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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,	*	April 3, 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 21, MORNING SESSION  
TRANSCRIPT OF NONJURY TRIAL  
BEFORE THE HONORABLE CARL J. BARBIER  
UNITED STATES DISTRICT JUDGE

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Videotaped deposition 7055

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14:13 1

07:40 2 **THE DEPUTY CLERK:** All rise.

08:04 3 **THE COURT:** Good morning, everyone. Please be  
08:04 4 seated.

08:04 5 I thought you left out a phrase there at the end  
08:04 6 there, Stephanie. But you caught me by surprise, but it's  
08:04 7 okay.

08:04 8 Any preliminary matters before we resume  
08:04 9 testimony?

08:04 10 **MR. DOYEN:** I understand there are, Your Honor.

08:05 11 **MR. GODWIN:** Good morning, Your Honor.

08:05 12 **THE COURT:** Good morning.

08:05 13 **MR. GODWIN:** Don Godwin for Halliburton, Judge.

08:05 14 I have the exhibits that we used yesterday in  
08:05 15 the direct examination of Jesse Gagliano, and we've circulated  
08:05 16 these. To my knowledge there's no objections, and I would  
08:05 17 offer them into evidence at this time, sir.

08:05 18 **THE COURT:** Any objection to Halliburton's exhibits  
08:05 19 regarding Mr. Gagliano?

08:05 20 Hearing none, those are admitted.

08:05 21 **MR. GODWIN:** Thank you, Your Honor.

08:05 22 **THE COURT:** Sure.

08:05 23 **MR. IRPINO:** Good morning, Your Honor. Anthony  
08:05 24 Irpino for the PSC.

08:05 25 I have our list of exhibits and demonstratives



08:05 1 used in connection with our cross-examination of Mr. Gagliano  
08:05 2 yesterday. We have circulated those, haven't received any  
08:05 3 objections as of now, and we would offer, file, and introduce  
08:05 4 those exhibits and demonstratives into evidence.

08:05 5 **THE COURT:** All right. Any objection?

08:05 6 Hearing none, those are admitted.

08:05 7 **MR. BROCK:** Your Honor, good morning. Mike Brock for  
08:05 8 BP.

08:06 9 Likewise, we've circulated our exhibits for  
08:06 10 Jesse Gagliano. We've received no objections, and we would  
08:06 11 offer them at this time.

08:06 12 **THE COURT:** All right. Any remaining objections?

08:06 13 Without objection, those are admitted.

08:06 14 **MR. BROCK:** In addition, Your Honor, and as you may  
08:06 15 recall, yesterday at lunchtime, or just after the lunch break,  
08:06 16 Mr. Godwin advised that he was looking at cutting back his  
08:06 17 case. He's now cut his case back to the witness who is now on  
08:06 18 the stand and one additional witness, which we think will  
08:06 19 probably take the rest of today and maybe some into tomorrow.

08:06 20 Late yesterday afternoon, I started working to  
08:06 21 see if I could get a witness here for tomorrow. I have some  
08:06 22 options, but they're not good options for us. And I just  
08:06 23 wanted to state to the Court that our preference would be to  
08:06 24 start first thing Monday morning, if that would be agreeable to  
08:06 25 the Court. I've already gone ahead and served the witnesses

08:06 1 that we would call next week.

08:07 2 **THE COURT:** All right. I think that makes perfect  
08:07 3 sense, considering the fact that we're -- apparently we've  
08:07 4 picked up a little speed that you all didn't anticipate this  
08:07 5 week. So I think that's reasonable.

08:07 6 What we'll do, we'll finish Halliburton's case  
08:07 7 today and whatever it takes tomorrow, and then we'll recess  
08:07 8 until Monday morning and start BP's case. Okay?

08:07 9 **MR. BROCK:** Thank you, Your Honor.

08:07 10 **THE COURT:** Now, have you circulated your first  
08:07 11 week's witnesses, or will you do that today?

08:07 12 **MR. BROCK:** I have circulated the first week's  
08:07 13 witnesses. One change that I would make to that is -- one of  
08:07 14 the witnesses I was working on for tomorrow was Morten Emilsen.  
08:07 15 He's not on the list that I -- he is on the list of tentative  
08:07 16 witnesses that I told the parties last night I was working on.  
08:07 17 Later this morning I will plug his name into the list of next  
08:07 18 week's witnesses. We will plan to call him next week.

08:07 19 **THE COURT:** Okay.

08:08 20 **MR. BROCK:** Thank you.

08:08 21 **THE COURT:** Can you give us your best estimate? I  
08:08 22 know things change day by day here. But right now, if you  
08:08 23 started next Monday, we go four days next week.

08:08 24 **MR. BROCK:** Yes, sir, I can.

08:08 25 **THE COURT:** How long do you anticipate your case

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08:08 1 would be?

08:08 2 **MR. BROCK:** I'm anticipating that we would finish our  
08:08 3 case somewhere between the 18th and the 23rd. That's next  
08:08 4 Friday or possibly earlier than that, next week.

08:08 5 **THE COURT:** Okay. Great.

08:08 6 All right. Mr. Doyen?

08:08 7 **MR. DOYEN:** Good morning, Your Honor. Let me get  
08:08 8 wired up here.

08:08 9 **THE COURT:** Okay. Good morning, Mr. Stevick, how are  
08:08 10 you?

08:08 11 One more thing. I think I mentioned yesterday  
08:08 12 afternoon, when we recess around 3:00, 3:15, somewhere around  
08:09 13 there, we'll reserve probably two benches. It may not take all  
08:09 14 the two benches, but we may need the two benches for the Tulane  
08:09 15 class that's coming in around 3:00 this afternoon.

08:09 16 Also, I do need to break a little bit earlier  
08:09 17 today for lunch, probably about ten till, five till, at the  
08:09 18 latest, to noon, because I have a Court en banc meeting to  
08:09 19 attend. So we'll recess right before about 10 till noon and  
08:09 20 come back about 1:30 or so.

09:20 21 (WHEREUPON, **GLEN STEVICK**, having been previously duly  
09:20 22 sworn, testified as follows.)

08:09 23 **CROSS-EXAMINATION**

08:09 24 **BY MR. DOYEN:**

08:09 25 **Q.** Good morning, Dr. Stevick.

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08:09 1 A. Good morning.

08:09 2 Q. I'm not going to replot any of the ground yesterday, but  
08:09 3 let's just remind ourselves where we were and take off from  
08:09 4 there.

08:09 5 We were discussing yesterday afternoon the flow of  
08:09 6 the well pushing up on the pipe around the time the annular  
08:09 7 closes, and then when the VBRs close, having the pipe pinned  
08:10 8 into position with the drill pipe off to the side of the well  
08:10 9 near the variable bore ram -- I'm sorry -- near the blind shear  
08:10 10 rams, where they would remain for the next couple of days.

08:10 11 Do you recall all that?

08:10 12 A. Yes.

08:10 13 Q. Now, this phenomenon that we're talking about, the  
08:10 14 buckling of pipe -- the buckling of drill pipe, has been well  
08:10 15 known in the drilling industry for many years, hasn't it?

08:10 16 A. Yes.

08:10 17 Q. I think I saw you bring into court a ruler like the one  
08:10 18 we've been using. Did I see that?

08:10 19 A. Yes, you did.

08:10 20 Q. Do you still have it up there?

08:10 21 A. It's still here.

08:10 22 Q. That is an example of the buckling phenomenon that we're  
08:10 23 talking about?

08:10 24 A. Yes. It's a column. A column can be an I-beam or it can  
08:10 25 be a piece of pipe. The equations are the same, and it

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08:10 1 exhibits the concepts I've been talking about.

08:10 2 We have the classic 1757 formulas that tell you when  
08:10 3 it buckles. And you'll find that in every -- every mechanical  
08:11 4 engineering design, civil engineering design textbook. You  
08:11 5 can't buy one without it.

08:11 6 However, there are more advanced equations that tell  
08:11 7 you that if it's already buckled, the load to hold it there is  
08:11 8 a third to a half of that load. That, you'll only find in a  
08:11 9 few advanced mechanics and engineering textbooks.

08:11 10 Q. Now, this -- the ruler you and I both have here is  
08:11 11 representative in the skinny dimension; right? It won't bend  
08:11 12 in the fat dimension here.

08:11 13 But if we look at it that way, it's more like a very  
08:11 14 long piece of pipe, right, and that's why it will buckle in  
08:11 15 this direction?

08:11 16 A. Right. This is called -- Euler buckling is called planar  
08:11 17 buckling. Now, a tube could pick any plane, but it will tend  
08:11 18 to stay in that plane once it's gone in that direction.

08:11 19 Q. Now, you said a minute ago -- well, let me pause on that  
08:11 20 for one more minute.

08:11 21 The buckling we're seeing here is called elastic  
08:12 22 buckling, meaning that once we take the force back off of the  
08:12 23 tube, or the planar piece, it straightens back out; right?

08:12 24 A. Correct.

08:12 25 Q. Plastic buckling is what happens if we go further than the

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08:12 1 elastic limits here, bend it further than that, and then the  
08:12 2 pipe becomes -- or the ruler becomes permanently bent; correct?  
08:12 3 That's plastic buckling?  
08:12 4 A. Correct. If you've gone over the yield stress of the  
08:12 5 material, it will stay bent.  
08:12 6 Q. And we see evidence of both of those things happening to  
08:12 7 the drill pipe segments in and around the BOP; correct?  
08:12 8 A. Correct. It tells you which buckle -- or it actually  
08:12 9 tells you what the cause is, just using logical deductions.  
08:12 10 Q. Okay.  
08:12 11 A. Setting the equations aside completely.  
08:12 12 Q. We're going to come to that in a couple of minutes.  
08:12 13 You mentioned, I think a minute ago, that we see  
08:12 14 equations being provided for buckling of drill pipe in standard  
08:12 15 texts in industry; is that right?  
08:12 16 A. Yes.  
08:12 17 Q. And, in fact, one of the books I think you mentioned  
08:12 18 before is a book by Dr. -- by Robert Grace, one of BP's  
08:12 19 experts, the *Blowout and Well Control Handbook*. Do you see  
08:12 20 that?  
08:13 21 A. Both versions of his book have that, yes.  
08:13 22 Q. There's a chapter on, in fact, buckling and drill pipe;  
08:13 23 correct?  
08:13 24 A. Correct.  
08:13 25 MR. DOYEN: Let's pull up 41594.302.1.

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08:09 1 **BY MR. DOYEN:**

08:09 2 **Q.** And this is just a chapter -- part of a chapter from

08:13 3 Mr. Grace's book on well control. And it's talking about the

08:13 4 elastic and plastic deformation of drill pipe; correct?

08:13 5 **A.** Yes.

08:13 6 **Q.** And you mentioned, I think a minute ago, some equations,

08:13 7 some 1757 equations. You're talking about the fact that the

08:13 8 formulas for this buckling of a long slender piece of metal

08:13 9 like this were provided by the great mathematician -- I think

08:13 10 you pronounced it Leonhard Euler?

08:13 11 **A.** Euler is the correct pronunciation.

08:13 12 **Q.** Leonhard Euler, in 1757; correct?

08:13 13 **A.** Correct.

08:13 14 **Q.** And we see that in other textbooks in the industry,

08:13 15 correct, for drill pipe?

08:13 16 **A.** Almost all of them, yes.

08:13 17 **Q.** Now, from what I have seen, the textbooks in the industry

08:13 18 are often talking about what happens during drilling

08:14 19 operations. When we have the drill and we have the bit in the

08:14 20 formation, and we're pressing down and the formation pressing

08:14 21 back up, we can get buckling in those circumstances; correct?

08:14 22 **A.** Yes.

08:14 23 **Q.** But we can also get buckling, as you pointed out, from the

08:14 24 force from below, the force from the flow of oil; correct?

08:14 25 **A.** Yes, and internal pressure. There's only one textbook

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08:14 1 that I've actually seen that formula in.

08:14 2 Q. This ruler won't provide us with an example of this. But,  
08:14 3 in fact, the long slender tube is not only subject to being  
08:14 4 bent in this one dimension, this planar dimension, as you  
08:14 5 mentioned, but also helical buckling, right, where it spins  
08:14 6 sort of like a corkscrew or a spring shape?

08:14 7 A. Yes.

08:14 8 Q. Let me put up TREX-7697.16.1.

08:14 9 These are figures from the Stress Engineering report  
08:14 10 of buckling at Macondo at the time of the blowout and their  
08:15 11 modeling showing the forces were sufficient to cause the  
08:15 12 helical buckling. And this is also a form of buckling known to  
08:15 13 happen to drill pipes; correct?

08:15 14 A. Yes, sir.

08:15 15 Q. In fact, I think you cite in your reliance documents --

08:15 16 MR. DOYEN: Let's pull up 61123.95.1, a 1962 article  
08:15 17 by Lubinski and Logan called "Helical Buckling of Tubing Sealed  
08:15 18 in Packers."

08:09 19 BY MR. DOYEN:

08:09 20 Q. You cited that in your paper; correct?

08:15 21 A. I did.

08:15 22 Q. And helical buckling has been long known in the drilling  
08:15 23 industry as something that can happen to the drill pipe;  
08:15 24 correct?

08:15 25 A. Absolutely.



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08:15 1 Q. Let's go back again, just to return briefly to where we  
08:15 2 were yesterday as a leaping-off point, to the demonstrative  
08:15 3 D-6746.

08:16 4 And we were just talking about -- briefly, about the  
08:16 5 four experts who talked about why is the pipe offside, when is  
08:16 6 the pipe offside. We've been talking about the force from  
08:16 7 below, the flow theory, that has been explained by you and  
08:16 8 Mr. Childs.

08:16 9 I want to talk now about Mr. Shanks' theories, the BP  
08:16 10 witness. You spoke briefly about this, I think, in response to  
08:16 11 one of my questions yesterday.

08:16 12 You understand that Mr. Shanks says what happened  
08:16 13 here, the traveling block fell -- and there are witness  
08:16 14 accounts of this -- about half an hour after the explosion, and  
08:16 15 that that created some downward force in the pipe, and that  
08:16 16 that can account for why the pipe is off-center.

08:16 17 Do you recall that, generally?

08:16 18 A. Yes. It is a viable theory as to why you can have pipe  
08:16 19 buckle in a BOP.

08:16 20 Q. That is something that -- I'm sorry. I didn't mean to  
08:16 21 interrupt you.

08:16 22 A. Well, it's one more reason that you have to configure  
08:16 23 those LEGO blocks such that it won't be buckled enough when you  
08:16 24 cut the pipe.

08:16 25 Q. Understood.

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08:16 1 A. And you'll safely close the well.

08:16 2 Q. Again, I understand that goes to your design theory. I do

08:17 3 understand that.

08:17 4 A. I'm --

08:17 5 Q. Right now I'm just focusing on what happened that night

08:17 6 and over the next couple of days.

08:17 7 A. Very good.

08:17 8 Q. You understand Mr. Shanks' theory is the traveling block

08:17 9 falls and pushes the pipe into a buckled position. And

08:17 10 although you say it's possible for something like that to

08:17 11 happen and it would result in buckled pipe in the BOP, that did

08:17 12 not happen in this case; correct?

08:17 13 A. I don't believe so, no. Well, it did fall, and it did

08:17 14 plastically buckle the pipe above the upper annular, just not

08:17 15 in the area where the cutting occurred.

08:17 16 Q. Not down in the BOP?

08:17 17 A. Correct.

08:17 18 Q. Let's talk a little more about that.

08:17 19 **MR. DOYEN:** Let's put up D-6636. And let me go back

08:17 20 over to the board here.

08:09 21 **BY MR. DOYEN:**

08:09 22 Q. The fundamental problem with Mr. Shanks' theory relates

08:17 23 back to this severing of the pipe that we were talking about

08:17 24 yesterday here.

08:17 25 And I'm looking at the big blue demonstrative,

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08:17 1 severing the pipe, separation of pipe just above the annular.

08:17 2 A. Yes, sir.

08:18 3 Q. And that's something that occurs here on D-6636 on the far

08:18 4 left column. That separation occurred between pipe 1-B-1 and

08:18 5 Piece 39; correct?

08:18 6 A. Correct.

08:18 7 Q. Within minutes of the closing of the variable bore rams,

08:18 8 that breaks?

08:18 9 A. Yes, it does.

08:18 10 Q. And we can see evidence, correct, in the forensic

08:18 11 evidence, that that happened before the traveling block fell;

08:18 12 correct?

08:18 13 A. Absolutely.

08:18 14 Q. Okay. Now, just to go back -- I don't know where all my

08:18 15 pieces of pipe here are.

08:18 16 I think I want to put up another demonstrative.

08:18 17 **MR. DOYEN:** Let's put up TREX-61124.19.1.

08:09 18 **BY MR. DOYEN:**

08:09 19 Q. So these are some photos from your report. Do you

08:19 20 recognize those?

08:19 21 A. Yes.

08:19 22 Q. I'm looking for my laser pointer here, which I've

08:19 23 misplaced.

08:19 24 What we see on your report -- on these pictures which

08:19 25 are taken from the DNV's forensic examination, we see the

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08:19 1 extensive erosion, correct, where the pipe is heavily eroded  
08:19 2 right above the annular? Correct?

08:19 3 A. Right above the upper annular, yes.

08:19 4 Q. And more of this erosion up in here.

08:19 5 And then in this part of the pipe, in the lower two  
08:19 6 pictures, we see where there was a classic tensile failure of  
08:19 7 the pipe; correct?

08:19 8 A. Correct. The remaining ligament that was not eroded away  
08:19 9 was not strong enough to take the tensile load.

08:19 10 Q. So the tensile load occurs as the rig begins to drift --  
08:19 11 the rig loses power, begins to drift, and the ocean currents  
08:19 12 pull on the pipe which has been greatly eroded, there's not  
08:19 13 much of the pipe left, literally snaps off it; correct?

08:19 14 A. Correct.

08:20 15 Q. I've got our little demonstrative here. Just the very end  
08:20 16 of the piece that sticks up above the annular, that classic  
08:20 17 tensile failure at this 45 degree angle sliced right along the  
08:20 18 top of this piece; correct?

08:20 19 A. Yes, yes. Ductile metal in tension will fail in shear  
08:20 20 mode, which gives you the 45 degrees.

08:20 21 Q. One of the pieces of evidence that that happened before  
08:20 22 the traveling block fell is the condition of piece of pipe  
08:20 23 No. 39; correct?

08:20 24 A. Correct.

08:20 25 Q. So let's look at that for just a second. This is the

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08:20 1 lower end of Exhibit 39. We've marked this -- this is 39-E, as  
08:20 2 it's marked here in the chart. Okay?

08:20 3 A. Correct.

08:20 4 Q. And you've looked at this piece, haven't you?

08:20 5 A. Yes.

08:20 6 Q. And I think you explained briefly yesterday that what we  
08:20 7 can see from the condition of this pipe where the fingers, the  
08:20 8 eroded fingers have been bent over, is that this piece of pipe,  
08:20 9 39, did come down with considerable force and slammed into the  
08:20 10 top of the annular and bent; correct?

08:20 11 A. Yes.

08:21 12 Q. Bent these fingers back?

08:21 13 A. Bent the fingers back and also plastically buckled the  
08:21 14 pipe above it. It plastically deformed the fingers left from  
08:21 15 the erosion -- do you have a label on this?

08:21 16 Q. 39-E, we'll call it.

08:21 17 A. 39-E, and the pipe above it was plastically bowed or bent.

08:21 18 Q. I've got a model of that, too. So I'll bring that to you  
08:21 19 in just a second. I think the judge's suggestion is, if we  
08:21 20 bring the mic over here, that helps us when we're in this part  
08:21 21 of the room.

08:21 22 A. Further, this area of pipe is still very round. That  
08:21 23 means it wasn't bent by the riser folding over, where there's  
08:21 24 other pipes that are plastically deformed but they're not round  
08:21 25 anymore, so we know it was from the riser falling over.

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08:21 1 So there's a lot of evidence, both bowing and the  
08:21 2 shape of the part or the pipe, so you can determine what  
08:21 3 happened.

08:21 4 Q. All right. So to go with -- on the idea that pictures  
08:21 5 help us understand what it is you just said. This is a model,  
08:21 6 obviously, smaller piece. Full size would be a little bit  
08:22 7 unwieldy here in the exam. This is Piece No. 39, again,  
08:22 8 created by laser scanning and then having a 3D printer. And  
08:22 9 it's bowed; correct? This is what you're talking about, this  
08:22 10 slight bow we see in the pipe?

08:22 11 A. Yes.

08:22 12 Q. And it's also, as you say, round along this long axis;  
08:22 13 right? It's preserved its round shape up and down?

08:22 14 A. Right. And for this, the amount of buckling that can  
08:22 15 occur trapped inside the riser, 18 3/4 inches, it should still  
08:22 16 be round, unless it was folded.

08:22 17 Q. And it's hard for it to fold inside the riser, which is  
08:22 18 constraining the shape; correct?

08:22 19 A. Right. Exactly.

08:22 20 Q. So your contention is that from the forensic evidence, we  
08:22 21 can see that this piece, 39, and, of course, all the pieces up  
08:22 22 above it were then intact, slammed into the riser -- I'm sorry,  
08:22 23 slammed into the top of the annular, the steel top of the  
08:22 24 annular, bent the very end of it, and deformed it along the  
08:22 25 axis; correct?

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08:22 1 A. Yes.

08:23 2 Q. While preserving its basic roundness of the pipe up and  
08:23 3 down the long axis?

08:23 4 A. Exactly.

08:23 5 Q. And we do not see a similar sort of bending in the pipe  
08:23 6 inside the BOP; correct?

08:23 7 A. Correct. Section 83 is perfectly straight -- Section 83  
08:23 8 is not only -- it's still round and it's still straight, and  
08:23 9 that's in the section --

08:23 10 Q. Section 83?

