2296/6 2299/8 2304/5 2304/15 2312/19 2312/24 2312/24 2313/12 2313/20 2313/22 2313/24 2315/20 2315/22 2316/2 2316/4 2328/19 2329/4 2330/1 2336/3 2336/25 2339/14 2339/17 2339/18 2339/19 2339/25 2339/25 2340/6 2340/13 2340/16 2342/6 2342/19 2342/22 2342/24 2342/25 2345/10 2347/15 2348/25 2350/22 2352/4 2352/7 2352/10 2352/22 2352/22 2355/1 2358/4 2358/15 2360/23 2364/14 2371/17 2372/8 2376/25 2376/25 2377/3 2378/17 2378/25 2379/4 2380/12 2386/3 2386/22 2386/24 2388/10</p> <p>wouldn't [10] 2173/2 2223/15 2270/11</p>
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<p><b>W</b></p> <p>wouldn't... [7] 2315/8 2322/25 2335/20 2337/3 2342/8 2343/12 2355/1 Wright [1] 2165/18 write [2] 2257/11 2341/7 writes [6] 2251/20 2278/21 2300/18 2312/4 2317/15 2330/16 writing [5] 2249/19 2261/15 2317/5 2361/1 2363/9 written [10] 2189/25 2213/12 2215/5 2215/16 2218/15 2218/17 2219/4 2219/17 2221/5 2269/15 wrong [3] 2326/24 2342/15 2378/14 wrote [5] 2226/19 2249/15 2263/2 2312/2 2351/4</p>	<p>2372/10 2372/17 2379/18 2383/24 2384/6 you've [57] 2180/18 2182/4 2183/22 2186/16 2187/16 2191/25 2196/7 2198/5 2201/3 2202/15 2208/21 2215/1 2220/7 2220/16 2229/25 2232/24 2236/10 2238/11 2241/6 2243/10 2243/11 2244/7 2244/24 2255/9 2260/7 2264/10 2268/25 2270/7 2275/20 2280/10 2280/23 2282/1 2282/2 2285/21 2287/5 2287/14 2291/3 2295/18 2299/15 2300/6 2303/11 2306/3 2309/5 2311/12 2315/5 2316/14 2333/11 2334/19 2334/19 2335/20 2337/10 2353/18 2365/25 2369/17 2369/19 2369/20 2370/16</p>	<p>zonal [10] 2288/15 2289/2 2290/13 2292/2 2292/23 2293/5 2339/22 2345/25 2383/21 2384/12 zone [2] 2258/22 2289/5 zones [5] 2307/7 2307/9 2383/14 2383/24 2384/3</p>
<p><b>X</b></p> <p>X axis [1] 2303/3 X-centered [2] 2286/1 2286/16 Xs [3] 2303/14 2303/14 2303/16</p>	<p>YOUNG [1] 2168/5 your [217] 2172/8 2173/6 2174/15 2174/24 2175/2 2175/4 2176/5 2177/16 2177/16 2177/21 2178/7 2178/16 2178/17 2178/22 2179/5 2179/12 2179/15 2179/18 2179/23 2180/18 2181/5 2181/23 2182/9 2183/5 2183/10 2183/24 2185/3 2185/23 2187/21 2188/25 2193/23 2193/24 2194/1 2194/24 2195/10 2196/13 2198/11 2199/7 2201/23 2204/11 2206/20 2207/5 2209/7 2210/11 2213/9 2214/1 2214/5 2214/14 2214/21 2215/12 2215/24 2218/20 2218/25 2219/3 2220/19 2221/12 2221/21 2222/3 2222/15 2223/17 2224/18 2224/23 2225/13 2225/17 2225/22 2226/7 2226/10 2226/11 2227/3 2227/16 2228/6 2229/24 2230/9 2233/13 2233/18 2233/22 2234/2 2234/5 2235/2 2235/6 2239/4 2239/12 2239/14 2239/15 2240/22 2242/2 2243/9 2248/17 2249/9 2249/15 2249/19 2249/21 2252/24 