08:23 11 A. -- that the blind shear ram's going to act on. And this  
08:23 12 is the section between the upper annular all the way down to  
08:23 13 the upper VBR.

08:23 14 Q. We'd need two of those pieces?

08:23 15 A. Right. Now the other way.

08:23 16 Q. Yeah. This was eventually severed by the blind shear ram?

08:23 17 A. Correct.

08:23 18 Q. I'm sorry. We have 83 -- 1-B-1 and 83 were at one point  
08:24 19 one piece of pipe; correct?

08:24 20 A. Correct.

08:24 21 Q. And you're talking about 83 being found perfectly  
08:24 22 straight; correct?

08:24 23 A. Right. It's a remnant of pipe that was undamaged by the  
08:24 24 riser folding.

08:24 25 Q. And you're saying Pipe 39 here has been bowed as a result

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08:24 1 of the traveling block falling; correct?

08:24 2 A. Yes.

08:24 3 Q. And if that piece of pipe had still been connected and not  
08:24 4 severed up here above the annular, we would see a similar sort  
08:24 5 of bowing all along these pieces down to whatever point it was  
08:24 6 held firmly in place; correct?

08:24 7 A. Absolutely.

08:24 8 Q. And we just don't see that. This piece was found  
08:24 9 perfectly straight, 83; right?

08:24 10 A. Correct.

08:24 11 Q. Which is evidence that this was elastically buckled;  
08:24 12 right? It did have to be bent to go from the VBRs over to the  
08:24 13 blind shear ram?

08:24 14 A. And be off-center, yeah.

08:24 15 Q. And be off-center. It needed to be bent, but it was  
08:24 16 elastically bent so that when the pressure was taken back off,  
08:24 17 it went back into its straight form, just like our ruler;  
08:24 18 correct?

08:24 19 A. Correct.

08:25 20 Q. Now, to go back to another point you made a minute ago.  
08:25 21 Again, to use our models, Point 1-B-1, which is just below 39,  
08:25 22 tool joint stuck in the annular and then extending down a  
08:25 23 little ways into the BOP.

08:25 24 This pipe has been bent; correct?

08:25 25 A. Yes.



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08:25 1 Q. But it's been bent out of round in this long axis  
08:25 2 dimension; correct? It's been flattened?

08:25 3 A. Yes. It slid through. As the riser fell, it was in that  
08:25 4 kinked area and worked its way out as the riser fell.

08:25 5 Q. It was found up in here in the riser, where the riser was  
08:25 6 kinked; right?

08:25 7 A. Correct.

08:25 8 Q. And the sort of deformation we see in this piece of pipe  
08:25 9 where it's been flattened out and slightly bent along the axis  
08:25 10 is consistent with it having been folded over inside the riser;  
08:25 11 correct?

08:25 12 A. Correct. Therefore, you can't use its shape for  
08:25 13 determining what was buckled when.

08:25 14 Q. Okay. Fair to say, Dr. Stevick, that all the forensic  
08:26 15 evidence we're looking at here -- the condition of Pipe No. 39,  
08:26 16 the condition of 1-B-1, the evidence of the separation of those  
08:26 17 pipes, the condition of 83 -- all of those things in this case  
08:26 18 eliminate the possibility it's that falling of the traveling  
08:26 19 block that explains why the pipe is off-center at the blind  
08:26 20 shear rams; correct?

08:26 21 A. That's correct.

08:27 22 Q. Let's go back to D-6746 for just a minute. Just very  
08:27 23 briefly, Dr. Davis's theory in his report that the rig drifted,  
08:27 24 pulled the pipe far off to the side above the BOP and bent the  
08:27 25 pipe inside the BOP, again, that is a possible thing to happen

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08:27 1 in the world; right? The drifting of the rig can cause the  
08:27 2 pipe to be bent inside the BOP; correct?

08:27 3 A. Yes. And it's one more reason you have to design and  
08:27 4 operate the BOP accordingly, because it can -- the drill pipe  
08:27 5 can be buckled in the BOP.

08:27 6 Q. Understood.

08:27 7 But your -- the forensic evidence tells us in this  
08:27 8 case that that is not what happened here in this blowout;  
08:27 9 correct?

08:27 10 A. Correct. But the fix, again, is exactly the same for all  
08:27 11 the buckling theories.

08:27 12 Q. I'm just focusing on what happened. The basic problem is,  
08:28 13 again, once this pipe separates, which it does, from the  
08:28 14 massive erosion, leaving only a little bit of the pipe left  
08:28 15 when it snaps off, once those two pieces snap apart, the  
08:28 16 continuing drifting of the rig for the next two days, for this  
08:28 17 broken piece of pipe -- this broken piece of pipe has no impact  
08:28 18 on the pipe inside the BOP; correct?

08:28 19 A. Correct. Plus, if you look at the currents -- the buoys  
08:28 20 survived the *Deepwater Horizon*. You know, water currents are  
08:28 21 very slow, less than walking speed. It's never really going to  
08:28 22 slam down. It may come down and kiss the top of the upper  
08:28 23 annular, but it's not going to slam down.

08:28 24 Q. I think you had stated that in your opinion, based on the  
08:28 25 physical evidence that we've been looking at, it can't be

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08:28 1 disputed that it was the force from below that buckled the  
08:28 2 pipe; correct?

08:28 3 A. Well, it's also the pressure inside the pipe itself,  
08:29 4 probably one of the big -- it gives you an effective  
08:29 5 compression.

08:29 6 Q. I'm encompassing that within the force from below. That's  
08:29 7 a pressure that's arising from the well; correct?

08:29 8 A. It is, due to flow into the drill pipe, yes.

08:29 9 Q. Flow and the pressure from the well are, in your view, the  
08:29 10 only things that can explain why this pipe was off-center at  
08:29 11 the blind shear rams; correct?

08:29 12 A. Yes. And keep it buckled all the way through the riser  
08:29 13 falling.

08:29 14 Q. Let me just briefly come back to the timing question we  
08:29 15 talked about. We do understand that the explosion occurs right  
08:29 16 around 9:49 on the 20th; correct?

08:29 17 A. That's correct.

08:29 18 Q. And by that point -- in fact, a few minutes before that,  
08:29 19 when the crew was closing the annular and then closing the  
08:29 20 variable bore rams, pipe is already buckled inside the BOP;  
08:29 21 correct?

08:29 22 A. Yes.

08:29 23 Q. Now, I think you indicated that none of us can know for  
08:29 24 certain when we lost total communication from the rig down to  
08:29 25 the BOP. Correct?

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08:29 1 A. Correct.

08:29 2 Q. We don't have any records like the Sperry data that  
08:30 3 actually tell us that?

08:30 4 A. Correct.

08:30 5 Q. We know power was lost right away, so electric  
08:30 6 communication appears to be lost. But there's also hydraulic  
08:30 7 communication; correct?

08:30 8 A. Right. In my experience analyzing explosions and fires,  
08:30 9 electrical connections are typically much weaker than hydraulic  
08:30 10 event connections.

08:30 11 Q. Okay.

08:30 12 A. And we know the hydraulic was definitely gone when the  
08:30 13 riser fell, but we don't know for sure --

08:30 14 Q. Exactly when.

08:30 15 A. -- exactly.

08:30 16 Q. The hydraulic pipes, like the electronic signals, are  
08:30 17 coming up through the moon pool, through the MUX cables;  
08:30 18 correct?

08:30 19 A. Correct.

08:30 20 Q. And subject -- and there was an intense fire burning there  
08:30 21 for the next two days after the 20th; correct?

08:30 22 A. Correct.

08:30 23 Q. And at some point it's likely that that fire took out  
08:30 24 those lines of communication?

08:30 25 A. Agreed.

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08:30 1 Q. Now, if on April 22nd, when the blind shear rams are  
08:30 2 activated mechanically -- I shouldn't say it that way -- the  
08:31 3 autoshear is activated mechanically by the severing of a piece  
08:31 4 of metal. Do you recall that?

08:31 5 A. Yes.

08:31 6 Q. You've seen the video of that?

08:31 7 A. Yes.

08:31 8 Q. It's at that point that the blind shear rams are closed,  
08:31 9 the pipe is off-center as a result of the flow and the pressure  
08:31 10 from this well; correct?

08:31 11 A. Yes. That's when I believe the blind shear ram was  
08:31 12 activated.

08:31 13 Q. And it cannot -- blind shear rams cannot seal -- shear the  
08:31 14 pipe and seal the well because the pipe is off-centered;  
08:31 15 correct?

08:31 16 A. Correct. At that point they should have activated the CSR  
08:31 17 first, centered the pipe, and then did the autoshear; but  
08:31 18 that's not what they did.

08:31 19 Q. Understood.

08:31 20 Likewise, going back to April 20th or from whenever  
08:31 21 thereafter when the AMF conditions were met -- and we can't be  
08:31 22 certain because none of us know here today exactly when  
08:31 23 hydraulic communicating was lost. But whenever that was, given  
08:31 24 the buckled state of the pipe, even if the AMF works perfectly,  
08:31 25 the pods worked perfectly, it cannot shear the pipe and seal

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08:32 1 the well; correct?

08:32 2 A. Correct.

08:32 3 MR. DOYEN: Let's pull up TREN-61123.27.2.

08:32 4 BY MR. DOYEN:

08:32 5 Q. Turning briefly to the solenoid. You understand this is a

08:32 6 dual-coil solenoid; correct?

08:32 7 A. Yes.

08:32 8 Q. And there was some testing on that solenoid -- I'm sorry.

08:32 9 One other fact. One of the coils is wired in the reverse

08:32 10 direction, correct --

08:32 11 A. Correct.

08:32 12 Q. -- in this particular solenoid?

08:32 13 And there was testing done at DNV; correct?

08:32 14 A. Yes. The technical working group, yes.

08:32 15 Q. And you understand that the way this solenoid has

08:33 16 functioned in the field is there's electric and hydraulic

08:33 17 communication, as you say, to the pods; and when that's

08:33 18 terminated, the pods then go into action on their own, using

08:33 19 battery power, sends a signal to the solenoid, cause it to

08:33 20 function; correct?

08:33 21 A. Correct.

08:33 22 Q. And you state here in your report, talking about the DNV

08:33 23 testing, "The results of Solenoid 103 testing are

08:33 24 inconclusive" -- did I read that correctly so far?

08:33 25 A. Yes.

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08:33 1 Q. ". . . because 103Y" -- that's Solenoid 103Y; correct?

08:33 2 A. Yes.

08:33 3 Q. . . . "Solenoid 103Y worked properly when connected to and  
08:33 4 operated by SEM-A and SEM-B, as would have occurred in the  
08:33 5 field."

08:33 6 Did I read that correctly?

08:33 7 MS. KARIS: Your Honor, I'm objecting, move to  
08:33 8 strike. This is the DNV results, which the Court has excluded.

08:33 9 MR. DOYEN: No, Your Honor. The Court's order is  
08:34 10 quite clear that the testing that occurred of the solenoid,  
08:34 11 which everybody has relied on and says we shouldn't pay  
08:34 12 attention to Transocean's testing, the only testing we could  
08:34 13 look at is the DNV testing. This is his statement about what's  
08:34 14 found by the DNV testing.

08:34 15 MS. KARIS: Your Honor, if I may respond. What this  
08:34 16 is citing to is the results of that testing, which is precisely  
08:34 17 what the Court has held to be excluded.

08:34 18 Definitely, Mr. Stevick can speak to his own  
08:34 19 conclusions with respect to DNV's testing, but this paragraph  
08:34 20 is a direct citation to the results and conclusions of the  
08:34 21 DNV's report, which the Court has excluded.

08:34 22 MR. DOYEN: This paragraph, Your Honor, is his  
08:34 23 conclusion that he draws from the testing, which everyone  
08:34 24 agrees is appropriate to look at, his description of what we  
08:34 25 take from the results.

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08:34 1           **THE COURT:** Okay. Is that your conclusion, or are  
08:34 2 you reporting -- are you citing what was in the DNV report as  
08:34 3 their conclusion?

08:34 4           **THE WITNESS:** Your Honor, I actually went back to the  
08:35 5 laboratory notes.

08:35 6           **THE COURT:** Okay.

08:35 7           **THE WITNESS:** It's my conclusion. The wording's  
08:35 8 poor. I'm not relying on their conclusions whatsoever.

08:35 9           **THE COURT:** Okay.

08:35 10          **MS. KARIS:** Okay.

08:35 11          **MR. DOYEN:** Let's turn up -- pull up, I'm sorry.

08:35 12

08:35 13 **BY MR. DOYEN:**

08:35 14 **Q.** One more point on the solenoids. The SEMs, the subsea  
08:35 15 electronic modules, SEM-A and SEM-B, they use something called  
08:35 16 "pulse-width modulation"; correct?

08:35 17 **A.** Yes.

08:35 18 **Q.** That basically involves turning the power off and on  
08:35 19 really rapidly; correct?

08:35 20 **A.** Yes.

08:35 21 **Q.** And that's a common method used in devices like this to  
08:35 22 save battery power; correct?

08:35 23 **A.** To save battery power and to control small motors. I've  
08:35 24 actually designed that circuit myself for controlling motors  
08:35 25 and --



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08:35 1 Q. And the --

08:35 2 A. Well, hold on. From these tests, the three tests we've  
08:36 3 talked about, from the technical working group, and I concluded  
08:36 4 in my rebuttal report that although it worked twice, the first  
08:36 5 time it didn't work, and the reason is because it stuck and  
08:36 6 became unstuck during the testing.

08:36 7 I've tested lots of solenoid valves, and we know now  
08:36 8 that the reason it didn't work at the time was the poles were  
08:36 9 reversed, so you had much less force. You still had force, so  
08:36 10 it can work sometimes because pulse-width modulation doesn't  
08:36 11 always cancel 100 percent, so you still have some pulling  
08:36 12 force; it's just highly reduced.

08:36 13 But when you have a severe environment, the hydraulic  
08:36 14 fluid itself will never be completely clean. So what's been  
08:36 15 exhibited by these tests is sticking. And let me explain why  
08:36 16 that happens in a solenoid valve.

08:36 17 **MR. DOYEN:** Your Honor, we'll object to that. The  
08:36 18 sticking portion is not in his -- not in his report.

08:36 19 **THE COURT:** Well, you asked him the question, let him  
08:36 20 answer it.

08:37 21 **MR. DOYEN:** Fine. Understood.

08:37 22 **THE WITNESS:** So if I may continue. The way a  
08:37 23 hydraulic valve works, you have a plunger that sticks out into  
08:37 24 the coils and it pulls that plunger. It's attached to what's  
08:37 25 called a spool. The spool has disks and spaces between those

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08:37 1 disks that route the hydraulic fluid to ports in the body.

08:37 2 The spool slides in a hole that's only 10,000ths  
08:37 3 of an inch larger than the size of those disks on the spool.  
08:37 4 So there are no rubber or elastomeric seals. The seal is just  
08:37 5 the tightness of the fit. So a very common failure mode for  
08:37 6 hydraulic valves is a little piece of dirt or debris gets in  
08:37 7 there and it sticks.

08:37 8 And when you see the first test not activate  
08:37 9 until the last seven seconds, so it's not long enough, this  
08:37 10 valve was stuck downhole. And after that first test, they got  
08:38 11 it unstuck, and then they got it to work a couple more times.  
08:38 12 That's almost certainly what happened.

08:38 13 **BY MR. DOYEN:**

08:38 14 **Q.** Let me say -- the solenoid was removed from the pod in May  
08:38 15 of 2010; correct?

08:38 16 **A.** Yes.

08:38 17 **Q.** And it wasn't disassembled and photographed until over a  
08:38 18 year later; correct?

08:38 19 **A.** Correct. And it was still stuck.

08:38 20 **Q.** And you're aware of testimony, aren't you, that if left  
08:38 21 stagnant, solenoids like this can have growth that causes the  
08:38 22 sticking you're talking about?

08:38 23 **A.** I don't think so.

08:38 24 **Q.** You said -- I want to go back to pulse-width modulation,  
08:38 25 which is where we started this whole thing.

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08:38 1 A. Sure.

08:38 2 Q. Pulse-width modulation, turning the power on and off;  
08:38 3 correct?

08:38 4 A. Yes.

08:38 5 Q. Given your understanding of the pulse-width modulation,  
08:38 6 it's not a surprise to you that DNV tests showed that when the  
08:38 7 solenoid was activated through SEM-A and SEM-B, as it would be  
08:38 8 in the field, the solenoid actually functioned?

08:38 9 A. Correct. But if you look at the entire test result, it  
08:39 10 had lower pulling force because one of the coils was reversed,  
08:39 11 and that puts you in a situation where you're extremely  
08:39 12 susceptible to a small amount of debris getting caught in that  
08:39 13 1/10,000 of an inch gap.

08:39 14 Q. Okay.

08:39 15 A. If you look at any book on hydraulic actuating valves,  
08:39 16 this is a big problem, sticking.

08:39 17 Q. And this biggest problem with this debris theory that  
08:39 18 you're talking about now is not in your report; correct?

08:39 19 A. I don't think I ever mentioned it, but I do say in my  
08:39 20 rebuttal report I concluded it didn't work based on those test  
08:39 21 results.

08:39 22 **MR. DOYEN:** Let's turn to 61124.24.1.

08:39 23 **BY MR. DOYEN:**

08:39 24 Q. So we're looking back over at the blue pod, just to make  
08:39 25 it clear here and remind everybody where we are. The solenoid

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08:39 1 we were talking about, 103Y, the Y is for yellow; correct?

08:39 2 A. Correct.

08:40 3 Q. So it's a solenoid on the yellow pod?

08:40 4 A. Yes.

08:40 5 Q. Now we're looking over at the blue pod and the question of  
08:40 6 the shape of the batteries; correct?

08:40 7 A. That's correct.

08:40 8 Q. And you indicate in your report that the control pod that  
08:40 9 was in use in the blue pod at the time of the incident,  
08:40 10 referred to as Pod No. 3, had been the spare pod on deck since  
08:40 11 2007.

08:40 12 **MR. DOYEN:** I'm going to read that again, Your Honor.  
08:40 13 I was sort of paraphrasing.

08:40 14 **BY MR. DOYEN:**

08:40 15 Q. And I won't be able to ask you if I read it correctly  
08:40 16 because I didn't.

08:40 17 Let me try again. "The control pod that was in use  
08:40 18 as the blue pod at the time of the incident, referred to as Pod  
08:40 19 No. 3, had previously been the spare pod on deck since  
08:40 20 November 2007."

08:40 21 Did I read that correctly?

08:40 22 A. Yes.

08:40 23 Q. And you understand the batteries had been changed out in  
08:40 24 2007 by Cameron; correct?

08:40 25 A. Yes.

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08:40 1 MR. DOYEN: Let's pull up TREX-4617.61.1.

08:40 2 BY MR. DOYEN:

08:40 3 Q. This is a document in your reliance list from the RMS  
08:40 4 system. Do you recall that?

08:41 5 A. No, but I -- I'm sure it's there.

08:41 6 Q. And this is just indicating back in '08 that the pod had  
08:41 7 been sent to Cameron and overhauled, the SEM upgraded with new  
08:41 8 batteries. Do you see that?

08:41 9 A. Yes.

08:41 10 MR. DOYEN: Let's put up for a second -- 3329 -- just  
08:41 11 a moment, for a second -- 3329.2.1.

08:41 12 BY MR. DOYEN:

08:41 13 Q. There were some discussion yesterday about Cameron's  
08:41 14 policies, but I don't think we actually had the policies up.

08:41 15 So just to remind everybody where we are, it's  
08:41 16 recommended that the 9-volt and the 27-volt battery be  
08:41 17 replaced -- either -- the earliest of, after one year of  
08:41 18 on-time operation, if the number of actuations have exceeded  
08:41 19 33, or five years after purchase; correct?

08:41 20 A. Yes.

08:41 21 MR. DOYEN: Let's call up TREX-5154.1.1. Do we have  
08:42 22 a call-out .1.1 -- 5.41.1.1 [sic]?

08:42 23 All right. We can do it that way.

08:42 24 BY MR. DOYEN:

08:42 25 Q. This is another document in your reliance documents. Do

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08:42 1 you recall that?

08:42 2 A. Well, I don't recall it, but I'm sure I looked at it at  
08:42 3 some point.

08:42 4 Q. Okay. And I think Mr. Williamson was asking you about  
08:42 5 some correspondence involving Cameron a year or so before this  
08:42 6 concerning Cameron's old batteries.

08:42 7 This is a series of e-mails concerning the testing of  
08:42 8 Cameron's then-new batteries in 2006. Let's highlight the  
08:42 9 first paragraph there: The results were not published to  
08:42 10 customers.

08:42 11 So looking at the third sentence in that paragraph,  
08:42 12 let me focus on that first. Do you see where it says, When  
08:42 13 Cameron publishes to the customers -- I'm sorry. I read that  
08:43 14 wrong.

08:43 15 "What Cameron publishes to the customers is  
08:43 16 33 actuations or one year of normal operation."

08:43 17 Do you see that?

08:43 18 A. I do.

08:43 19 Q. You didn't see anything from Cameron, did you, where they  
08:43 20 indicate that having the pod on deck as the spare pod for a  
08:43 21 year constitutes one year of normal operations, did you?

08:43 22 A. Oh, I think a pod sitting out in the sun, you've got to  
08:43 23 count the time --

08:43 24 Q. Sir, I'm asking you a more specific question, not your  
08:43 25 opinion. Did you find anything from Cameron advising its

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08:43 1 customers that the pod sitting on deck, not being used,  
08:43 2 constitutes one year of normal operations?

08:43 3 A. I'd have to go back and look at the -- what it says, but I  
08:43 4 believe there's correspondence asking that, that Cameron  
08:43 5 replied it was installed time, not --

08:43 6 Q. You're talking about the correspondence that occurred  
08:43 7 after the event, aren't you?

08:43 8 A. It could be. But there was correspondence --

08:43 9 Q. Can you point to anything before the event where Cameron  
08:44 10 advised its customers that merely installing the batteries on  
08:44 11 the unused spare pod for a year constitutes one year of normal  
08:44 12 operations?

08:44 13 A. No, I can't. However, in this particular case, this is a  
08:44 14 known critical issue. These batteries have to be checked  
08:44 15 before you splash, or just changed.

08:44 16 Q. I'm just focusing on the recommendation from Cameron to  
08:44 17 its customers, sir.

08:44 18 Let's look at the previous sentence.

08:44 19 "The results showed that the batteries should last  
08:44 20 77 actuations or two years of normal operation."

08:44 21 Did you see that?

08:44 22 A. Yes, I see it.

08:44 23 Q. And your report doesn't contain any analysis of how long  
08:44 24 the batteries will, in fact, last in normal operations, does  
08:44 25 it?

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08:44 1 A. No. I did not test the batteries in this case.

08:44 2 Q. Now, you read the report by BP's expert on batteries and  
08:44 3 solenoids, Mr. Zatarain, didn't you?

08:44 4 A. I did.

08:45 5 MR. DOYEN: Let's put up TREX-22729.15.1.

08:45 6 BY MR. DOYEN:

08:45 7 Q. You saw Mr. Zatarain's analysis showing that if the  
08:45 8 27-volt battery had been bad on the 20th, April 20th, at the  
08:45 9 time of the incident, all three batteries would be bad when  
08:45 10 tested at Michoud; correct?

08:45 11 A. Yes.

08:45 12 Q. And that is not the condition we found the batteries in at  
08:45 13 Michoud; correct? We didn't find three dead batteries, did we?

08:45 14 A. No.

08:45 15 Q. According to Mr. Zatarain's analysis, the 27-volt battery,  
08:45 16 to be in the bad condition we found it at Michoud --

08:46 17 A. Yes.

08:46 18 Q. -- must have been drained after the incident; correct?

08:46 19 A. Well, I don't know if that's what he said or not. I'd  
08:46 20 have to review --

08:46 21 Q. Well, that does follow from the analysis, doesn't it? We  
08:46 22 have to have a bad -- if we had a bad battery in the 27-volt on  
08:46 23 April 20th, regardless of the condition of the other  
08:46 24 batteries -- good, bad, weak, whatever -- they would all be  
08:46 25 dead when we measured them?



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08:46 1 A. I'd have to go back and review that. I can't tell that  
08:46 2 from this.

08:46 3 Q. You didn't really analyze this chart?

08:46 4 A. I did at some point, yes.

08:46 5 Q. You don't recall now whether you agree with Mr. Zatarain's  
08:46 6 conclusions on this point or not?

08:46 7 A. This exact point, no.

08:46 8 Q. Thank you.

08:46 9 MR. DOYEN: Let put up TRES-4 -- I'm sorry, I'm  
08:46 10 saying that wrong -- 5495.5.1.

08:46 11 BY MR. DOYEN:

08:46 12 Q. This is another document. This is from the Transocean  
08:47 13 internal investigation, likewise in your reliance documents.  
08:47 14 Do you recall reviewing this?

08:47 15 A. It looks familiar.

08:47 16 Q. Do you recall reviewing the conclusion of Transocean's  
08:47 17 internal investigation team, when they were looking at why do  
08:47 18 we have batteries that are more than a year old on one of the  
08:47 19 pods, one of the three pods, the Transocean team determined  
08:47 20 that the annual battery change-out procedure had been  
08:47 21 inadvertently dropped from the EMPAC system, computer-based  
08:47 22 system, and then reinstated when the new computer system, RMS,  
08:47 23 was rolled out.

08:47 24 Do you recall that?

08:47 25 A. Yes.

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- 08:47 1 Q. And you didn't find any evidence that this computer  
08:47 2 scheduling error was on purpose, did you?
- 08:47 3 A. No.
- 08:47 4 Q. And you are aware that, in fact, the RMS system did  
08:47 5 reinstate an annual battery change-out, aren't you?
- 08:47 6 A. Well, that's what it says.
- 08:47 7 Q. Well, let's look at another one of the documents you cite  
08:47 8 in your reliance document, 581.4.1.
- 08:47 9 This is providing definitions for hundreds and  
08:48 10 thousands of RMS-mandated maintenance tasks. This one is for  
08:48 11 Standard Preventive Maintenance Task 02, BOP control pod  
08:48 12 service. Do you see that?
- 08:48 13 A. Yes.
- 08:48 14 Q. And it indicates "change deadman AMF batteries."  
08:48 15 Do you see that?
- 08:48 16 A. Yes.
- 08:48 17 Q. Mr. Stevick, we started talking, I think yesterday  
08:48 18 afternoon, about the considerable experience you have had in  
08:48 19 looking at what's happened to pipes, buckling of pipes, failure  
08:48 20 of pipes.
- 08:48 21 Do you recall that, generally?
- 08:48 22 A. Yes.
- 08:48 23 Q. You have never worked for a BOP manufacturer, have you?
- 08:48 24 A. No, I have not.
- 08:48 25 Q. You don't have any experience operating a BOP, do you?

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08:48 1 A. No. I've assisted with shearing calculations and  
08:48 2 buckling.

08:48 3 Q. Okay. Never worked on the installation of a BOP?

08:49 4 A. No, just what you should close to make sure you don't  
08:49 5 buckle when you're going to shear.

08:49 6 Q. Understood. Never been asked to evaluate whether a BOP  
08:49 7 was suitable for application in a particular well, have you?

08:49 8 A. Not on a particular well, but on wells in general,  
08:49 9 shearing and making sure your free length is too short to have  
08:49 10 buckling when you have to shear.

08:49 11 Q. And you've never designed a BOP stack; correct?

08:49 12 A. No, I have not, but certainly many devices that hold  
08:49 13 pressures up to 27,000 psi.

08:49 14 Q. And you don't have any experience performing repair or  
08:49 15 maintenance on a BOP, do you?

08:49 16 A. No, I do not.

08:49 17 Q. Now, I think you said in your report that Transocean  
08:49 18 should periodically examine BOP components for corrosion, wear,  
08:49 19 and other flaws. Do you recall that?

08:49 20 A. Yes, and check the batteries every time, also.

08:49 21 Q. And you indicated in your report that Transocean should  
08:49 22 have periodically replaced components when necessary. Do you  
08:49 23 recall that?

08:49 24 A. Yes.

08:49 25 **MR. DOYEN:** Let's put up TREX-1195.223.1.

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08:50 1 **BY MR. DOYEN:**

08:50 2 **Q.** This is from the daily activity report, another one of

08:50 3 your reliance documents. Do you recall reviewing that?

08:50 4 **A.** No, but I'm sure I did.

08:50 5 **MR. DOYEN:** Well, let's zoom in on the highlighted

08:50 6 entries. Phil, if we could, 1195.223.2.

08:50 7 **BY MR. DOYEN:**

08:50 8 **Q.** So this is from the maintenance records, from the subsea

08:50 9 daily activity reports for the several days before this BOP was

08:50 10 splashed at Macondo.

08:50 11 You've heard that phrase before, being "splashed,"

08:50 12 haven't you?

08:50 13 **A.** I've used it.

08:50 14 **Q.** You understand that's when they put the BOP off the rig

08:50 15 down into the water and lower it into the well?

08:50 16 **A.** Yes.

08:50 17 **Q.** So it indicates that in the two days before this, the

08:50 18 subsea guys are replacing bad solenoids on the yellow pod. Do

08:50 19 we see that?

08:51 20 **A.** Yes, we do.

08:51 21 **Q.** And you understand that included, back in this case,

08:51 22 Solenoid 103Y; correct?

08:51 23 **A.** Right. And they installed one that was -- they installed

08:51 24 it improperly.

08:51 25 **Q.** They installed one that had a reverse-wired coil?

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08:51 1 A. Correct.

08:51 2 Q. "Activated the autoshear valve prior to separation in  
08:51 3 order to verify autoshear valve will function and close blind  
08:51 4 shears."

08:51 5 Do you see that?

08:51 6 A. Yes.

08:51 7 Q. "Change out the pod filters on both pods." Do you see  
08:51 8 that?

08:51 9 A. Yes.

08:51 10 Q. "Wiping down and inspecting all bonnets and ram blocks."  
08:51 11 Do you see that?

08:51 12 A. Yes.

08:51 13 Q. "Installing new ram packers, changed out upper and lower  
08:51 14 annular elements." Do you see that?

08:51 15 A. Yes.

08:51 16 Q. "Started changing 1/2-inch hoses on all failsafes on the  
08:51 17 LBOP," which I think we can see on the next line is the lower  
08:51 18 BOP. Do you see that?

08:51 19 A. Yes.

08:51 20 Q. "Installed new 1/2-inch hoses on all ST-locks."  
08:51 21 And then finally pressure testing the BOP. Do you  
08:52 22 see that?

08:52 23 A. Yes.

08:52 24 Q. And all of that is drawn -- I think that is page 224 of a  
08:52 25 225-page consolidated report of maintenance on the BOP going

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08:52 1 back to 2002. Do you recall that?

08:52 2 A. Yes.

08:52 3 Q. Your report doesn't discuss whether the same kind of  
08:52 4 maintenance we see here was done in all the previous rig moves;  
08:52 5 correct?

08:52 6 A. No, it doesn't.

08:52 7 Q. Now, you understand, don't you, that Transocean actually  
08:52 8 sends out a special maintenance crew to the rig between rig  
08:52 9 moves to assist with all maintenance and specifically with the  
08:52 10 maintenance on the BOP?

08:52 11 A. I would assume that's the case.

08:52 12 Q. You've seen -- you've seen testimony where this team is  
08:52 13 routinely or often referred to as the "SWAT team." You've seen  
08:52 14 that?

08:52 15 A. That sounds familiar.

08:52 16 **MR. DOYEN:** Let's put up TREN-3340.1.1.

08:52 17 **BY MR. DOYEN:**

08:53 18 Q. This is another one of your reliance documents, isn't it?

08:53 19 A. Yes.

08:53 20 Q. This is a subsea support team daily report -- they don't  
08:53 21 call themselves the SWAT team, apparently -- the subsea support  
08:53 22 team daily report. I think we see the date down below that,  
08:53 23 1/28/2010. Do you see that?

08:53 24 A. Yes.

08:53 25 Q. Indicating they've arrived on board the rig and they've

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08:53 1 reviewed the scope of work with Mr. Hay.

08:53 2 You're familiar with Mr. Hay, aren't you?

08:53 3 A. Yes.

08:53 4 Q. One of the subsea guys?

08:53 5 A. Yes.

08:53 6 Q. You don't know him personally, but you've seen his  
08:53 7 deposition?

08:53 8 A. Yes.

08:53 9 MR. DOYEN: Let's pull up TREN-3340.2.1.

08:53 10 BY MR. DOYEN:

08:53 11 Q. So this is indicating on the 30th of January, the subsea  
08:53 12 support team functions the blind shear ram and the super shears  
08:53 13 and functioned EDS Modes 1 and 2, both pods, separated the  
08:53 14 lower marine riser package from the BOP to fire the autoshear.

08:53 15 Do you see that?

08:53 16 A. Yes. They are actually going through all the steps, and  
08:54 17 because it is a support team, they would be familiar with the  
08:54 18 entire TO fleet. And most of that fleet has two shearing blind  
08:54 19 rams.

08:54 20 Q. The --

08:54 21 A. And they would know that this -- they should know that  
08:54 22 this configuration is a problem.

08:54 23 Q. Well, I think anybody that looked at it and saw the  
08:54 24 various permit applications would know that it had one blind  
08:54 25 shear ram. Correct?

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08:54 1 A. Exactly. And that's why I don't understand why the  
08:54 2 support team is not stepping up to bat here and saying, "How do  
08:54 3 we mitigate this problem?"

08:54 4 Q. And put in another blind shear ram?

08:54 5 A. Not necessarily. There's an intermediate step you can do,  
08:54 6 and that is, for deadman, make sure the CSR cuts first, which  
08:54 7 will center the pipe and make sure the blind shear ram will  
08:54 8 close without damaging the shear and packers.

08:54 9 Q. I understand you have a bunch of opinions on design.

08:54 10 A. Yeah. Now, this is design configuration. Yes.

08:54 11 Q. Focusing here on maintenance that was done. Okay.  
08:54 12 Something you also comment on in your report; correct?

08:54 13 A. Yes.

08:55 14 **MR. DOYEN:** Let's pull up TREN-3340.11.1.

08:55 15 **BY MR. DOYEN:**

08:55 16 Q. Now, on the 1st of February, we see the subsea support  
08:55 17 team reporting that they're cleaning, inspecting, and prepping  
08:55 18 the ram cavities, installing new rubber goods in the bonnets,  
08:55 19 removing the blind shear ram blocks, pulling the seal carriers,  
08:55 20 removing both lower and upper annulars to change the elements,  
08:55 21 cleaned and inspected the annular cavities.

08:55 22 Do you see all that?

08:55 23 A. Yes.

08:55 24 **MR. DOYEN:** Let's look at 3340.15.1.  
25



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08:55 1 **BY MR. DOYEN:**

08:55 2 **Q.** On the 2nd, the subsea support team is cleaning and

08:55 3 inspecting the annular cavities, installing the new seals,

08:55 4 installing the new seal carrier in the starboard blind shear

08:55 5 ram. Do you see that?

08:55 6 **A.** Yes.

08:55 7 **Q.** And finally, the last page of that document -- I've lost

08:56 8 my number -- 3340.22.1.

08:56 9 On the 6th of February, after a week of work, they

08:56 10 report the testing they're doing on the BOP; correct?

08:56 11 **A.** Yes.

08:56 12 **Q.** Now, you understand that all this work that we've been

08:56 13 looking at here is done pursuant to a schedule that's set out

08:56 14 in advance; right?

08:56 15 **A.** I would assume.

08:56 16 **MR. DOYEN:** Well, let's look at TREX-5101 -- I'm

08:56 17 sorry, I said that wrong. 5102.3.2, I believe.

08:56 18 **BY MR. DOYEN:**

08:56 19 **Q.** This is another document in your reliance documents. Do

08:56 20 you recall that?

08:56 21 **A.** It looks familiar.

08:56 22 **Q.** And here in this particular case, this particular blowout,

08:56 23 is listing the tasks we have to be performed on the blowout

08:57 24 preventer: function the well test, dry-fire EDS-1 and 2.

08:57 25 Do you see all that?

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08:57 1 A. Yes.

08:57 2 Q. And then it's tracking the progress of what's been  
08:57 3 completed and not completed. Do you see that?

08:57 4 A. Yes.

08:57 5 Q. And let's just look briefly -- this, I think, is work on  
08:57 6 the BOP, which is the lower segment.

08:57 7 **MR. DOYEN:** Let's look at 5102.3.3.

08:57 8 **BY MR. DOYEN:**

08:57 9 Q. And here's the work to be performed on the lower marine  
08:57 10 riser package; correct?

08:57 11 A. Yes.

08:57 12 Q. And many of us in the world would think of the BOP as both  
08:57 13 units, right, what's formally called the BOP, those stacks at  
08:57 14 the bottom and then the lower marine riser package which has  
08:57 15 the annular elements; correct?

08:57 16 A. Correct.

08:57 17 Q. But in a technical parlance, those get separated. The  
08:57 18 annulars are in the lower marine riser package and the other  
08:57 19 BOP elements are in the BOP; correct?

08:57 20 A. Yes. It's used both ways.

08:57 21 Q. Now, you understand that the maintenance schedule, the  
08:57 22 tasks that are to be performed when the rig -- I'm sorry, let  
08:58 23 me step back for a second.

08:58 24 You understand that it is common in the industry to  
08:58 25 do most of the BOP maintenance when the BOP is up on the rig

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08:58 1 and not when it's down on the bottom of the ocean; correct?

08:58 2 A. Of course.

08:58 3 Q. And you understand, as we just saw a minute ago, that  
08:58 4 there's a schedule for all the work that's going to be  
08:58 5 performed over a week on the BOP that's set out in advance;  
08:58 6 correct?

08:58 7 A. Yes, but there's no evaluation of whether it's going to  
08:58 8 work.

08:58 9 Q. I understand, sir. I'm going again to your design and  
08:58 10 configurations. I'm just looking at the maintenance that's  
08:58 11 done.

08:58 12 You also understand, don't you, that this maintenance  
08:58 13 schedule that's laid out here in detail and that is reported in  
08:58 14 detail in the records we saw is approved by BP in advance.  
08:58 15 Correct?

08:58 16 A. I would assume that's the case.

08:58 17 **MR. DOYEN:** Well, let's look at TREX-3338.1.1.

08:58 18 **BY MR. DOYEN:**

08:58 19 Q. Another one of your reliance documents. Do you recall  
08:58 20 this?

08:58 21 A. Yes.

08:58 22 Q. Just internal e-mails among some of the people that we  
08:59 23 know in the case: Mr. Guide, Mr. Cocalles, Mr. Duocet. I'm  
08:59 24 probably slaughtering the pronunciation of that.

08:59 25 They've then forwarded that plan, the schedule that

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08:59 1 we talked about before. This is Transocean's schedule, and  
08:59 2 they're talking about does this work for us, do we want to do  
08:59 3 this, do we want to make any changes.

08:59 4 Do you understand that happens routinely, sent to BP,  
08:59 5 they approve the maintenance that's been done before the BOP is  
08:59 6 splashed? Correct?

08:59 7 **MS. KARIS:** Object to foundation.

08:59 8 **THE COURT:** Sustained.

08:59 9 **BY MR. DOYEN:**

08:59 10 **Q.** Let's look at --

08:59 11 **MR. DOYEN:** I'm about done.

08:59 12 **BY MR. DOYEN:**

08:59 13 **Q.** A document you put up -- I shouldn't say you put up. I  
08:59 14 think Mr. Williamson put this up, 611 -- actually, before we go  
08:59 15 do that. Let's look at one thing in your report, 61123.14.1.

09:00 16 This is, again, your amended report from  
09:00 17 January 2012. You state: "Furthermore, for BOP designs, BP  
09:00 18 decides what the BOP stack configuration will be and instructs  
09:00 19 its drilling contractors, including Transocean, regarding what  
09:00 20 types of rams should be used and where the rams will be located  
09:00 21 in the BOP."

09:00 22 Did I read that correctly?

09:00 23 **A.** Yes. And that's my experience in the oil industry, the  
09:00 24 major does direct how the construction's going to be.

09:00 25 **Q.** Okay. And then the next sentence: "Here, BP specified

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09:00 1 the configuration of the BOP in its original contract with  
09:00 2 Transocean and re-specified the configuration in September 2009  
09:00 3 in a contract amendment."

09:00 4 Did I read that correctly?

09:00 5 A. Yes.

09:00 6 Q. Again, consistent with your experience in the industry?

09:00 7 A. Yes.

09:00 8 Q. Now, let me go to the document that we saw up on the  
09:00 9 screen yesterday, that is, 4114.1.1.

09:01 10 You understand this is a memo we were looking at on  
09:01 11 the design philosophy relating to, among other things, the  
09:01 12 emergency disconnect systems; correct?

09:01 13 A. Yes.

09:01 14 Q. And this Vastar Resources is a predecessor for BP;  
09:01 15 correct?

09:01 16 A. Yes.

09:01 17 Q. And you understand this document is signed by a BP  
09:01 18 representative, a Vastar representative, as well as a legacy  
09:01 19 company of Transocean's; correct?

09:01 20 A. Yes.

09:01 21 MR. DOYEN: I'm trying to find the language  
09:01 22 here . . .

09:01 23 If I could have one minute, Your Honor. I'm  
09:01 24 sorry.

09:02 25 Is this 2.1.1? There we go. Thank you. I'm

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09:02 1 sorry. I called that up incorrectly. The same document.

09:02 2 **BY MR. DOYEN:**

09:02 3 **Q.** I think you looked at the language and highlighted the  
09:02 4 language just before the top sentence that I highlighted there,  
09:02 5 and you read that out loud yesterday.

09:02 6 **A.** Yes.

09:02 7 **Q.** And we had this up on the board, but we didn't read out  
09:02 8 the next sentence, which I've highlighted there, where the  
09:02 9 announced philosophy is stated, "The overall reliability  
09:02 10 philosophy of the deadman system" -- that's DMS; correct?

09:02 11 **A.** Yes.

09:02 12 **Q.** -- "is to provide reliability through simplicity. This  
09:02 13 means that the fewer decisions the system has to make, the more  
09:02 14 reliable it will be in executing its preprogrammed logic."

09:02 15 Do you see that?

09:02 16 **A.** Yes, but I --

09:02 17 **Q.** Did I read that correctly?

09:02 18 **A.** Yes. However, a proper design -- simplicity is not a --  
09:02 19 should not be a governing concept. You have to determine  
09:03 20 whether it will work. And what's shown here is outside of the  
09:03 21 standard of care in engineering.

09:03 22 **Q.** I understand, sir. You disagree with this, don't you?

09:03 23 **A.** Yes, I do.

09:03 24 **Q.** But people back at the time looked at the very issue  
09:03 25 you're talking about, and this is the decision they made and

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09:03 1 wrote down; correct?

09:03 2 A. It's an absolutely horrible decision.

09:03 3 Q. Okay.

09:03 4 A. It's not supported by any text or philosophy that I've

09:03 5 ever seen in mechanical engineering design, in any textbook

09:03 6 when I taught or was taught to. It's, as I said, well outside

09:03 7 the standard of care in engineering.

09:03 8 Q. And you understand BP looked at this at the time and came

09:03 9 to this conclusion in 2001.

09:03 10 A. I understand.

09:03 11 Q. And pursuant to the philosophy that we get reliability

09:03 12 from simplicity, they decided that the AMF/deadman system will

09:03 13 close only the shearing blind rams; correct?

09:03 14 A. Yes. And that completely flies in the face of their own

09:03 15 well control manuals, which state that that probably won't

09:04 16 work.