2253/4 2254/5 2254/13 2254/17 2255/1 2255/3 2256/1 2258/6 2258/14 2258/16 2259/19 2261/6 2262/22 2263/5 2266/2 2266/10 2266/13 2267/1 2267/14 2267/15 2273/22 2275/22 2275/23 2276/23 2280/6 2280/12 2284/3 2284/14 2284/20 2289/2 2289/7 2290/16 2291/3 2291/10 2291/19 2294/20 2295/1 2296/1 2296/14 2296/14 2298/16 2298/20 2299/7 2299/11 2299/15 2300/3 2300/5 2300/12 2301/16 2301/21 2301/25 2303/17 2306/10 2308/1 2308/11 2309/5 2313/22 2322/6 2326/4 2328/5 2328/8 2330/25 2332/7 2332/11 2332/22 2333/4 2333/21 2333/22 2334/2 2334/2 2334/4 2334/4 2334/5 2334/15 2335/1 2335/14 2335/22 2339/21 2339/22 2340/1 2340/13 2341/17 2342/6 2342/9 2342/10 2342/11 2343/13 2343/19 2345/8 2346/23 2346/25 2346/25 2347/7 2348/6 2349/10 2355/22 2360/8 2361/24 2362/4 2364/13 2366/16 2369/21 2374/9 2374/10 2374/21 2377/11 2377/16 2378/3 2378/16 2381/5 2382/25 2383/5 2383/20 2384/2 2384/16 2386/2 2386/18 2386/23 2387/1 2387/17 2388/2 2388/6 2388/9 2388/17</p>	
<p><b>Y</b></p> <p>Y axis [1] 2303/6 yeah [20] 2176/5 2186/7 2193/18 2205/10 2205/11 2213/23 2216/18 2266/23 2285/24 2295/7 2295/13 2304/18 2312/5 2313/22 2339/11 2349/16 2372/23 2373/8 2377/20 2379/2 year [1] 2230/4 years [18] 2178/7 2226/14 2227/14 2228/8 2229/25 2230/3 2230/10 2230/17 2247/24 2248/1 2261/2 2271/20 2300/12 2301/25 2308/21 2330/6 2386/2 2386/18 yellow [4] 2196/24 2205/5 2322/2 2322/14 yes [573] yesterday [2] 2301/23 2355/15 yet [8] 2172/13 2193/15 2242/13 2266/3 2272/1 2279/22 2312/6 2363/11 Yoakum [1] 2167/6 you [1028] you'd [4] 2201/19 2202/10 2249/12 2355/1 you'll [23] 2175/8 2225/20 2236/18 2236/24 2238/14 2241/13 2241/14 2243/5 2243/5 2243/6 2247/13 2249/2 2251/11 2256/20 2260/10 2265/3 2272/15 2297/2 2297/3 2305/25 2305/25 2315/12 2323/10 you're [91] 2172/23 2179/8 2184/8 2184/17 2186/14 2187/3 2188/5 2193/2 2196/5 2196/8 2196/10 2196/15 2197/16 2198/24 2199/19 2199/21 2202/14 2202/22 2211/16 2212/4 2212/17 2212/25 2213/5 2213/22 2214/8 2214/18 2214/19 2216/25 2220/3 2220/11 2220/14 2224/24 2227/18 2227/20 2227/20 2230/5 2239/13 2241/2 2241/15 2241/20 2241/20 2242/25 2242/25 2243/1 2243/2 2243/2 2244/1 2247/12 2249/13 2251/13 2256/12 2256/12 2273/21 2277/6 2286/4 2286/5 2286/16 2291/5 2296/13 2296/15 2298/15 2305/20 2309/16 2309/22 2310/7 2310/14 2311/12 2313/4 2313/5 2313/10 2313/16 2313/17 2313/18 2315/10 2315/10 2315/11 2316/12 2318/1 2319/10 2322/2 2323/9 2338/16 2338/20 2339/11 2345/6 2346/11</p>	<p>yourself [2] 2226/24 2299/13</p> <p><b>Z</b></p> <p>zero [4] 2286/6 2331/23 2368/1 2371/4</p>	