09:04 17 Q. And you agree, don't you, that once this is programmed

09:04 18 this way -- I'm losing my stack -- once the program has set and

09:04 19 the crew's working with that programmed system, the crew itself

09:04 20 can't change how the AMF functions; correct?

09:04 21 A. I agree.

09:04 22 MR. DOYEN: Your Honor, I would pass the witness.

09:04 23 THE COURT: All right. BP?

09:04 24 MS. KARIS: Yes, Your Honor.

09:05 25 Your Honor, may I proceed?

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09:05 1 THE COURT: Yes.

09:05 2 MS. KARIS: Thank you.

09:05 3 CROSS-EXAMINATION

09:05 4 BY MS. KARIS:

09:05 5 Q. Good morning, Dr. Stevick. Hariklia Karis on behalf of  
09:05 6 BP. And for the record, I need to state that I have you on  
09:06 7 cross-examination.

09:06 8 A. Good morning.

09:06 9 Q. I want to follow up on some of the testimony that you've  
09:06 10 given from yesterday and today.

09:06 11 But I want to start by asking you, in connection with  
09:06 12 all of your opinions regarding the BOP -- whether it's  
09:06 13 buckling, whether it's erosion, whatever the analysis is --  
09:06 14 would you agree with me that timing of activation of a BOP  
09:06 15 matters?

09:06 16 A. Yes.

09:06 17 Q. Okay. And would you agree that the response time for  
09:06 18 activating a BOP affects the ability of that BOP to operate and  
09:06 19 serve its purpose?

09:06 20 A. Yes. In fact, in this case, if you had operated it  
09:06 21 timely, you could have shut the well with no problem --

09:06 22 Q. Exactly.

09:06 23 A. -- and properly.

09:06 24 Q. And so if a well control events -- or if a well control  
09:06 25 event starts slowly -- well, let me back up.



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09:06 1 You understand from your work in this case, and from  
09:06 2 other experience that you have, that well control events  
09:07 3 generally start out slowly and then, of course, increase with  
09:07 4 time.

09:07 5 A. Yes, they accelerate.

09:07 6 Q. Okay. And you agree that waiting too long results in  
09:07 7 having increased flow rates that the BOP needs to contend with.

09:07 8 A. Yes. And damaging of equipment and erosion, yes.

09:07 9 Q. Now, all of the opinions that you've given in your report  
09:07 10 and over the last couple of days, you would agree with me that  
09:07 11 none of the issues you've identified would have prevented  
09:07 12 Transocean's crew from responding to the signs of a kick and  
09:07 13 shutting in the well and -- with the BOP prior to 9:41 on  
09:07 14 April 20th, 2010?

09:07 15 MR. DOYEN: Your Honor, I do object to that. The  
09:07 16 witness is not a well control expert, hasn't been qualified as  
09:07 17 such, hasn't talked about those issues in his report. I think  
09:07 18 he's limited to talking about the equipment and what happened  
09:08 19 to it, but not what the crew should have done.

09:08 20 MS. KARIS: Your Honor, if I may respond. Both in  
09:08 21 his report and in his deposition, Dr. Stevick opined that there  
09:08 22 was buckling and other issues --

09:08 23 THE COURT: I'll allow it. I'll allow the witness to  
09:08 24 answer that.

09:08 25 MS. KARIS: Thank you.

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09:08 1 **BY MS. KARIS:**

09:08 2 **Q.** Would you like me to restate --

09:08 3 **A.** Yes.

09:08 4 **Q.** -- the question?

09:08 5 **A.** I'm sorry.

09:08 6 **Q.** Sure.

09:08 7 **A.** Please.

09:08 8 **Q.** Would you agree that none of the issues you've identified

09:08 9 in your report would have prevented Transocean's crew from

09:08 10 responding to the signs of a kick and shutting in the well with

09:08 11 the BOP prior to 9:41 on April 20th, 2010?

09:08 12 **A.** That's correct. There's no reason you could -- in fact,

09:08 13 the signs were obvious. They shut the pumps off at 9:30, and

09:08 14 it was obvious well before that that there was a problem.

09:08 15 And it doesn't take a well control expert -- you see

09:08 16 the hook load bouncing, inflow. There's no question this was a

09:08 17 well that was in communication with the reservoir.

09:08 18 **Q.** And would you also agree that if Transocean's crew had

09:08 19 activated EDS-2 prior to the first explosion, the BOP would

09:09 20 have successfully sealed the well?

09:09 21 **A.** Yes, it would have.

09:09 22 **Q.** Now, you reached certain conclusions in this case with

09:09 23 respect to the activation of the deadman that we've discussed

09:09 24 over the last couple of days. And I want to follow up, and I'm

09:09 25 going to try not to be repetitive.

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09:09 1           You agree that the AMF/deadman failed to activate the  
09:09 2 blind shear ram due to a low charge of the 27-volt battery in  
09:09 3 the blue pod; correct?

09:09 4   A.   In the blue pod, yes.

09:09 5   Q.   And you agree that had that blue pod battery been replaced  
09:09 6 or the yellow pod solenoid been properly wired, the AMF would  
09:09 7 have functioned.

09:09 8   A.   Absolutely. And given the criticality of the batteries,  
09:09 9 they should have been changed every splash.

09:10 10   Q.   And you agree that if the drill pipe was centered at the  
09:10 11 time of the incident and didn't become centered until later,  
09:10 12 then activating the blind shear ram probably would have  
09:10 13 completely sheared the drill pipe and sealed the well,  
09:10 14 preventing the blowout?

09:10 15   A.   Yes. And even if late, if you had closed all your annular  
09:10 16 devices, closed the CSR first, you would have no problem  
09:10 17 shearing that pipe.

09:10 18   Q.   Now, you don't know precisely when AMF conditions were  
09:10 19 satisfied; correct?

09:10 20   A.   Correct.

09:10 21   Q.   And you don't know when the AMF conditions -- you don't  
09:10 22 know if -- when the AMF conditions were satisfied, whether the  
09:10 23 pipe was off-center precisely at that time; correct?

09:10 24   A.   Well, it was off-center right away. So it was  
09:10 25 off-center --

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09:10 1 Q. Okay.

09:10 2 A. -- but it just didn't fire. The blind shear ram was not

09:10 3 activated until -- not 48 hours, but 40 hours later, on the

09:11 4 morning of the 22nd, by autoshear.

09:11 5 Q. Would you agree that it's entirely possible that at the

09:11 6 time the AMF conditions were satisfied, the drill pipe could

09:11 7 have been sufficiently centered such that the blind shear ram

09:11 8 would have been capable of cutting the pipe and sealing the

09:11 9 well?

09:11 10 A. At the time the AMF criteria was satisfied?

09:11 11 Q. Yes.

09:11 12 A. No.

09:11 13 Q. You agree with that or you don't agree with that?

09:11 14 A. Well, I'd have to go through your sentence very carefully.

09:11 15 But what I'm saying is that when the criteria for AMF

09:11 16 was satisfied, the pipe was already buckled, almost certainly.

09:11 17 Q. Okay. Let's look at your deposition.

09:11 18 A. Sure.

09:11 19 MS. KARIS: Page 483, lines 4 to 13, please.

09:11 20 BY MS. KARIS:

09:11 21 Q. You gave a deposition in this case; correct?

09:11 22 A. Yes.

09:11 23 Q. And were you asked the following question:

09:11 24 "QUESTION: So it's entirely possible that at the

09:11 25 time the AMF conditions were satisfied, the drill pipe

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09:11 1 could have been sufficiently centered such that the blind  
09:12 2 shear ram would have been capable of cutting the pipe and  
09:12 3 sealing the well?  
09:12 4 "ANSWER: Possible. It seems unlikely, but  
09:12 5 possible."  
09:12 6 A. Well --  
09:12 7 Q. And then you were asked:  
09:12 8 "QUESTION: You can't rule it out?  
09:12 9 And you responded:  
09:12 10 "ANSWER: Can't rule it out."  
09:12 11 Correct?  
09:12 12 A. Correct. Anything's possible; it's just extremely  
09:12 13 unlikely.  
09:12 14 Q. You just couldn't rule it out, to use your words; correct?  
09:12 15 A. Not absolutely.  
09:12 16 Q. Okay. Now, you reached a conclusion as to the timing for  
09:12 17 when the first explosion likely occurred; correct?  
09:12 18 A. Yes.  
09:12 19 Q. Okay. And after looking at the data in this case, your  
09:12 20 conclusion was that the first explosion likely occurred around  
09:12 21 9:49 p.m.; correct?  
09:12 22 A. Right.  
09:12 23 Q. And you believe that the drill pipe buckled or bowed  
09:13 24 closer to 2150; correct, that is, after the explosion?  
09:13 25 A. We can't say exactly when, but I think it's buckled pretty

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09:13 1 early at the time of the VBRs closing, or if it's later, it's  
09:13 2 very short -- a very short time later.

09:13 3 Q. Okay. And that's precisely my point. You can't say  
09:13 4 exactly when. It could have been when the VBRs closed, but  
09:13 5 sometime very close after the VBRs closed.

09:13 6 A. Or while they're closing --

09:13 7 Q. Okay.

09:13 8 A. -- which is more likely, given the internal pressure  
09:13 9 buckling mechanism.

09:13 10 Q. All right. And, of course, in order to have any chance of  
09:13 11 sealing in the well once the explosion occurs, if the pipe  
09:13 12 isn't off-center, then you need your AMF/deadman to work;  
09:13 13 correct?

09:13 14 A. Yes.

09:13 15 Q. All right. Now, you were asked some questions by counsel  
09:13 16 for Transocean regarding the batteries, and I want to follow up  
09:13 17 on that very briefly, because there's been a lot of testimony  
09:14 18 in this case about the batteries.

09:14 19 But you're aware that multiple other experts have  
09:14 20 looked at this battery issue -- Dr. Davis on behalf of the  
09:14 21 United States, Mr. Zatarain on behalf of BP, and Mr. Coronado  
09:14 22 on behalf of Cameron -- correct?

09:14 23 A. Yes.

09:14 24 Q. And yourself.

09:14 25 A. Yes.

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09:14 1 Q. And all of you reached the conclusion that the batteries  
09:14 2 in the blue pod were not capable of working -- the 27-volt  
09:14 3 battery in the blue pod was not capable of working to activate  
09:14 4 the AMF/deadman on the evening of April 20th; correct?

09:14 5 A. Correct, we all agree on that issue. There's no question  
09:14 6 those batteries were dead and could not activate the AMF.

09:14 7 Q. The only one that disagrees is Mr. Childs, Transocean's  
09:14 8 expert; correct?

09:14 9 A. Correct. I think he's mistaken.

09:14 10 Q. Okay.

09:14 11 MS. KARIS: If we can pull up 3792.1.1, please.

09:15 12 BY MS. KARIS:

09:15 13 Q. We've talked a lot about the life of the batteries, and I  
09:15 14 don't want to go into all of that again, but are you familiar  
09:15 15 with this document, which is from Transocean's subsea  
09:15 16 superintendent to James Kent, a Transocean employee, setting  
09:15 17 out what the dates for those batteries were?

09:15 18 A. This is one of the documents I relied on to conclude that  
09:15 19 the blue pod batteries were changed in November of '07.

09:15 20 Q. Okay. And your conclusion is based on the fact that --

09:15 21 MS. KARIS: If we can pull out No. 3 there, which is  
09:15 22 the pod at issue.

09:15 23 BY MS. KARIS:

09:15 24 Q. -- those batteries had been replaced by Transocean most  
09:15 25 recently November 4th of 2007; correct?

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09:15 1 A. Correct.

09:15 2 Q. And that is what --

09:15 3 THE COURT: Wait. Refresh my recollection. No. 3,  
09:15 4 again, that's the blue pod; right?

09:15 5 MS. KARIS: Correct, Your Honor.

09:15 6 THE COURT: Okay.

09:15 7 THE WITNESS: Yes.

09:15 8 MS. KARIS: No. 1 is the spare; No. 2 is the yellow  
09:15 9 pod.

09:15 10 THE COURT: Okay.

09:15 11 BY MS. KARIS:

09:15 12 Q. So Pod No. 3, which is the one that we're talking about  
09:16 13 the batteries not functioning, the most recent time that  
09:16 14 Transocean had replaced those batteries was November of 2007;  
09:16 15 correct?

09:16 16 A. Yes.

09:16 17 Q. And that is well in excess of Cameron's recommended  
09:16 18 practice for when batteries should be changed out; correct?

09:16 19 A. Yes. And that's what I stated in my report.

09:16 20 Q. And you agree that the AMF/deadman sequence would have  
09:16 21 functioned on April 20th if the blue pod batteries had been  
09:16 22 replaced per Cameron's recommended schedule for battery  
09:16 23 replacement; correct?

09:16 24 A. Yes.

09:16 25 Q. Let's talk briefly about the solenoid.



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09:16 1 The miswired solenoid was in the yellow pod; correct?

09:16 2 A. Yes.

09:16 3 Q. And to be clear here, we have a blue pod and a yellow pod,  
09:16 4 and those are supposed to be redundant systems to activate the  
09:17 5 AMF/deadman.

09:17 6 A. Yes.

09:17 7 Q. So if one doesn't work, you can call on the other one; and  
09:17 8 assuming that one works, then you can activate your  
09:17 9 AMF/deadman. Correct?

09:17 10 A. Correct.

09:17 11 Q. But the problem here was the blue pod had batteries that  
09:17 12 didn't work and the yellow pod had a solenoid that had a --  
09:17 13 that was miswired, 103Y; correct?

09:17 14 A. Yes.

09:17 15 Q. And given that that solenoid was miswired, that eliminated  
09:17 16 the possibility that the redundant system in the yellow pod  
09:17 17 could possibly activate to kick in the deadman sequence;  
09:17 18 correct?

09:17 19 A. Absolutely. With a hydraulic system in a severe service  
09:17 20 like this, it's always going to have some contamination.  
09:17 21 Unless you have full pulling power, you're not going to be able  
09:17 22 to activate that valve.

09:17 23 **THE COURT:** I want to make sure I understand what you  
09:17 24 said about the solenoid being miswired.

09:17 25 Did you say earlier and just now did I

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09:18 1 understand you to say that in your opinion, it could function  
09:18 2 somewhat at some times, but you don't believe it functioned  
09:18 3 fully, properly in this instance?

09:18 4 **THE WITNESS:** That's correct, Your Honor.

09:18 5 **THE COURT:** Because it didn't have sufficient power?

09:18 6 **THE WITNESS:** Exactly.

09:18 7 **THE COURT:** Because of the miswiring?

09:18 8 **THE WITNESS:** Right. Yes, yes. Because they would  
09:18 9 oppose each other -- not oppose each other 100 percent, because  
09:18 10 we have this pulse-width modulation, and one coil is pulsing  
09:18 11 and the other coil is pulsing by two different controllers, so  
09:18 12 the pulsing won't line up exactly. So it substantially cancels  
09:18 13 itself, but not 100 percent.

09:18 14 **THE COURT:** Okay. Thank you.

09:18 15 **MS. KARIS:** Thank you, Your Honor. That eliminates a  
09:18 16 couple questions.

09:18 17 **THE COURT:** Okay.

09:18 18 **MS. KARIS:** If we can pull up 61 --

09:18 19 **THE COURT:** I'll send you a bill.

09:18 20 **MS. KARIS:** At this point, no problem.

09:18 21 **THE COURT:** At the billing rate in this courtroom,  
09:18 22 that's probably worth a few hundred dollars, you know.

09:19 23 **MR. DOYEN:** It would be in a long line.

09:19 24 **MS. KARIS:** Sadly, I think our client concurs.

09:19 25 Okay. If we can pull up 61123.27.3, please.

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09:19 1 **BY MS. KARIS:**

09:19 2 **Q.** And just to be clear, Mr. Doyen from Transocean showed you  
09:19 3 a line from your report in which you were talking about the DNV  
09:19 4 testing. And I have put up here a page from your expert report  
09:19 5 that you've tendered in this case.

09:19 6 And just to be clear, it is your opinion that  
09:19 7 post-incident forensic testing by the DNV showed -- also showed  
09:19 8 that one of two coils from the yellow control pod Solenoid 103  
09:19 9 had been incorrectly wired, and 103Y failed to activate either  
09:19 10 yellow control pod SEM during bench testing; correct?

09:19 11 **A.** Yes.

09:19 12 **Q.** And it's also your opinion that, "As a result of 103Y  
09:19 13 being incorrectly wired, the two coils had opposite polarities  
09:20 14 and the electromagnetic fields generated by the two coils would  
09:20 15 largely cancel each other out and could prevent 103Y actuating  
09:20 16 BSR in response to the AMF/deadman circuit in the yellow pod."  
09:20 17 Correct?

09:20 18 **A.** Correct.

09:20 19 **Q.** And the canceling out concept is just what you explained  
09:20 20 to His Honor; correct?

09:20 21 **A.** That's correct.

09:20 22 **Q.** So to eliminate any confusion here, you're not suggesting,  
09:20 23 nor did you ever in your report suggest, that the miswired  
09:20 24 solenoid would have somehow allowed this AMF/deadman to work;  
09:20 25 correct?

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09:20 1 A. Correct.

09:20 2 Q. Now, you reviewed Mr. Childs', Transocean's expert, report  
09:20 3 regarding the solenoid; correct?

09:20 4 A. Yes.

09:20 5 Q. And you saw where Mr. Childs opines that he relies on  
09:21 6 testing, the testing that was conducted by the DNV, to suggest  
09:21 7 that that testing would support his view that that solenoid  
09:21 8 could actually activate the deadman. You saw that testimony in  
09:21 9 his report; correct?

09:21 10 A. Yes.

09:21 11 Q. And just to be clear, you disagreed with Dr. Childs'  
09:21 12 opinions; correct?

09:21 13 A. I do. I've tested many solenoids and it's not uncommon to  
09:21 14 break a solenoid free in your testing and then all of a sudden  
09:21 15 you've fixed it, it now works, and that's -- the evidence is  
09:21 16 that it didn't have enough pulling power for its service.

09:21 17 MS. KARIS: If we can pull up 61124.28.2.

09:21 18 BY MS. KARIS:

09:21 19 Q. And this is from your report whether you analyzed  
09:21 20 Dr. Childs' -- or Mr. Childs' opinions.

09:21 21 MS. KARIS: And it we can call out the bottom.

09:21 22 BY MS. KARIS:

09:21 23 Q. "Childs does not address this issue, which contradicts his  
09:21 24 argument. The proper interpretation of the DNV test data in  
09:22 25 light of this issue is that an incorrectly wired solenoid is

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09:22 1 unlikely to properly function when both SEMs are activated, as  
09:22 2 happens in practice."

09:22 3 That's your opinion in this case; correct?

09:22 4 A. Correct.

09:22 5 Q. All right. We're done with the solenoid.

09:22 6 Now, you were asked about some of your opinions in  
09:22 7 this case regarding buckling and the timing of that buckling.  
09:22 8 We're not going to go back over them. We'll just cover them a  
09:22 9 little bit.

09:22 10 Just to be clear, you initially calculated some  
09:22 11 forces on the drill string that would be required in order to  
09:22 12 buckle the string; correct?

09:22 13 A. Yes, I calculated forces due to flow.

09:22 14 Q. And you attached those to your report as Appendix C  
09:22 15 initially; correct?

09:22 16 A. It could be. I don't remember the appendix.

09:23 17 Q. And do you recall that those were actually part of the  
09:23 18 materials and the opinions that you withdrew in this case?

09:23 19 A. I believe that's the case.

09:23 20 Q. And so you have not submitted to the Court, as a result of  
09:23 21 withdrawing some of your opinions, your analyses regarding what  
09:23 22 forces were required for the drill string to buckle; correct?

09:23 23 A. Well, I have not submitted them to the Court, but you  
09:23 24 could come to the exact conclusions just on looking at the  
09:23 25 physical evidence. You do not need those calculations. In

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09:23 1 fact, it's more a logical deduction.

09:23 2 The numbers are so simple, you have a 6,000-psi

09:23 3 pressure in the drill pipe, you've got an area of 18 square

09:23 4 inches. That's 108 kips. It's ready to buckle right off the

09:23 5 bat.

09:23 6 Q. Okay. And we're --

09:23 7 A. It's not complicated.

09:23 8 Q. I'm sorry. We're going to get there, but I just want to

09:23 9 be clear. Whatever opinions you have, it's just based on what

09:23 10 you just identified as the physical evidence; correct?

09:24 11 A. Yes, and logical deduction with very simple numbers you

09:24 12 can do in your head.

09:24 13 Q. But whatever numbers you did in your head, to the extent

09:24 14 you did any numbers or calculations or analyses and attached

09:24 15 those to Appendix C for those forces, you've withdrawn those

09:24 16 opinions from this case; correct?

09:24 17 A. I guess they were withdrawn, yes.

09:24 18 Q. Okay. Now, you believe that the blind shear ram did close

09:24 19 at some point in time; correct?

09:24 20 A. Yes.

09:24 21 Q. All right. And you believe that that blind shear ram

09:24 22 closed when the autoshear pin was cut; correct?

09:24 23 A. Yes.

09:24 24 Q. And that would have been on April 22nd, about 7:30 in the

09:25 25 morning; correct?

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09:25 1 A. April 22nd, yes.

09:25 2 Q. Yes. And you believe that the drill pipe was still  
09:25 3 off-center at the time that the blind shear ram was activated  
09:25 4 on April 22nd through the autoshear?

09:25 5 A. No question, yes.

09:25 6 Q. Okay. Now, Transocean's expert, Dr. Childs, testified  
09:25 7 that in his opinion, it's not possible for the drill pipe to  
09:25 8 have been off-center on April 22nd. Are you aware of that  
09:25 9 opinion?

09:25 10 A. Yes.

09:25 11 Q. Okay. And do you agree with that opinion?

09:25 12 A. No. I've reviewed the calculations that he's basing his  
09:25 13 opinions on, and they don't include the fact that when you  
09:25 14 buckle a column or pipe in this case, that once it's buckled,  
09:25 15 it takes a third to less than half to hold it in that position.  
09:25 16 So you don't need very much flow up that drill pipe to keep it  
09:25 17 buckled.

09:25 18 Q. And so to the extent there was any suggestion by the chart  
09:26 19 that we saw up there by Mr. Doyen that you agree with  
09:26 20 Mr. Childs' analysis and calculations regarding the buckling of  
09:26 21 that off-center pipe, you disagree with him regarding what the  
09:26 22 condition of that pipe was on April 22nd, when the blind shear  
09:26 23 ram activated; correct?

09:26 24 A. Yes. And I've reviewed Dr. Garrett's calculations very --  
09:26 25 in much detail.

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09:27 1 Q. I want to talk to you about some of your opinions  
09:27 2 regarding the suitability of this BOP for the Macondo well. I  
09:27 3 know you haven't spoken much about your opinions regarding best  
09:27 4 and safest available technology, but those opinions still are  
09:27 5 in your report that you've tendered to the Court. So I'll try  
09:27 6 and walk through them very briefly, because there's been a lot  
09:27 7 of testimony on them, but you've also offered some opinions in  
09:27 8 this case.

09:27 9 A. Okay.

09:27 10 Q. You would agree with me that there's a federal regulation  
09:27 11 that speaks to the issue of best available and safest  
09:27 12 technology; correct?

09:27 13 A. Yes, and it's not substantially different than the codes,  
09:27 14 standards, and regulations I've dealt with in California,  
09:27 15 Alaska. In fact, some of them say "best available technology."  
09:27 16 So it's very similar to other codes and standards.

09:27 17 Q. Okay. And we're going to get to that, but let's see if --  
09:28 18 before we get there, you would agree that prior to this case,  
09:28 19 you've never been asked to evaluate whether a particular BOP  
09:28 20 was suitable for an application for drilling at a particular  
09:28 21 well; correct?

09:28 22 A. Not personally, but I've assisted others in doing just  
09:28 23 that, going through the shearing and the buckling to make sure  
09:28 24 they don't have a free length that's going to be off-center and  
09:28 25 that they could still shear the pipe. So in a sense, yes, I



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09:28 1 have.

09:28 2 Q. All right. Well, you would agree with me that you,  
09:28 3 personally, have never been asked to evaluate whether a  
09:28 4 particular BOP, either one that was used by Chevron when you  
09:28 5 were working there or anywhere in the field, was suitable for  
09:28 6 the application for a particular well; correct?

09:28 7 A. Correct. I've assisted others in doing that as a  
09:28 8 consultant.

09:28 9 Q. Okay. And with respect to BAST, that is, best available  
09:28 10 and safest technology, which is found in the regulations, you  
09:29 11 have never reviewed those regulations before your work in this  
09:29 12 case?

09:29 13 A. Not those specific regulations, but many regulations that  
09:29 14 say the exact same thing; in other words, from everything from  
09:29 15 piping to cranes to underground gasoline storage tanks to the  
09:29 16 Alaska pipeline. In fact, if you look in any textbook on  
09:29 17 mechanical engineering design, like the one I used when I  
09:29 18 taught, or the one that I used when I went to college, and I  
09:29 19 referenced in my report, they actually start by going through  
09:29 20 and telling you, you have to consider codes and standards.

09:29 21 Q. Okay.

09:29 22 A. Not a legal interpretation, but the engineering  
09:29 23 interpretation.

09:29 24 Q. In this case, however, the regulations that you cited in  
09:29 25 your report as applying to the BOP and its technology are not

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09:29 1 any of those other regulations dealing with pipelines or  
09:30 2 anything else, you cited the MMS' regulations found at  
09:30 3 30 CFR 250.107, which deals specifically with BOPs; correct?  
09:30 4 A. Correct, because those are the specific codes in this  
09:30 5 case. What I like about them is that they actually describe  
09:30 6 the engineering process.  
09:30 7 Q. Okay.  
09:30 8 A. Engineering is the application of science, considering  
09:30 9 economics, to provide a product that serves man.  
09:30 10 Q. Okay.  
09:30 11 A. In fact, when you look in the front of the design book,  
09:30 12 that's exactly what it tells you, consider the economics --  
09:30 13 there's always a section on economics. There's always a  
09:30 14 section on codes and standards, make sure you use them,  
09:30 15 calculate the safety factor multiple ways, and make sure you  
09:30 16 have a safe product.  
09:30 17 Q. Okay. And with respect to the regulation that you cited,  
09:30 18 you've never applied that, that specific regulation that speaks  
09:30 19 to best available and safest technology, to any offshore  
09:31 20 drilling environment for a BOP. That specific regulation is  
09:31 21 the one I'm focusing on.  
09:31 22 A. Not that specific one --  
09:31 23 Q. Okay.  
09:31 24 A. -- but regulations just like it and it just describes the  
09:31 25 engineering process, just like the other regulations do.

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09:31 1 Q. You're aware that several witnesses from Minerals  
09:31 2 Management Service, the MMS, the regulatory agency that applies  
09:31 3 those regulations, were deposed in this case; correct?  
09:31 4 A. Yes.  
09:31 5 Q. And you didn't bother to read a single one of their  
09:31 6 depositions to see how the MMS applies the regulation that you  
09:31 7 cited and have never previously worked with; correct?  
09:31 8 A. I have read Mr. Trocquet, who was the director of MMS in  
09:31 9 Louisiana.  
09:31 10 Q. Okay.  
09:31 11 A. And he stated that the regulation means the plain English  
09:31 12 wording that's right there.  
09:31 13 Q. Did you review that deposition after you gave your  
09:31 14 deposition testimony in this case?  
09:32 15 A. I don't recall.  
09:32 16 Q. All right.  
09:32 17 MS. KARIS: If we can pull up your deposition,  
09:32 18 page 59, line 11 to 14.  
09:32 19 BY MS. KARIS:  
09:32 20 Q. Were you asked the following question: "Did you review  
09:32 21 any of the depositions of the MMS employees who were deposed in  
09:32 22 connection with this case?"  
09:32 23 And did you give the following answer: "No"?  
09:32 24 A. Correct. So obviously I did read it after. So now I know  
09:32 25 when I read it, yes.

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09:32 1 Q. Okay. And you would agree with me that you have never had  
09:32 2 any responsibility with any of your prior employers for  
09:32 3 determining regulatory compliance with MMS' BOP requirements;  
09:32 4 correct?

09:32 5 A. Certainly I've participated in -- it wasn't any job to say  
09:32 6 whether we met a legal criteria. However, as an engineer,  
09:32 7 you're always looking at the codes and helping those who do  
09:32 8 determine that.

09:32 9 Q. Okay.

09:32 10 A. Whether we meet the plain English wording of a code or  
09:33 11 standard.

09:33 12 Q. We can pull up your deposition at page 59, line 15 to 19,  
09:33 13 please.

09:33 14 Were you asked the following question at your  
09:33 15 deposition: "Have you ever had any responsibility with any of  
09:33 16 your prior employers for determining regulatory compliance with  
09:33 17 MMS BOP requirements?"

09:33 18 And did you give the following answer: "No, I've  
09:33 19 not"?

09:33 20 A. Correct. It's always the job of the company lawyers to do  
09:33 21 that.

09:33 22 Q. Okay.

09:33 23 A. But they're always assisted by the engineers, which I  
09:33 24 have?

09:33 25 Q. Okay. But at least your testimony was you have never had

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09:33 1 any responsibility for any of your prior -- with any of your  
09:33 2 prior employers for determining regulatory compliance with MMS  
09:33 3 requirements; correct?

09:33 4 A. That was not my responsibility. Do I assist them, sure.

09:33 5 Q. Okay. And is it correct that you have never been asked,  
09:33 6 at any time in your career prior to this case, to assess  
09:33 7 whether a BOP was in compliance with MMS regulations; correct?

09:34 8 A. That's correct.

09:34 9 Q. Okay. It is also correct that you have never had occasion  
09:34 10 prior to this case to review or utilize MMS regulations  
09:34 11 relating to BOPs in offshore use; correct?

09:34 12 A. That's correct.

09:34 13 Q. And prior to your work in this case, you've never offered  
09:34 14 any testimony or opinions about who has regulatory  
09:34 15 responsibility under MMS' regulations for maintenance and  
09:34 16 repair of a BOP; correct?

09:34 17 A. I'm not getting into any legal opinions, and I would  
09:34 18 consider that to be just that.

09:35 19 Q. Now, you testified that you looked at the MMS regulation  
09:35 20 with respect to best available and safest technology in  
09:35 21 connection with the work you did in this case. And, in fact,  
09:35 22 that's the one regulation you cite to in your report; correct?

09:35 23 A. Correct.

09:35 24 Q. All right.

09:35 25 MS. KARIS: If we can pull up 7762.10.1, please.

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09:35 1 **BY MS. KARIS:**

09:35 2 **Q.** This is from the regulation that you cite in your report;

09:35 3 correct?

09:35 4 **A.** Yes.

09:35 5 **Q.** And you understand that this would be the applicable

09:35 6 regulation for determining best available and safest technology

09:35 7 with respect to a BOP used in offshore applications; correct?

09:35 8 **A.** Correct.

09:35 9 **Q.** All right. And what it says is that "Best available and

09:35 10 safest technology means the best available and safest

09:36 11 technologies that the Director," with a capital D," determines

09:36 12 to be economically feasible wherever failure of equipment would

09:36 13 have a significant effect on safety, health, or the

09:36 14 environment."

09:36 15 That's what the regulation states; correct?

09:36 16 **A.** That's exactly what it says, and the director has

09:36 17 testified that it means the plain English language of best

09:36 18 available and safest technology that's available, which is

09:36 19 standard of care in engineering. It's fitness for purpose,

09:36 20 fitness for service. There's lots of ways to say it, but it's

09:36 21 the plain English interpretation is what the director has

09:36 22 testified to.

09:36 23 **Q.** And who are you calling the director that has testified to

09:36 24 this?

09:36 25 **A.** In this case Mr. Trocquet was the director of Louisiana.

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09:36 1 Q. Was he the director of the Minerals Management Services?

09:36 2 A. No. But in this particular case, if you look at the  
09:36 3 report to the president, one of the criticisms of MMS was that  
09:36 4 the director has never been a technical person and, therefore,  
09:37 5 that's been a problem.

09:37 6 Q. Dr. Stevick, I'm actually going to interrupt you because I  
09:37 7 think you're citing to a report that the Court has held to be  
09:37 8 excluded from evidence.

09:37 9 A. All right.

09:37 10 MS. KARIS: That's the Presidential Commissions  
09:37 11 report, Your Honor.

09:37 12 THE WITNESS: Very good.

09:37 13 BY MS. KARIS:

09:37 14 Q. So just to go back to this point. The director here  
09:37 15 that's referenced is the MMS' director. Can we agree to that?

09:37 16 A. I would assume that's the case.

09:37 17 Q. And it was your opinion that the director is far removed  
09:37 18 from the details in looking at the concepts of BAST; correct?

09:37 19 A. Yes. They're setting a concept, they're setting the  
09:37 20 scope, the engineering methodology that has to occur. They're  
09:37 21 not going to get into the details. And that's true of any code  
09:37 22 and standard. The same with the ones on the West Coast with  
09:37 23 best available technology. It's, of course, the director's job  
09:37 24 to be the responsible person, but he's not going to get into  
09:38 25 those kind of details.

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09:38 1 Q. All right. Now, what the MMS and the director has spoken  
09:38 2 to, though, is they've given guidance on what constitutes BAST,  
09:38 3 best available and safest technology; correct?

09:38 4 A. Yes.

09:38 5 Q. All right.

09:38 6 MS. KARIS: If we can look at TREX-7765.7.2. If we  
09:38 7 look at letter 2(c) -- I'm sorry, (c), not 2(c).

09:38 8 BY MS. KARIS:

09:38 9 Q. The guidance that we're speaking to is found in 250.107.  
09:38 10 It's 30 CFR 250.107. This is what you've referred to in your  
09:38 11 report; correct?

09:38 12 A. Yes. That's a very good description of the engineering  
09:38 13 process, which you'll see in any textbook on mechanical  
09:38 14 engineering design.

09:38 15 Q. Correct. And what it says there is: "You must use best  
09:38 16 available and safest technology whenever practical on all  
09:39 17 exploration, development, and production operations."  
09:39 18 Correct?

09:39 19 A. Yes. That would be the economic application of science.

09:39 20 Q. And it goes on to say that: "In general, we consider your  
09:39 21 compliance with MMS regulations to be the use of BAST."  
09:39 22 Correct?

09:39 23 A. Yes.

09:39 24 Q. Now, in your expert reports, both your opening report and  
09:39 25 your rebuttal report, as well as the amended reports that you



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09:39 1 issued in this case, you omitted that last sentence, that your  
09:39 2 compliance with MMS regulations is considered to be BAST;  
09:39 3 correct?

09:39 4 A. Of course. Because it's saying in general, and the kind  
09:39 5 of details that I'm talking about, such as configuring that  
09:39 6 BOP, putting those LEGO blocks together correctly so that they  
09:39 7 actually function. I'm sure if you told the MMS that the BSR  
09:39 8 can never work if you don't activate the CSR first, they  
09:40 9 wouldn't be too thrilled about this configuration.

09:40 10 Q. And we'll talk about what the MMS knew and what the MMS  
09:40 11 did.

09:40 12 But you would agree with me, that at least in  
09:40 13 connection with your opinion, while you were speaking to BAST,  
09:40 14 you omitted the sentence that, under the regulations,  
09:40 15 compliance with MMS regulations is deemed generally to be  
09:40 16 compliance with BAST; correct?

09:40 17 A. Yes.

09:40 18 Q. Okay.

09:40 19 MS. KARIS: Now, if we can pull up D-4607.

09:46 20 BY MS. KARIS:

09:46 21 Q. You did look at what the MMS requires in terms of  
09:40 22 configuration for a BOP under the regulations; correct?

09:40 23 A. Yes.

09:40 24 Q. All right. And I have put here in a demonstrative,  
09:40 25 D-4607, in the left-hand column what the MMS requires, and in

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09:40 1 the right-hand column what the *Deepwater Horizon's* BOP stack  
09:41 2 actually contained.

09:41 3           You would agree with me that under the regulations  
09:41 4 what is required is one annular, two pipe rams, one blind shear  
09:41 5 ram, one accumulator closing system, and then dual control  
09:41 6 pods.

09:41 7           That's what the MMS requires; correct?

09:41 8 A. Yes, if you want to look at the regulation as merely a  
09:41 9 checkoff box. However --

09:41 10 Q. Well --

09:41 11 A. -- my interpretation, and I think any engineer's  
09:41 12 interpretation of this -- it says "one blind shear ram."  
09:41 13 They're expecting that it will actually work. Under the  
09:41 14 circumstances, it's expected to work.

09:41 15           It cannot work under the situations that it will  
09:41 16 encounter unless it has a CSR going first.

09:41 17 Q. We're going to talk about it. And the circumstances  
09:41 18 you're speaking to is a well control blowout; correct?

09:41 19 A. Yes.

09:41 20 Q. Do you think the MMS was aware that there could be a well  
09:41 21 control blowout when they put together this regulation as to  
09:42 22 what is required?

09:42 23 A. No. The head of the MMS has never been a technical  
09:42 24 person, and I do not believe that they get into that kind of  
09:42 25 detail.

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09:42 1 Q. Okay.

09:42 2 A. They're setting up a framework under which the engineers  
09:42 3 are expected to design a system where the one blind shear ram  
09:42 4 can work.

09:42 5 Q. The head of the Minerals Management Service that issues  
09:42 6 licenses for offshore drilling, in your opinion, is not aware  
09:42 7 that you can have a blowout when drilling offshore, including  
09:42 8 in the Gulf of Mexico?

09:42 9 A. I think he is aware.

09:42 10 Q. Okay.

09:42 11 A. And he is also probably unaware that someone might design  
09:42 12 a blind shear ram that won't work under those circumstances.

09:42 13 Q. All right. Now, the blind shear ram that we're speaking  
09:42 14 to are the blind shear rams -- well, let me ask you this.

09:42 15 You think the MMS is now aware, after you've issued  
09:42 16 your opinions in this case and various other people have issued  
09:43 17 opinions in this case, that a blind shear ram may not work  
09:43 18 under certain circumstances?

09:43 19 A. I would hope so.

09:43 20 Q. All right. And definitely no dispute that at least now,  
09:43 21 2 1/2 years later, the director would be aware of the  
09:43 22 circumstances that you've been telling us about; correct? At  
09:43 23 least you hope so; correct?

09:43 24 A. I still don't know if they're into those kind of details.

09:43 25 Q. All right. After we've had this catastrophic blowout, you

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09:43 1 still don't know if the director is into, as you call it, those  
09:43 2 kind of details; is that correct?

09:43 3 A. I'm not the director. I don't know him personally.

09:43 4 Q. All right. I accept that you don't know him personally.

09:43 5 Do you know whether, even today, Minerals Management  
09:43 6 Services or BOEMRE, a new agency, continues to approve  
09:43 7 applications that use the very same configuration and very same  
09:44 8 type of blind shear ram that we had on the *Deepwater Horizon*?

09:44 9 Do you know that?

09:44 10 A. I'm sure they do.

09:44 11 Q. Okay.

09:44 12 A. But those are different situations, and there are other  
09:44 13 ways to mitigate it, such as configuring your diverters so you  
09:44 14 always go overboard, also insisting on closing various elements  
09:44 15 so that the free length is too short to buckle.

09:44 16 There are many ways to mitigate this problem.  
09:44 17 Unfortunately, on this rig none of them existed.

09:44 18 Q. All right. Well, we're speaking to the issue, though, of  
09:44 19 blind shear rams and having one or two blind shear rams, which  
09:44 20 is what I believe you offered opinions over the last two days  
09:44 21 about; correct?

09:44 22 A. Yes. But the design --

09:44 23 Q. And the BOP's configuration --

09:44 24 A. Let me explain this. No design stands completely  
09:44 25 isolated, and you have to use this particular method to solve a

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09:44 1 problem. There's usually several methods.

09:44 2           Given the way this rig is configured, I think you  
09:45 3 need two blind shear rams and you need to fire your CSR first,  
09:45 4 then the blind shear ram, just like the *Discoverer Enterprise*,  
09:45 5 which is one of the ships that came to rescue here. They had  
09:45 6 an event in 2003, and that's exactly what happened. The CSR,  
09:45 7 automatic, the deadman system fired the CSR and then fired a  
09:45 8 VSR, then the ROV came down and closed the second VSR.

09:45 9 **Q.** Are you aware of any regulations today that say you need  
09:45 10 to activate the CSR first in a well control event? Are you  
09:45 11 aware of any regulation anywhere that says that?

09:45 12 **A.** No.

09:45 13 **Q.** All right.

09:45 14 **A.** Because there are multiple ways to solve the problem.

09:45 15 **Q.** Are you aware of any regulations --

09:45 16 **A.** They're expecting a standard of care in engineering, not  
09:45 17 one particular way to solve the problem.

09:45 18 **Q.** Let's go back to this chart and see if we can at least  
09:45 19 agree that with respect to these configurations in this  
09:45 20 regulation, the *Deepwater Horizon's* BOP had at least those  
09:45 21 configurations -- or excuse me -- those type of rams available  
09:46 22 to it.

09:46 23           **THE COURT:** Ms. Karis, I think you're beating a dead  
09:46 24 horse here.

09:46 25           **MS. KARIS:** Thank you, Your Honor, and I'll move on.

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09:46 1           **THE COURT:** The witness has answered. I think you  
09:46 2 need to move on.

09:46 3           **MS. KARIS:** Thank you.

09:46 4 **BY MS. KARIS:**

09:46 5 **Q.** Now, you are also aware that in addition to this MMS  
09:46 6 requirement, the MMS required operators to submit what is  
09:46 7 called an application for permit to drill before any activities  
09:46 8 began on a specific well; correct?

09:46 9 **A.** Yes. And like all regulations, these are minimums.  
09:46 10 They're floors, to try to get the industry to where it's  
09:46 11 supposed to go. It does not mean you're excused from doing  
09:46 12 engineering and just checking off boxes on components. They  
09:46 13 have to work together to (1) function, and (2) protect the  
09:46 14 workers, and (3) protect the environment.

09:46 15 **Q.** And you would agree with me that Minerals Management  
09:47 16 Service, and now BOEMRE, is interested in doing that,  
09:47 17 protecting the workers, protecting the environment, and having  
09:47 18 requirements that satisfy those objectives?

09:47 19 **A.** They're interested. The government moves slowly. You  
09:47 20 will see more regulations as time proceeds. That's still not  
09:47 21 an excuse for not doing the right thing, which is standard of  
09:47 22 care in engineering.

09:47 23 **Q.** Can we agree, at least, that before the *Deepwater Horizon*  
09:47 24 BOP was sent to the Macondo well, BP sought and obtained the  
09:47 25 approval of the MMS to use this BOP with its configuration at

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09:47 1 the Macondo well?

09:47 2 A. Of course. They have to.

09:47 3 Q. And that application contained a schematic that identified

09:47 4 the pressure rating for the annulars, the location and number

09:47 5 of blind shear rams, the number of casing shear rams, as well

09:47 6 as the number of VBRs, including the test ram?

09:47 7 A. Yes. But approval by the MMS is a floor.

09:48 8 Q. Okay.

09:48 9 A. They're supposed to use the standard of care in

09:48 10 engineering and design a functional, safe piece of equipment,

09:48 11 which simply was not done here.

09:48 12 Q. Now, you testified yesterday that -- if I heard you

09:48 13 correctly -- and I verified this with the transcript -- that

09:48 14 you believed that one of the annulars had been downgraded to a

09:48 15 7.5, or 7,500 psi rating. Is that correct?

09:48 16 A. Yes. Based on the APDs and the testimony of

09:48 17 Mr. Abbassian.

09:48 18 Q. Now, did you look at that APD?

09:48 19 A. Yes.

09:48 20 Q. Okay.

09:49 21 **MS. KARIS:** If we can pull up TREN-5334.1.

09:46 22 **BY MS. KARIS:**

09:46 23 Q. And to be clear, it was your testimony that the upper

09:49 24 annular had been revised so that it had been downgraded --

09:49 25 quote, downgraded to 7,500 psi on 5 1/2-inch pipe, which is

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09:49 1 actually less than MASP; correct?

09:49 2 A. Yes.

09:49 3 Q. That was your testimony yesterday; correct?

09:49 4 A. Yes.

09:49 5 Q. And what you were relying on is this application for  
09:49 6 revised bypass; correct?

09:49 7 A. Yes.

09:49 8 MS. KARIS: And if we can call out TREX-5834.2.1.

09:49 9 BY MS. KARIS:

09:49 10 Q. And this is what I believe Mr. Williamson showed you when  
09:49 11 he was asking you about this.

09:49 12 A. Yes.

09:49 13 Q. And just to be clear here, this says Revision I --

09:49 14 MR. WILLIAMSON: Your Honor, just for the record, it  
09:49 15 wasn't me.

09:49 16 MS. KARIS: Whoever --

09:49 17 MR. WILLIAMSON: I think it was Mr. Von Sternberg.

09:49 18 MS. KARIS: Then I stand corrected.

09:50 19 MR. VON STERNBERG: I'll take credit for it,  
09:50 20 Your Honor.

09:50 21 BY MS. KARIS:

09:50 22 Q. So to be clear here, Revision I is what you relied on to  
09:50 23 tell this Court that the upper annular had actually been  
09:50 24 downgraded to 7,500 psi. That's what we're looking at here;  
09:50 25 correct?



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09:50 1 A. Yes.

09:50 2 Q. Revision I, what's the date it?

09:50 3 A. It's 10/15/09. But if you also look in this document, it

09:50 4 says that all references to the *Marianas* have been removed. So

09:50 5 the assumption is the same is being applied to the *Deepwater*

09:50 6 *Horizon*, and that was confirmed by Mr. Abbassian.

09:50 7 Q. We're going to get to that.

09:50 8 A. Okay.

09:50 9 Q. But just to be clear, Revision I was for a date that the

09:50 10 *Marianas* was actually at the well; correct?

09:50 11 A. Yes.

09:50 12 Q. All right. The *Deepwater Horizon* did not begin drilling

09:50 13 at Macondo until February of 2010; correct?

09:50 14 A. Correct.

09:50 15 Q. And you're aware that the way these APDs work is, to the

09:51 16 extent you have received any dispensations or revisions, you

09:51 17 carry them over from application to application so that you can

09:51 18 have a complete history when you're submitting an application

09:51 19 to the MMS; correct?

09:51 20 A. Correct.

09:51 21 Q. Do you know who Scherie Douglas is?

09:51 22 A. No.

09:51 23 Q. Scherie Douglas, I'll represent to you, was the

09:51 24 regulatory -- a member of BP's regulatory compliance team who

09:51 25 submitted these applications to the MMS. Were you aware that

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09:51 1 she was deposed in this case?

09:51 2 A. No.

09:51 3 Q. You never bothered to read her deposition, did you?

09:51 4 A. I read as many depositions as I could.

09:51 5 Q. Okay. Let's look at Ms. Douglas's testimony regarding

09:51 6 this application and whether it applies to the *Marianas* or the

09:51 7 *Deepwater Horizon* BOP, which you assumed related to the

09:51 8 *Deepwater Horizon*.

09:51 9 MS. KARIS: We can pull up 84.9.1. I'm sorry -- yep.

09:50 10 BY MS. KARIS:

09:50 11 Q. Do you see there -- this is from Ms. Douglas's testimony:

09:52 12 "QUESTION: What positions have you held with BP

09:52 13 within those ten years?

09:52 14 And she says:

09:52 15 "ANSWER: I was hired in as regulatory adviser for

09:52 16 the exploration group, and then in April of 2010 I was

09:52 17 promoted to regulatory compliance team lead."

09:52 18 Do you see that?

09:52 19 A. Yes.

09:52 20 Q. You have no reason to doubt that she was a member of BP's

09:52 21 regulatory compliance team; correct?

09:52 22 A. Correct.

09:52 23 Q. All right.

09:52 24 MS. KARIS: And if we can now look at her testimony

09:52 25 at 84.276.1, where she's testifying about the specific

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09:52 1 provision that you relied on and assumed it related to the  
09:52 2 *Deepwater Horizon*.

09:52 3 If we can first call out the top, just to  
09:52 4 establish that we're talking about the same provision. It's  
09:53 5 lines 8 through 13.

09:53 6 **MR. KANNER:** Objection, Your Honor. They can produce  
09:53 7 this witness live.

09:53 8 **THE COURT:** Yes, they can. What's the objection?

09:53 9 **MR. KANNER:** Inappropriate hearsay.

09:53 10 **THE COURT:** Overruled. Go ahead.

09:53 11 **MS. KARIS:** Thank you, Your Honor.

09:53 12 **BY MS. KARIS:**

09:53 13 **Q.** Dr. Stevick, do you see here Ms. Douglas, who submitted  
09:53 14 this application, was being asked about Revision I, which has  
09:53 15 the date of October 15th of 2009 --

09:53 16 **A.** Yes, I do.

09:53 17 **Q.** -- the same revision we're talking about.

09:53 18 **MS. KARIS:** If we can go further down back on the  
09:53 19 page -- further down, please. Oh, sorry. Let's go to --  
09:53 20 beginning with "Which rig."

09:53 21 Sorry. If we can go to 276.1, and then I'll  
09:53 22 identify the line numbers. Here we go, line 21.

09:50 23 **BY MS. KARIS:**

09:50 24 **Q.** Beginning with line 21, in connection with this revision  
09:54 25 she was asked:

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09:54 1 "QUESTION: Which rig was working at the Macondo well  
09:54 2 at the time of the revision?  
09:54 3 "ANSWER: That would have been the *Marianas*."  
09:54 4 Correct?  
09:54 5 A. Yes.  
09:54 6 Q. And that's consistent with your understanding and  
09:54 7 knowledge in this case. That in October of 2009 the rig that  
09:54 8 was on the Macondo well was the *Marianas*'s rig with its BOP;  
09:54 9 correct?  
09:54 10 A. Correct.  
09:54 11 Q. That was not the same BOP that was on the *Deepwater*  
09:54 12 *Horizon*; correct?  
09:54 13 A. Right. But these things have to be done ahead of time.  
09:54 14 Q. Okay.  
09:54 15 A. And, secondly, the --  
09:54 16 Q. Okay. Now, if we can go back, please --  
09:54 17 A. Never mind. Go ahead.  
09:54 18 Q. So these comments would reflect --  
09:54 19 MS. KARIS: And to the top, to "That's correct."  
09:54 20 BY MS. KARIS:  
09:54 21 Q. And, "So these comments" -- being the comments in Revision  
09:54 22 I, which is what she's asked about.  
09:55 23 "QUESTION: So these comments would reflect the  
09:55 24 *Marianas* rig; is that correct?"  
09:55 25 And what does she say?

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09:55 1 A. She says, "That's correct."  
09:55 2           However, the APD says the *Marianas* references have  
09:55 3 been removed.  
09:55 4 Q. And you see Ms. Douglas actually says that was inaccurate,  
09:55 5 that it had been removed. The *Marianas*, which was the rig at  
09:55 6 the site on October 15th, 2009, was the one that had the  
09:55 7 downgraded upper annular; correct?  
09:55 8 A. Correct. And if I'm incorrect -- maybe I am incorrect on  
09:55 9 that. And if I am, the upper annular was still downgraded by  
09:55 10 the stripping through, such that at the time of the incident we  
09:55 11 knew that it could only hold 2500 psi.  
09:55 12 Q. Do you know who Mr. Ambrose is?  
09:55 13 A. I believe he was the VP of drilling for BP.  
09:55 14 Q. Mr. Ambrose was the --  
09:55 15 A. No, not Mr. Ambrose. No, I'm sorry. I was thinking of  
09:55 16 Mr. Abbassian.  
09:55 17 Q. All right. Do you know who Mr. Ambrose is?  
09:55 18 A. No.  
09:55 19 Q. I'll represent to you that Mr. Ambrose is Transocean's  
09:55 20 director of maintenance and tech support. And he was also the  
09:56 21 gentleman who headed up Transocean's investigation, including  
09:56 22 into the condition of the BOP for this incident.  
09:56 23           Did you review Mr. Ambrose's deposition that he gave  
09:56 24 in this case?  
09:56 25 A. I don't recall it.

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09:56 1 Q. Okay. Were you aware that Mr. Ambrose, as the director of  
09:56 2 maintenance, testified that the BOP -- the upper annular on the  
09:56 3 BOP of the *Deepwater Horizon* did, in fact, stay at a 10,000 psi  
09:56 4 rating?

09:56 5 A. If that's true, I was probably incorrect on that.

09:56 6 Q. Okay.

09:56 7 A. But again, it was still downgraded by the stripping such  
09:56 8 that it couldn't hold more than 2500 psi, well below MASP.

09:56 9 Q. Now, you would agree with me that -- well, you also spoke  
09:56 10 yesterday about a document relating to what BP knew about --  
09:56 11 BP's knowledge, I think it was referenced -- about the wear and  
09:57 12 tear of the BOP. Do you recall that, generally?

09:57 13 A. No, but I'm sure you'll show me.

09:57 14 Q. Okay. You're correct.

09:57 15 MS. KARIS: If we can look at Exhibit 4423, please.

09:53 16 BY MS. KARIS:

09:53 17 Q. And now I think I have it right. I think Mr. Williamson  
09:57 18 did show you this document.

09:57 19 If we can look at the top, just to verify. This is  
09:57 20 the e-mail that Mr. Williamson used with you to talk about what  
09:57 21 Mr. Byrd, of BP, knew in November of 2001.

09:57 22 Do you recall looking at this document yesterday?

09:57 23 A. Yes.

09:57 24 Q. All right. And this is what was used and you testified  
09:57 25 from to say that BP was aware of certain conditions in

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09:57 1 connection with the limitations of the BOP; correct?

09:57 2 A. Yes.

09:57 3 Q. Okay. Now, you understand that what this document is  
09:57 4 referencing is what would happen if ROVs are used to activate  
09:58 5 the BOP; correct?

09:58 6 A. Correct. And the same situation occurs.

09:58 7 Q. We're going to talk about that.

09:58 8 A. Sure.

09:58 9 Q. But at least the document itself references what would  
09:58 10 happen in the event that an ROV, a remote-operated vehicle, is  
09:58 11 used to activate the BOP under certain conditions; correct?

09:58 12 A. Yes.

09:58 13 Q. And you would agree with me that closing the blind shear  
09:58 14 rams through ROV intervention does not occur in the same way  
09:58 15 that you close the blind shear rams through an AMF/deadman  
09:58 16 sequence?

09:58 17 A. Yes.

09:58 18 Q. The AMF/deadman is activated -- when the AMF/deadman is  
09:58 19 activated, the blind shear rams are closed by a subsea  
09:58 20 accumulator that's attached to the BOP and supplies a  
09:58 21 high-pressure hydraulic fluid; correct?

09:58 22 A. Yes. It's going to close much faster.

09:59 23 Q. It's going as to close much faster.

09:59 24 And, therefore, the time that's permitted for any  
09:59 25 kind of flow-through piping in the well and any of the erosion

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09:59 1 or fatigue of the packers is impacted as a result of it closing  
09:59 2 much faster; correct?

09:59 3 A. Yes.

09:59 4 Q. And the issue that they're looking at here, which you said  
09:59 5 gave BP notice to look at the situation -- what they're talking  
09:59 6 about here, if you can look at --

09:59 7 MS. KARIS: Pull out "Situation," please.

09:53 8 BY MS. KARIS:

09:53 9 Q. The situation that's being evaluated here is if you have  
09:59 10 the *Horizon* driving off. And it says if the "well is flowing  
09:59 11 at 100,000 to 300,000 barrels per day"; correct?

09:59 12 A. Yes.

09:59 13 Q. And that is if the BOP is open, no rams closed; correct?

09:59 14 A. Yes.

09:59 15 Q. All right. And you would agree with me that the flow rate  
10:00 16 definitely affects the erosion and impact on the BOP and its  
10:00 17 ability to function.

10:00 18 That's where we started this -- or earlier today;  
10:00 19 correct?

10:00 20 A. Yes.

10:00 21 Q. And so the issue or the notice, to use the words  
10:00 22 previously used, is about what would happen with the well  
10:00 23 flowing at 100- to 300,000 barrels if an ROV, which activates  
10:00 24 the blind shear ram at a much slower rate, is called upon to  
10:00 25 shut in a well; correct?



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10:00 1 A. Yes.

10:00 2 Q. The blind shear rams here were not -- "here" meaning in  
10:01 3 the *Deepwater Horizon* incident -- were not activated by the  
10:01 4 ROV; correct?

10:01 5 A. No, they were not.

10:01 6 Q. And they were not activated with rates in the vicinity of  
10:01 7 100- to 300,000 barrels per day flowing through that ram;  
10:01 8 correct?

10:01 9 A. No. But that does not matter that much. It could be a  
10:01 10 third of that and you still have the same problem.

10:01 11 Because the erosion really doesn't occur until the  
10:01 12 blades are getting close to each other, like when you put your  
10:01 13 thumb over the top of a hose. And it's -- when it's open, the  
10:01 14 flow rate is pretty irrelevant.

10:01 15 Q. Let's go down to the answer, since you say it doesn't  
10:01 16 matter.

10:01 17 A. Yes.

10:01 18 Q. The question being asked is: "Can we close the shear rams  
10:01 19 with ROV override without further damage to the BOP at 100-,  
10:01 20 200-, or 300,000 barrel per day flow rates?"

10:01 21 That's the question being asked; correct?

10:02 22 A. Correct.

10:02 23 Q. And the answer is: "No. Closing the shear rams at any of  
10:02 24 the above flow rates will probably cause them to wash out."

10:02 25 So the answer does pertain to those flow rates;

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10:02 1 correct?

10:02 2 A. Absolutely.

10:02 3 Q. Okay.

10:02 4 A. But based on standard engineering, this is going to be  
10:02 5 true right down to 20,000 barrels a day.

10:02 6 Q. We're just talking about what this document shows.

10:02 7 A. This is not the only document I relied on. This is one  
10:02 8 Mr. Williams brought up.

10:02 9 Q. Okay.

10:02 10 A. I did not rely on this at all for my opinions.

10:02 11 Q. All right. Well, that's not exactly how I heard it  
10:02 12 yesterday. I thought you said yesterday --

10:02 13 A. Well, it's not the only document I relied on.

10:02 14 Q. Okay. But I thought you said yesterday that you relied on  
10:02 15 this document to speak to the issue of notice.

10:02 16 A. Sure.

10:02 17 Q. It goes on to say: "One has to assume given that rate" --  
10:02 18 and that is the 100-, 200-, 300,000 rate -- "there is a lot of  
10:02 19 sand being transported as well which only accelerates the  
10:02 20 erosion process."

10:02 21 That was the conclusion at that time when this issue  
10:02 22 was considered; correct?

10:03 23 A. Yes.

10:03 24 Q. All right.

10:03 25 **THE COURT:** How much more do you have to go,

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10:03 1 Ms. Karis?

10:03 2 **MS. KARIS:** I'm going to try and wrap up, Your Honor,

10:03 3 but probably another 10 or 15 minutes.

10:03 4 **THE COURT:** All right. Let's go ahead and take a

10:03 5 15-minute recess.

10:03 6 **MS. KARIS:** Thank you, Your Honor.

10:03 7 **THE DEPUTY CLERK:** All rise.

10:03 8 (WHEREUPON, the Court took a recess.)

10:05 9 **THE DEPUTY CLERK:** All rise.

10:24 10 **THE COURT:** Please be seated, everyone.

10:24 11 All right, Ms. Karis.

10:24 12 **MS. KARIS:** Thank you, Your Honor.

10:24 13 **BY MS. KARIS:**

10:24 14 **Q.** Dr. Stevick, are you ready to proceed?

10:24 15 **A.** Yes.

10:24 16 **Q.** You testified just before the break that one of the things

10:24 17 you did is you interpreted BAST by looking at engineering

10:24 18 standard of care, I think you called it; is that correct?

10:24 19 **A.** Yes.

10:24 20 **Q.** All right. And, of course, part of what engineering

10:24 21 standard of care requires is to understand how the industry

10:24 22 operates; correct?

10:24 23 **A.** Yes.

10:24 24 **MS. KARIS:** And if we can look at 7542.3.2.

25

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10:25 1 BY MS. KARIS:

10:25 2 Q. As part of the work that you did in this case, in order to

10:25 3 render opinions about what constituted BAST, did you look to

10:25 4 see how other operators configure their BOP stacks?

10:25 5 A. Yes, I --

10:25 6 Q. Operators and contractors. I'm sorry. Go ahead.

10:25 7 A. Sorry. I looked at the T0 fleet --

10:25 8 Q. Okay.

10:25 9 A. -- as on their website, and the vast majority have two

10:25 10 sealing shear rams.

10:25 11 Q. And we'll get to that --

10:25 12 A. In fact --

10:25 13 Q. -- in a second. I'm sorry.

10:25 14 A. -- the *Marianas* and the *Deepwater Horizon* are outliers in

10:25 15 that fleet.

10:25 16 Q. All right. Well, let's look at the -- you're familiar

10:25 17 with this document. It's from Cameron; correct?

10:25 18 A. Okay.

10:25 19 Q. And you see here where it says -- and I don't have a date.

10:25 20 Do we have a date on this? I'm sorry. If we can look at the

10:26 21 beginning of it first --

10:26 22 A. Yes.

10:26 23 Q. -- just to put it in context.

10:26 24 This is a document dated June of 2010. Do you see

10:26 25 that?

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10:26 1 A. Yes.

10:26 2 Q. And this says: "Thierry, During the current new build  
10:26 3 cycle ([from] 2005-2010) we have booked 38 subsea stacks. 36  
10:26 4 of those have one [blind shear ram] and one casing shear  
10:26 5 [ram]."

10:26 6 Correct?

10:26 7 A. That's what it says. And --

10:26 8 Q. Well, Mr. Stevick --

10:26 9 A. -- it very likely has CSRs that fire first on the deadman.  
10:26 10 We don't know that from this sentence.

10:26 11 Q. That was going to be my question.

10:26 12 You say "very likely." Did you look at any of those  
10:26 13 36 stacks to see whether the CSRs fire before the blind shear  
10:26 14 rams?

10:26 15 A. I have no way to look at that.

10:26 16 Q. Okay. So you don't know whether those 36 stacks, which  
10:27 17 have only one SBR and one casing shear ram, are configured the  
10:27 18 exact same way as the *Deepwater Horizon's* BOP is; is that  
10:27 19 correct?

10:27 20 A. Correct. But from an engineering standard of care, just  
10:27 21 because you can find many poorly-designed units that are  
10:27 22 similar doesn't make it right.

10:27 23 Q. All right. Now --

10:27 24 A. Multiple wrongs don't make a right. There are many stacks  
10:27 25 out there that meet what I consider engineered or

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10:27 1 properly-configured stack.

10:27 2 Q. Okay. We're going to get to that.

10:27 3 MS. KARIS: Let's look at D-4644.

10:27 4 BY MS. KARIS:

10:27 5 Q. As part of the work that you did in this case, you said

10:27 6 you looked at what other rig configurations were; correct?

10:27 7 A. Yes.

10:27 8 Q. You said Transocean rigs; correct?

10:27 9 A. Yes.

10:27 10 Q. And you're aware, though, that in the course of this case,

10:27 11 some of the materials produced include applications for permit

10:27 12 to drill from a variety of different operators in the industry

10:28 13 operating in the same environment that the *Deepwater Horizon*

10:28 14 was operating in, deepwater out in the Gulf of Mexico; correct?

10:28 15 A. Yes. But you still have to evaluate each system based on

10:28 16 a particular well.

10:28 17 Q. We're going to talk about that.

10:28 18 You're aware, though, that their APDs were part of

10:28 19 the materials available in this case for you to review in

10:28 20 rendering your opinions about industry standard of care;

10:28 21 correct?

10:28 22 A. Correct.

10:28 23 Q. Okay. And you would agree with me that this chart

10:28 24 accurately represents applications for permit to drill which

10:28 25 were approved by Mineral Management Services in 2010, the same

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10:28 1 year as the *Deepwater Horizon's* BOP, for depths similar to the  
10:28 2 *Deepwater Horizon* Macondo well use; correct?  
10:28 3 A. Well, I can't say that for sure. I'll have to take your  
10:28 4 word for it.  
10:28 5 Q. All right. Well, you worked, you said, for Chevron  
10:29 6 previously; is that correct?  
10:29 7 A. Yes.  
10:29 8 Q. All right. And do you see one of those applications here  
10:29 9 is actually for Chevron?  
10:29 10 A. Correct.  
10:29 11 Q. A company you said you had done some suitability and  
10:29 12 shearability calculations for.  
10:29 13 A. Correct.  
10:29 14 Q. And you see there in 2010, Chevron, through the *Discoverer*  
10:29 15 *Inspiration* -- do you know what that stack looks like?  
10:29 16 A. Well, it says right there, one BSR and one CSR.  
10:29 17 Q. Okay. And that's the configuration we have here; correct?  
10:29 18 A. Yes. But you can't compare them that simply.  
10:29 19 Q. Okay. Well --  
10:29 20 A. You have to know -- let me continue.  
10:29 21 Q. Okay.  
10:29 22 A. You have to know whether the CSR fires first.  
10:29 23 You need to know whether the overboard line is  
10:29 24 activated automatically. And we do know from the record that  
10:29 25 Chevron's policy is to always have the overboard line activated

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10:29 1 so that you've got lots of time and you're not going to have a  
10:29 2 fire or an explosion on the rig. If that was done here, you  
10:29 3 could have used the existing equipment and shut in the well.

10:30 4 So you can't look at a system in an isolated fashion  
10:30 5 with just the BSR and the CSR. You also have to look at their  
10:30 6 well control policies. When you set the diverter, do you go to  
10:30 7 the mud-gas separator or do you head overboard?

10:30 8 Q. So you're critical of the way Transocean handled the  
10:30 9 overboard versus the diverter configuration here; is --

10:30 10 A. Yes.

10:30 11 Q. -- that correct?

10:30 12 A. You have to consider that in your configuration, what's  
10:30 13 your default position.

10:30 14 Q. And did you look -- first of all, did you look at that APD  
10:30 15 that was submitted by Chevron, since you had previously worked  
10:30 16 for them?

10:30 17 A. I don't recall.

10:30 18 MS. KARIS: All right. Let's see if we can pull up  
10:30 19 47846-167.1.2.

10:30 20 BY MS. KARIS:

10:30 21 Q. And if you haven't looked at it, just let me know.

10:30 22 Do you recognize this as an application for permit to  
10:30 23 drill a new well for Chevron --

10:30 24 MS. KARIS: Highlight Chevron.  
25



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10:30 1 **BY MS. KARIS:**

10:30 2 **Q.** -- approval date February 8th of 2010, and the water depth

10:30 3 is 6,730 feet.

10:31 4 Do you see that?

10:31 5 **A.** Yes, Counselor. I don't recall if I looked at it or

10:31 6 not --

10:31 7 **Q.** Fair to --

10:31 8 **A.** -- but I have looked at Chevron's policy on going

10:31 9 overboard.

10:31 10 **Q.** All right.

10:31 11 **A.** And if that had happened in this case and gone down to

10:31 12 the -- or gone out the downwind overboard line, there would

10:31 13 have been no fire and explosion on the rig. In fact, I even

10:31 14 modeled it. I know for a fact you won't have a fire or an

10:31 15 explosion on the rig. You would have had all the time in the

10:31 16 world to use the preferred method, which is to use the CSR, cut

10:31 17 the pipe, pull the drill pipe up, and shut the BSR, without

10:31 18 even cutting pipe at all.

10:31 19 **Q.** And if I just heard you correctly, those criticisms that

10:31 20 you just voiced were with respect to how the crew diverted that

10:31 21 evening, going overboard as opposed to going to the mud-gas

10:31 22 separator.

10:31 23 Is that correct?

10:31 24 **A.** Right. And I don't know what policy they're following,

10:31 25 whether it's TO or BP policy, but the codes and standards are

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10:32 1 even clear. API 59, API 64, they are unambiguous. You --  
10:32 2 whenever you shut the pumps down to investigate, you will set  
10:32 3 the diverter to go out the overboard lines. That was not done  
10:32 4 here.

10:32 5 Q. Now, last series of questions and then we'll be done.

10:32 6 You've identified throughout your report various  
10:32 7 features, some of which we've talked about, that you contend  
10:32 8 should have been utilized on the *Deepwater Horizon's* BOP;  
10:32 9 correct?

10:32 10 A. Yes.

10:32 11 Q. And in your opinion, those features were necessary in  
10:32 12 order to make this BOP safe for use and fit for purpose.

10:32 13 A. Yes.

10:32 14 Q. Now, you tendered your opinions to Halliburton in this  
10:32 15 case in late 2011; correct?

10:32 16 A. That sounds right.

10:32 17 Q. All right. And do you know whether Halliburton, to this  
10:32 18 day, after you tendered your opinions about what constitutes  
10:33 19 safe and fit for purpose, whether to this day Halliburton  
10:33 20 continues to send its crew to rigs that have BOPs with the  
10:33 21 exact same features and configurations that we had on the  
10:33 22 *Deepwater Horizon*?

10:33 23 A. I can't say whether they do or don't.

10:33 24 But again, I think everybody's on their toes now, and  
10:33 25 you could have shut this down safely with this equipment. But

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10:33 1 I think you should have both, policies that will shut it down  
10:33 2 and also automatic systems when the crew fails to act quickly  
10:33 3 enough. Mistakes are always made.

10:33 4 **Q.** So is it fair to say that you have not evaluated whether  
10:33 5 Halliburton, the company that hired you, continues to allow its  
10:33 6 crew to go to rigs that have the same policies, same  
10:33 7 procedures, same configurations as what we saw on the *Deepwater*  
10:33 8 *Horizon* on April 20th of 2010? That's not something you would  
10:33 9 consider?

10:33 10 **A.** That's well beyond the scope of what I was looking at.

10:34 11 **MS. KARIS:** I have nothing further, Your Honor.  
10:34 12 Thank you.

10:34 13 **THE COURT:** All right. Cameron.

10:34 14 **MR. JONES:** Cameron has no questions of this witness,  
10:34 15 Your Honor.

10:34 16 **THE COURT:** All right. Any redirect by Halliburton?

10:34 17 **MR. VON STERNBERG:** Just short, Your Honor, I  
10:34 18 promise. I know you've heard it from me before, but I promise.

10:34 19 **THE COURT:** All right.

10:34 20 **REDIRECT EXAMINATION**

10:34 21 **BY MR. VON STERNBERG:**

10:34 22 **Q.** Hello, Dr. Stevick. It's been a while you've been on the  
10:34 23 stand at this point, so we're going to make it quick.

10:34 24 **A.** Thank you.

10:34 25 **Q.** Just a few discrete points.

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10:34 1 In reference to some of the cross-examination by  
10:34 2 Transocean, we discussed batteries and replacement of  
10:34 3 batteries; is that true?

10:34 4 And I don't want to go into great detail on this  
10:34 5 because I know the Court's heard a lot about it.

10:34 6 **MR. VON STERNBERG:** But can we pick up 3340, Rob,  
10:35 7 please.

10:35 8 **BY MR. VON STERNBERG:**

10:35 9 **Q.** One thing that counsel for Transocean did talk to you  
10:35 10 about was the SWAT team that went out to the vessel to help  
10:35 11 repair and set up the BOP for the Macondo drilling; is that  
10:35 12 true?

10:35 13 **A.** Yes.

10:35 14 **Q.** And you've had an opportunity to look at documents related  
10:35 15 to the investigation and repairs that they did throughout that  
10:35 16 process?

10:35 17 **A.** Yes.

10:35 18 **Q.** And you'll see here down at the bottom, it's -- Mark Hay  
10:35 19 is the rig supervising engineer; is that correct?

10:35 20 **A.** Yes.

10:35 21 **Q.** And you understand that Ronald Guidry, he was one of the  
10:35 22 SWAT team members; is that true?

10:35 23 **A.** Yes.

10:35 24 **Q.** Now, have you had an opportunity to look at Exhibit 3340,  
10:35 25 which appears to be what the SWAT team did to the BOP during

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10:35 1 their time during the rig change between January and February  
10:35 2 of 2010?

10:35 3 A. Yes.

10:35 4 Q. Did you see anything in this document, Exhibit 3340, which  
10:35 5 said the SWAT team or Mr. Hay ever changed out the batteries on  
10:36 6 the blue pod?

10:36 7 A. No.

10:36 8 Q. Did you see anything in this document, Exhibit 3340, which  
10:36 9 indicates to you that the SWAT team or Mr. Hay even tested  
10:36 10 whether or not the blue pod batteries were, in fact, available  
10:36 11 and could possibly activate the AMF on April 20th of 2010?

10:36 12 A. No.

10:36 13 Q. Okay. Now, we've also heard some things in reference to  
10:36 14 whether or not the batteries should have been replaced every  
10:36 15 year.

10:36 16 Do you recall that?

10:36 17 A. Yes.

10:36 18 MR. VON STERNBERG: Let's go to 5495, please.

10:36 19 BY MR. VON STERNBERG:

10:36 20 Q. Now, counsel for Transocean also asked you about the  
10:36 21 Transocean investigation and the things they did to determine  
10:36 22 why the batteries were not changed out.

10:36 23 Do you remember that?

10:36 24 A. Yes.

10:36 25 MR. VON STERNBERG: Rob, if we can go to what ends in

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10:36 1 3662, please.

10:36 2 **BY MR. VON STERNBERG:**

10:36 3 **Q.** This is a Transocean investigation document that discusses  
10:37 4 their review of when the batteries were changed.

10:37 5 Have you reviewed this before?

10:37 6 **A.** Yes. This is one of the documents I relied on to come to  
10:37 7 the conclusion that the blue pod batteries were changed out in  
10:37 8 November of 2007.

10:37 9 **MR. VON STERNBERG:** And that's right there for the  
10:37 10 Court's convenience.

10:37 11 **BY MR. VON STERNBERG:**

10:37 12 **Q.** Pod 3 is 4 November 2007; right?

10:37 13 **A.** Correct.

10:37 14 **Q.** And that was, in fact, the blue pod?

10:37 15 **A.** Correct.

10:37 16 **Q.** Now, you've reviewed --

10:37 17 **THE COURT:** Remind me, that document is from --

10:37 18 **MR. VON STERNBERG:** Well, let's go to the first page.

10:37 19 **THE COURT:** What is the document?

10:37 20 **MR. VON STERNBERG:** I'll show you, Your Honor.

10:37 21 It's the first page, Rob.

10:37 22 It's Exhibit 5495, Your Honor.

10:37 23 **BY MR. VON STERNBERG:**

10:37 24 **Q.** And, Dr. Stevick, can you identify what this is?

10:37 25 **A.** Sure.

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10:37 1 Q. You remember looking at the deposition of Ewen Florence;  
10:37 2 is that correct?  
10:37 3 A. Yes.  
10:37 4 Q. And he was one of the investigators in reference to the  
10:37 5 BOP for Transocean's investigation?  
10:37 6 A. Right.  
10:37 7 Q. Okay.  
10:37 8 A. And they're --  
10:37 9 Q. That -- go ahead.  
10:37 10 A. Go ahead.  
10:37 11 Q. Well, no, you can tell me; I'm not supposed to tell you.  
10:38 12 A. Right. Well, they're investigating what actually happened  
10:38 13 to the batteries.  
10:38 14 Q. All right. Thank you.  
10:38 15 MR. VON STERNBERG: Any other questions, Your Honor,  
10:38 16 or can I move on?  
10:38 17 THE COURT: Move on.  
10:38 18 MR. VON STERNBERG: Thank you, sir.  
10:38 19 BY MR. VON STERNBERG:  
10:38 20 Q. And you remembered looking at depositions in reference to  
10:38 21 the testimony of the Transocean employees about the battery  
10:38 22 change-out; is that true?  
10:38 23 A. Yes.  
10:38 24 Q. And, in fact, Mark Hay, the very supervisor that we saw in  
10:38 25 that previous document, actually testified about the batteries;

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10:38 1 true?

10:38 2 A. Yes.

10:38 3 Q. Do you remember that testimony or do I need to show it to  
10:38 4 you?

10:38 5 A. You'll have to show it to me. I don't remember it in  
10:38 6 detail.

10:38 7 MR. VON STERNBERG: Okay. Rob, can you get his  
10:38 8 deposition at page 358, line 19, please?

10:38 9 BY MR. VON STERNBERG:

10:38 10 Q. And this is Mark Hay testifying:

10:38 11 "QUESTION: Your understanding is it's Transocean's  
10:38 12 policy to change the control pod batteries once a year; is  
10:38 13 that right?

10:38 14 "ANSWER: That's correct.

10:38 15 "QUESTION: And that's consistent with Cameron's  
10:38 16 policy about the replacement of the batteries; is that  
10:38 17 right?

10:38 18 "ANSWER: Yes."

10:38 19 Do you remember that testimony?

10:38 20 A. I do.

10:38 21 Q. And you relied upon that in reference to your report; is  
10:38 22 that true?

10:39 23 A. That's true.

10:39 24 Q. Let me talk to you about solenoids. Just two questions.  
10:39 25 We've talked a little bit about Transocean's testing.



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10:39 1 What is it, in your mind, that was fatally deficient about that  
10:39 2 testing?

10:39 3 A. The testing relied on -- well, there were actually many  
10:39 4 things wrong with the testing, but one was they would just  
10:39 5 listen to determine whether the solenoid actually activated.

10:39 6 I've tested many solenoids. What you have to do, you  
10:39 7 have to put pressure on them to determine whether they've  
10:39 8 actually shut or opened. You can't just rely on sound.

10:39 9 What you can do, after you've done a few tests with  
10:39 10 pressure, you can glue an accelerometer to it and understand  
10:39 11 the signature of what it looks like, and then you can do the  
10:39 12 test faster without pressure. But you can't rely on hearing.  
10:39 13 It just doesn't work.

10:39 14 Q. All right. Well, that was the Ph.D. response. Can we go  
10:39 15 back to just a standard human response.

10:39 16 How long did they wait to listen for the click?

10:39 17 A. I don't remember the exact time, but --

10:39 18 Q. Well, it was less than 5 seconds, was it not?

10:39 19 A. Yes.

10:39 20 Q. How long do you know that it would take for a solenoid to  
10:40 21 actually activate the AMF valves if, in fact, it was going to  
10:40 22 actuate? How long would it have to stay actuated to activate  
10:40 23 the AMF?

10:40 24 A. It has to stay actuated a full 30 seconds -- well, it's  
10:40 25 supposed to. It has to stay actuated at least 16 seconds.

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10:40 1 Q. So in your scientific and professional career, is it good  
10:40 2 enough for you to listen to a solenoid click when, in fact, you  
10:40 3 know it has to go 16 to 30 seconds before it actually utilizes  
10:40 4 what it's supposed to do to activate the AMF?

10:40 5 A. That's not acceptable, and you can't even tell whether the  
10:40 6 chick actually actuated the valve.

10:40 7 Q. All right, sir. Mr. Williamson talked to you yesterday a  
10:40 8 little bit about safety factors and I'm not sure we really got  
10:40 9 a lot of what your opinion really is and I just want to go  
10:40 10 through it really quick.

10:40 11 MR. VON STERNBERG: D-8204, please.

10:40 12 BY MR. VON STERNBERG:

10:40 13 Q. Can you describe for the Court why you made this document?

10:41 14 A. Yes.

10:41 15 Q. Please.

10:41 16 A. Sure.

10:41 17 To evaluate a failure like this, it helps to have  
10:41 18 some experience in the industry and some outside of the  
10:41 19 industry, just to get a feel for whether this industry is --  
10:41 20 has had some blinders on and really isn't paying attention to  
10:41 21 standard of care in engineering.

10:41 22 The blind shear ram itself has a safety factor less  
10:41 23 than 1. It doesn't always have a load that's higher than the  
10:41 24 pipes that can be in there. Typical safety factors for cars  
10:41 25 and airplanes, 1.3 to 1.5. The chairs we all sit in, 2.

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10:41 1 Offshore platforms for piping in refineries, pressure vessels,  
10:41 2 it's always between 3 and 4.

10:41 3 In fact, if we move to elevators, you'll see safety  
10:41 4 factors in the 10 to 14 range. So every industry uses safety  
10:41 5 factors that are higher than this. And your typical textbook  
10:41 6 will recommend the absolute minimum is 1.3. That's when you  
10:42 7 understand the material extremely well, you've characterized  
10:42 8 it, and you know the upper bounds very well.

10:42 9 Q. This is not a mistake that you put this vessel on the  
10:42 10 right side. What is that a picture of?

10:42 11 A. It's the *Deepwater Horizon*.

10:42 12 Q. Okay. What was the safety factor on the other mechanical  
10:42 13 engineering components of the *Deepwater Horizon* in your  
10:42 14 estimation?

10:42 15 A. Since I'm on the piping code, I'm very aware it has to be  
10:42 16 in the 3 to 4 range.

10:42 17 MR. VON STERNBERG: Let's go to D-8203, Rob, please.

10:42 18 BY MR. VON STERNBERG:

10:42 19 Q. This is also a chart you created. Is that true?

10:42 20 A. Yes.

10:42 21 Q. Can you tell the Court where you got this information and  
10:42 22 what it means to you?

10:42 23 A. Yes. These are the pressures required to shear pipe  
10:42 24 reliably, as testified to by the various experts.

10:42 25 Q. When you say "pipe," you're talking about 5 1/2-inch

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10:42 1 135 D-21 pipe that we had in this well; correct?

10:42 2 A. Right.

10:42 3 Q. Right. So this is what the other experts have said in  
10:42 4 reference to the shearing capacities of the BSR that was  
10:43 5 available on April 20th of 2010. Is that a fair statement?

10:43 6 A. Yes. And you'll see the numbers climb as you move toward  
10:43 7 experts who have experience outside of this industry.

10:43 8 Q. All right. And you have an asterisk down here about the  
10:43 9 Bly report. Can you explain to the Court what you mean by  
10:43 10 that?

10:43 11 A. That's the pressure estimated to be available with the  
10:43 12 various leaks that they found in the system.

10:43 13 Q. The hydraulic leaks?

10:43 14 A. Yes.

10:43 15 Q. All right. So am I wrong in saying that only Mr. Shanks  
10:43 16 believes that there was sufficient shearing capacity on  
10:43 17 April 20th, 2010 for the blind shear ram?

10:43 18 A. Yes. That's the only number below the available pressure.

10:43 19 Q. So I am wrong?

10:43 20 A. No, sir.

10:43 21 Q. Can you try that again? Am I wrong -- the only person  
10:43 22 who's said it wasn't available is Mr. Shanks?

10:43 23 A. Correct.

10:43 24 Q. Thank you.

10:43 25 **MR. VON STERNBERG:** Let's go to one last thing,

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10:43 1 Your Honor, and we're done.  
10:43 2 D-8226.1, please.  
10:44 3 **BY MR. VON STERNBERG:**  
10:44 4 **Q.** Now, you talked with counsel for BP about the Transocean  
10:44 5 fleet; correct?  
10:44 6 **A.** Yes.  
10:44 7 **Q.** All right. And you discussed it a little bit but didn't  
10:44 8 get into details. Now, will you tell the Court what this  
10:44 9 document is?  
10:44 10 **A.** This is figure 5 from page 15 of Mr. Shanks' rebuttal  
10:44 11 report, and it shows the TO fleet. And if you could draw a  
10:44 12 line between the column with one BSR, one CSR, the two BSRs,  
10:44 13 you can separate this into two distinct groups.  
10:44 14 **MR. VON STERNBERG:** All right, Rob. Can you draw  
10:44 15 that line? .2, please.  
10:44 16 **BY MR. VON STERNBERG:**  
10:44 17 **Q.** Is that what you're talking about?  
10:44 18 **A.** Yes.  
10:44 19 **Q.** So you've got the *Marianas* and then the AMI. And  
10:44 20 *Deepwater Horizon* and Petrobras are the only ones in the fleet  
10:44 21 that only have one BSR; is that true?  
10:44 22 **A.** Correct.  
10:44 23 **Q.** And you say "two sealing shearing rams" over here because  
10:44 24 the CSR doesn't seal. Is that what you're trying to tell us?  
10:44 25 **A.** Correct. Yes. You need backup.

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10:44 1 Q. Now, to your knowledge, were all these T0 vessels under  
10:44 2 the direction of BP, or no?

10:45 3 A. No.

10:45 4 Q. Were there other operators that were utilizing them?

10:45 5 A. Absolutely. And I looked up each one and annotated this  
10:45 6 at the time of my deposition.

10:45 7 Q. Now, were any of these vessels contemporaneous with the  
10:45 8 build of the *Deepwater Horizon*?

10:45 9 A. Yes.

10:45 10 Q. Have you done that work?

10:45 11 A. Yes, if we can look at the . . .

10:45 12 MR. VON STERNBERG: Rob, No. 3, please.

10:45 13 THE COURT: Wait. Before you move on.

10:45 14 MR. VON STERNBERG: Sure.

10:45 15 THE COURT: I'm looking at . . .

10:45 16 MR. VON STERNBERG: You want to go back to No. 2?

10:45 17 THE COURT: No, no, no. I'm looking at the exhibit  
10:45 18 and I'm trying to correlate it with the number that you call a  
10:45 19 dot. I want to make sure the record is clear. I thought you  
10:45 20 called out Demonstrative 6128?

10:45 21 MR. VON STERNBERG: Your Honor, it was 8226.1.

10:45 22 THE COURT: I don't see that -- did you call out that  
10:45 23 number?

10:45 24 MR. VON STERNBERG: I did, Your Honor. I think the  
10:45 25 TREX is 6128, maybe that --

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10:45 1 THE COURT: Well, I missed it or the court reporter  
10:45 2 missed it, I'm not sure.

10:45 3 MR. VON STERNBERG: No worries.

10:45 4 THE COURT: As long as we made that clear. Okay.  
10:45 5 Thank you.

10:45 6 MR. VON STERNBERG: No worries.

10:45 7 THE COURT: Okay.

10:45 8 BY MR. YORK:

10:45 9 Q. We're on to No. 3 now, Doctor.

10:46 10 A. Yes.

10:46 11 Q. And then try to describe for us what you did in reference  
10:46 12 to how you annotated this list and what means to you in  
10:46 13 reference to contemporaneous builds of other BOPs in deepwater  
10:46 14 environments.

10:46 15 A. Sure. If you look at the far right, the  
10:46 16 *Discoverer Enterprise*, which is one of the vessels that came to  
10:46 17 the rescue here and did the top-down work, that's a  
10:46 18 1999 vessel.

10:46 19 Deepwater Horizon was commissioned in 2001. It has  
10:46 20 two BSRs, one CSR. And we know from their 2003 incident where  
10:46 21 they had to -- the AMF was activated, that the CSR goes first  
10:46 22 and then the BSR, which is typical of any vessel that has more  
10:46 23 than one BSR.

10:46 24 I know this from calling other manufacturers of BOPs,  
10:46 25 GE, NOV, and talking to them about it. The development

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10:46 1 driller, 2 and 3, same thing. Those are the two vessels that  
10:47 2 drilled the relief wells that came to the rescue here.

10:47 3 Q. Well, you know from your investigation the *Marianas* was  
10:47 4 the first rig on the Macondo well. True?

10:47 5 A. Yes. And it was completely inadequate.

10:47 6 Q. And then obviously the *Deepwater Horizon* was the secondary  
10:47 7 vessel they brought in when the *Marianas* was damaged?

10:47 8 A. Right.

10:47 9 Q. Okay. Now, are you trying -- tell the Court what you  
10:47 10 think the right side of this line means in reference to the  
10:47 11 standard of care in the industry as opposed to the left line.

10:47 12 A. Well, to the right side we have at least two sealing shear  
10:47 13 rams. We have backup. On the left side, we've got one BSR,  
10:47 14 and, in fact, the *Deepwater Horizon*, in deadman mode, only has  
10:47 15 one BSR. The CSR does to the activate.

10:47 16 So if you look at deadman, you really have to put the  
10:47 17 *Deepwater Horizon* in the very left column.

10:47 18 Q. All right. Well, let's do that before we close.

10:47 19 MR. VON STERNBERG: Can we put 8226.4 up there,  
10:48 20 please, Rob.

10:48 21 BY MR. VON STERNBERG:

10:48 22 Q. Is that going to do something else, Doctor?

10:48 23 A. Well, it's supposed to move the *Deepwater Horizon* to the  
10:48 24 left.

10:48 25 Q. All right. Well, we'll do that later.



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10:48 1 A. Yep.

10:48 2 MR. VON STERNBERG: Thank you, Your Honor. I'll pass  
10:48 3 the witness.

10:48 4 THE COURT: Thank you. You're done.

10:48 5 THE WITNESS: Thank you, sir.

10:48 6 THE COURT: Thank you.

10:48 7 All right. Halliburton, what do you have next?

10:48 8 SPEAKERG: Yes, Your Honor.

10:48 9 THE COURT: Videos?

10:48 10 MR. GODWIN: We were going to play, with your  
10:48 11 permission, Judge -- Don Godwin. With your permission, we're  
10:48 12 going to play a video first of John Gisclair. It goes for  
10:48 13 about five minutes, I think, Judge.

10:48 14 And then following that, we'll have the  
10:48 15 deposition of Mr. Kurt Kronenberger. He goes for about, I  
10:48 16 think, six or seven minutes total. So it's a total of around  
10:48 17 11 minutes or so for both of them.

10:48 18 THE COURT: Do you have the transcripts for us?

10:48 19 MR. GODWIN: Yes, I do, Judge. I've got those right  
10:49 20 here.

10:49 21 THE COURT: Give us those and we'll turn down the  
10:49 22 lights and you can play them.

10:49 23 MR. GODWIN: I've also got the flash here.

10:49 24 THE COURT: The first one is John Gisclair?

10:49 25 MR. GODWIN: Yes, Judge.

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09:20 1 (WHEREUPON, the videotaped deposition of **John**  
09:20 2 **Gisclair** was played.)

10:57 3 **THE COURT:** This is Mr. Kurt Kronenberger; correct?  
10:57 4 **MR. GODWIN:** Yes, Your Honor.  
10:57 5 **THE COURT:** Okay. Go ahead.  
10:57 6 **MR. GODWIN:** Thank you, Judge.

09:20 7 (WHEREUPON, the videotaped deposition of **Kurt Adam**  
09:20 8 **Kronenberger** was played.)

12:07 9 **MR. GODWIN:** Don Godwin for Halliburton,  
11:02 10 Judge Barbier.  
11:02 11 That concludes our two video clips there. I  
11:02 12 passed up the hard copy transcripts for you as well. We now  
11:03 13 have Dr. Gene Beck we'll call live, Your Honor.  
11:03 14 **THE COURT:** Thank you.  
11:03 15 **MR. GODWIN:** And subject to Dr. Ravi, and some other  
11:03 16 things that are subject to, Dr. Beck is expected to be our last  
11:03 17 witness for Halliburton.  
11:03 18 **THE COURT:** We'll go until about 11:45, and then  
11:03 19 we'll recess for the morning at that time.  
11:03 20 **MR. GODWIN:** Thank you, Your Honor.  
11:03 21 (WHEREUPON, **FREDERICK E. BECK**, having been duly  
11:03 22 sworn, testified as follows.)  
11:03 23 **THE DEPUTY CLERK:** Please state your full name and  
11:03 24 correct spelling for the record.  
11:03 25 **THE WITNESS:** My name is Frederick E. Beck,

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11:03 1 F-R-E-D-E-R-I-C-K, E, B-E-C-K.

11:04 2 **MR. REGAN:** Your Honor, Matt Regan on behalf of BP.

11:04 3 In advance of Mr. Beck's testimony, I would just  
11:04 4 like to again renew the pending *Daubert* motion that we have  
11:04 5 with respect to Dr. Beck. And then it may be something that we  
11:04 6 have to do on a case-by-case basis in terms of testimony. But  
11:04 7 with respect to the report, there are elements and citations to  
11:04 8 particular government reports, government testimony that's been  
11:04 9 ruled out. And I think, as you've indicated before, that's  
11:04 10 something that you can look at when you're reviewing the report  
11:04 11 later on.

11:04 12 **THE COURT:** We'll do that. We'll proceed like that.  
11:04 13 If the report needs to be redacted in any way, hopefully you  
11:04 14 all can agree to that. Okay?

11:04 15 **MR. HILL:** Yes, Your Honor.

11:04 16 Good morning, Your Honor. Gavin Hill for  
11:04 17 Halliburton, conducting direct examination of Dr. Beck.

11:04 18 **DIRECT EXAMINATION**

11:04 19 **BY MR. HILL:**

11:05 20 **Q.** Dr. Beck, you don't go by "Frederick," do you?

11:05 21 **A.** Typically, I go by "Gene."

11:05 22 **Q.** You've already given your name to the Court. Can you tell  
11:05 23 us where you currently live.

11:05 24 **A.** I live in Austin, Texas, today.

11:05 25 **Q.** By whom are you currently employed?

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11:05 1 A. I work today for Statoil, oil and gas.

11:05 2 Q. What position do you hold for Statoil?

11:05 3 A. I'm a drilling and wells manager.

11:05 4 Q. What are your primary responsibilities as a drilling  
11:05 5 manager?

11:05 6 A. I work in the Williston district, which is in  
11:05 7 North Dakota.

11:05 8 Q. What do you do?

11:05 9 A. I manage drilling and -- well, I'm the drilling and  
11:05 10 completion manager for our operations in North Dakota.

11:05 11 Q. And how long have you held that position?

11:05 12 A. I just took that position full-time as an employee back in  
11:05 13 December. I had been a consultant in a similar role for about  
11:05 14 18 months prior to that.

11:05 15 Q. Thank you, Dr. Beck.

11:05 16 **MR. HILL:** Could we please have TREX-22571.

11:04 17 **BY MR. HILL:**

11:05 18 Q. Dr. Beck, I'm going to put up on the screen here --  
11:05 19 By the way, do you have a laser pointer up there that  
11:06 20 you can use?

11:06 21 **MR. HILL:** Next page, please.

11:04 22 **BY MR. HILL:**

11:04 23 Q. I'm putting up on the screen a copy of your CV that has  
11:06 24 been produced as an appendix to your report. I'd like to just  
11:06 25 go through a few things.

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11:06 1 Can you tell the Court what degrees you have,  
11:06 2 college-level degrees, please.

11:06 3 A. Yes. I earned a bachelor's degree in geology, and MS and  
11:06 4 Ph.D. degrees in petroleum engineering. They were all from LSU  
11:06 5 in Baton Rouge.

11:06 6 Q. When did you obtain your Ph.D.?

11:06 7 A. In 1986.

11:06 8 MR. HILL: Let's go to the next section, please.

11:04 9 BY MR. HILL:

11:05 10 Q. Can you tell the Court a little bit about the professional  
11:06 11 associations to which you belong and some of the activities  
11:06 12 that you have achieved with respect -- in association with  
11:06 13 those committees.

11:06 14 A. Yeah. I'm a long-standing member of the Society of  
11:06 15 Petroleum Engineers, SPE, as it's known. I've served on  
11:06 16 various committees for SPE over the years.

11:06 17 I've also served on an advisory committee for the LSU  
11:07 18 petroleum engineering department for quite some time now.

11:07 19 At various points in my career, I was a member of the  
11:07 20 American Association of Petroleum Geologists and a member of  
11:07 21 the IADC, the International Association of Drilling  
11:07 22 Contractors.

11:07 23 Q. How long have you been a member, for example, of the  
11:07 24 Society of Petroleum Engineers?

11:07 25 A. I joined SPE in college, I think, in 1981.

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11:07 1 Q. Doctor, turning to some of your prior employment, I see by  
11:07 2 your CV that prior to Statoil you were actually a professor.  
11:07 3 Correct?

11:07 4 A. Yes. I was on the faculty at Texas A&M through August of  
11:07 5 2012.

11:07 6 Q. What did you teach at A&M?

11:07 7 A. I taught drilling engineering, both a beginning level and  
11:07 8 an advanced level, at the senior engineering level at the  
11:07 9 school. And I also taught a graduate course in drilling  
11:07 10 engineering.

11:07 11 Q. How long did you actually teach as a professor at Texas  
11:08 12 A&M?

11:08 13 A. I was there for three full academic years.

11:08 14 Q. Okay. Prior to that, you've had some experience in the  
11:08 15 petroleum industry -- the oil and gas industry; correct?

11:08 16 A. Correct.

11:08 17 Q. Let's talk a little bit about that.

11:08 18 There's an entry on your CV that says "Vice  
11:08 19 President, Drilling/Operations, Gastar Exploration"; correct?

11:08 20 A. That is correct.

11:08 21 Q. Can you tell the Court, how long were you with Gastar  
11:08 22 Exploration?

11:08 23 A. I went to work for them in 2002 and left them in 2011, as  
11:08 24 I was transitioning into my teaching role at Texas A&M.

11:08 25 Q. So that's approximately nine to ten years.

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11:08 1 A. Nine to ten years.

11:08 2 Q. During that time, can you tell the Court primarily what  
11:08 3 your job responsibilities were.

11:08 4 A. So I was their operations manager early on. This was a  
11:08 5 really small company. And as we grew, my job became the  
11:08 6 drilling manager, as we hired a completion -- or a production  
11:08 7 manager for the company.

11:08 8 So my job was primarily operations management, from a  
11:09 9 senior management level all the way down to the drilling  
11:09 10 engineer, watching the rigs where we were drilling.

11:09 11 Q. How many, approximately, wells did you drill when you were  
11:09 12 with Gostar Exploration?

11:09 13 A. I think over that time period the count would be somewhere  
11:09 14 in between 30 and 40 wells.

11:09 15 Q. What types of wells were they?

11:09 16 A. These were very deep, very high pressure, very high  
11:09 17 temperature natural gas wells. The depths were in the 19- to  
11:09 18 20,000-foot vertical depth range.

11:09 19 Q. All right. In the interest of time, I'm going to skip  
11:09 20 over the consulting part that came there.

11:09 21 I'd like to jump to the time period of June 1996 to  
11:09 22 February 2002. Your CV says that you were the vice president  
11:09 23 at Nabors Drilling USA; correct?

11:09 24 A. That is correct.

11:09 25 Q. Can you tell Judge Barbier, who is Nabors Drilling?

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11:09 1 A. Nabors Drilling is a large drilling contractor. They're  
11:09 2 primarily land-based. They do have some offshore operations,  
11:10 3 but I worked in the land-based department of Nabors Drilling.  
11:10 4 Q. All right. Did you also drill -- and were you responsible  
11:10 5 for the drilling of high-pressure wells while you were at  
11:10 6 Nabors?  
11:10 7 A. Yes. My job at Nabors was as the turnkey drilling  
11:10 8 manager. And once again, it was a very small group of perhaps  
11:10 9 five or six engineers. And we were -- we were drilling wells  
11:10 10 for a fixed price for operators.  
11:10 11 Q. Okay.  
11:10 12 MR. HILL: Could you go to the next page, please.  
11:04 13 BY MR. HILL:  
11:05 14 Q. I'd like to go to the part here with respect to your ARCO  
11:10 15 Alaska experience.  
11:10 16 Can you tell the Court, between 1990 and 1996, what  
11:10 17 you did for ARCO Alaska.  
11:10 18 A. Well, I was hired into the industry. I had another  
11:10 19 academic job prior to this, and I went do work basically as an  
11:10 20 entry-level engineer, and went through some abbreviated  
11:10 21 training programs.  
11:11 22 And then I was in the drilling department, and I  
11:11 23 served as both a drilling engineer and a well site supervisor  
11:11 24 in that capacity.  
11:11 25 Q. Now, the Court has heard a couple of terms like "company



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11:11 1 man" and "well site leader."

11:11 2 Does any of that pertain to you, in terms of what you

11:11 3 did?

11:11 4 A. Yeah. Traditionally, we were referred to as company men,

11:11 5 drilling foreman. It could be drill site supervisor. Some of

11:11 6 the modern lingo is team leader or well site leader. They're

11:11 7 all the same description of that job.

11:11 8 Q. So on a drilling rig you had experience being the guy, the

11:11 9 company man, who actually directs the operations of drilling;

11:11 10 right?

11:11 11 A. Yes, I did.

11:11 12 Q. And you also supervised the activities of service

11:11 13 contractors that were also on the rig; correct?

11:11 14 A. Correct.

11:11 15 Q. And then prior to that, you had another teaching job in

11:11 16 academia; is that right?

11:11 17 A. Yes, I did.

11:11 18 Q. Could you tell the Court what that was.

11:11 19 A. Well, I was an assistant professor of petroleum

11:11 20 engineering, so an entry-level professor job at -- it's

11:12 21 New Mexico Tech. It's also known as New Mexico School of

11:12 22 Mining and Technology.

11:12 23 Q. What did you teach while you were there?

11:12 24 A. I taught, really, all phases of petroleum engineering,

11:12 25 primarily drilling, well completions, well design, casing

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11:12 1 design. But I also taught reservoir engineering and formation  
11:12 2 evaluation.

11:12 3 Q. Okay. Just a few more things.

11:12 4 In your CV there is a section starting on page 2 and  
11:12 5 continuing over to page 3 entitled "Publications and Reports"  
11:12 6 that identifies 12 publications or reports that you either  
11:12 7 authored or coauthored; correct?

11:12 8 A. Yes, correct.

11:12 9 Q. Is this an accurate list of publications that you have  
11:12 10 either co-authored or authored in the field of petroleum  
11:12 11 engineering and drilling?

11:12 12 A. I'd have to look at the very bottom.

11:12 13 Yes, I think that is an updated list. There may be  
11:12 14 one or two more papers that were added to that list last fall,  
11:13 15 but that is my publication record.

11:13 16 Q. Very good.

11:13 17 Finally, with respect to prior testimony, have you  
11:13 18 testified as an expert before in the last four years?

11:13 19 A. Yes.

11:13 20 Q. And is the case identified in your CV the case in which  
11:13 21 you testified?

11:13 22 A. Yes, it is.

11:13 23 Q. Okay. Can you tell the Court the nature of that case.

11:13 24 A. That was a dispute over some leased positions between the  
11:13 25 City of Houston and a private company. And I was asked to be

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11:13 1 an expert in the area of -- primarily drilling engineering and  
11:13 2 directional drilling engineering.

11:13 3 Q. I should ask you this. Do you consider yourself to be a  
11:13 4 professional expert?

11:13 5 A. Yes.

11:13 6 Q. Have you previously testified before, before any  
11:13 7 government body, regarding the Macondo incident?

11:13 8 A. Let me clarify my prior answer real quick.

11:13 9 In terms of --

11:13 10 Q. I was going to ask -- I was trying not to draw attention  
11:13 11 to it.

11:13 12 A. I'm an expert. I consider myself to be a well-versed  
11:14 13 petroleum and drilling engineer. I'm current with industry  
11:14 14 practice.

11:14 15 I'm not a professional expert witness. That's not  
11:14 16 really what I do for a living.

11:14 17 Q. In fact, you've been hired once in the last four years to  
11:14 18 be an expert; correct?

11:14 19 A. That's correct.

11:14 20 Q. All right. You had me a little concerned, because I  
11:14 21 didn't understand that to be your first response.

11:14 22 MR. REGAN: I thought it was pretty clear.

11:14 23 BY MR. HILL:

11:14 24 Q. But notwithstanding the fact that you've testified only  
11:14 25 once in the past, have you been asked to testify before any

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11:14 1 government body regarding the Macondo incident?

11:14 2 A. Just following the incident I was invited by the  
11:14 3 U.S. Senate to provide testimony in front of a committee in the  
11:14 4 U.S. Senate.

11:14 5 Q. Can you tell the Court how that came to pass, how you came  
11:14 6 to be someone who was asked to come testify before the Senate  
11:14 7 committee.

11:14 8 A. It was associated with my role on the faculty at Texas  
11:14 9 A&M, when -- you know, when experts were being sought in this  
11:15 10 area. They, obviously, contacted universities looking for  
11:15 11 experts, Texas A&M being, you know, one of the better-known  
11:15 12 petroleum engineering schools in the world. I'm pretty sure  
11:15 13 they came to us early on, and they sent me an invitation to  
11:15 14 provide testimony to the senate.

11:15 15 Q. And do you recall at whose invitation you went?

11:15 16 A. I had an invitation from Senator Jeff Bingaman to do that.

11:15 17 **MR. HILL:** Your Honor, Halliburton would tender  
11:15 18 Dr. Frederick Beck as an expert in the area of drilling  
11:15 19 operations to assist the Court in understanding the issues that  
11:15 20 we're going to talk about in this case.

11:15 21 **MR. REGAN:** Without waiving the pending *Daubert*  
11:15 22 motion, I think we can have our voir dire questions on  
11:15 23 cross-examination.

11:15 24 **MR. BRIAN:** Your Honor, Transocean would object, that  
11:15 25 there's been an inaccurate foundation as to his expertise in

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11:15 1 reference to mud logging. I can take up in cross-examination  
11:15 2 and renew the objection at that time, Your Honor.

11:15 3 **THE COURT:** Is he going to offer opinions in mud  
11:15 4 logging?

11:15 5 **MR. HILL:** Your Honor, Dr. Beck has actually prepared  
11:16 6 part of his report in response to some of the mud logging  
11:16 7 issues. I don't intend on his direct to actually bring a lot  
11:16 8 out of it, other than a pit volume analysis that he's done.

11:16 9 If Your Honor wants to see the opinions that  
11:16 10 he's filed, it's part of Appendix C to his expert report.

11:16 11 **THE COURT:** Okay. I'll reserve ruling.

11:16 12 **MR. BRIAN:** Your Honor, then I guess I would ask --  
11:16 13 if he's not going to offer opinions, I would ask that that  
11:16 14 portion of his report not be offered into evidence as his  
11:16 15 direct testimony, or else I will have to cross-examine him on  
11:16 16 it.

11:16 17 **THE COURT:** Yes. We either need to have an agreement  
11:16 18 that he's not going to offer opinions, or Mr. Brian will  
11:16 19 cross-examine him on that.

11:16 20 **MR. HILL:** Your Honor, I think, with respect to the  
11:16 21 agreement, we would tender that as part of his report.  
11:16 22 Mr. Brian is free to cross-examine him on those issues.

11:16 23 **THE COURT:** Very well. Very well.

11:16 24 **BY MR. HILL:**

11:16 25 **Q.** Dr. Beck, could you basically tell the Court what you were

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11:16 1 asked to do in this case.

11:16 2 A. Well, I was asked to review the time frame on this  
11:17 3 incident, you know, ending at the closing of the BOP, right up  
11:17 4 to the explosion, and then going back in time, as I saw fit, to  
11:17 5 try to develop an understanding of what happened, you know,  
11:17 6 what was the context of the blowout, what were the direct  
11:17 7 causes, what were the root causes of blowout.

11:17 8 Q. Have you done that work?

11:17 9 A. Yes, I have.

11:17 10 Q. Have you formed opinions relative to the scope of work  
11:17 11 that you just described?

11:17 12 A. Yes, I have.

11:17 13 Q. What documents, generally -- and I've seen your reliance  
11:17 14 list, but I'm just asking general categories of documents --  
11:17 15 did you review to assist you in forming the opinions that you  
11:17 16 arrived at?

11:17 17 A. Well, I looked at some of the basic data, the daily  
11:17 18 drilling reports.

11:17 19 I looked at the Sperry drilling log data that -- that  
11:17 20 was the direct measurement of -- measurements coming off the  
11:17 21 rig.

11:17 22 I looked at e-mail communications amongst people.

11:17 23 I looked at the governing documents that the BP  
11:18 24 drilling department was operating under.

11:18 25 Q. Have you reviewed depositions that have been -- deposition

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11:18 1 transcripts that have been taken in this MDL proceeding?

11:18 2 A. Yes. Depositions, as well, were included in my review.

11:18 3 Q. Have you read or reviewed the reports and rebuttal reports

11:18 4 of the experts of other parties involved in this proceeding?

11:18 5 A. Yes, I have.

11:18 6 Q. Have you responded in a rebuttal nature to those, to the

11:18 7 extent they pertain to drilling opinions?

11:18 8 A. Yes, I have.

11:18 9 Q. And are those opinions that you've reached contained in a

11:18 10 rebuttal -- in a written report and in a rebuttal report?

11:18 11 A. Yes, they are.

11:18 12 Q. Since the issue came up, have you also filed opinions with

11:18 13 the Court, or at least submitted opinions, regarding mud

11:18 14 logging?

11:18 15 A. Yes, I have.

11:18 16 Q. And are those contained in Appendix C to your report, as

11:18 17 well as parts of the main report?

11:18 18 A. Yes, they are.

11:18 19 **MR. HILL:** Your Honor, at this time Halliburton would

11:18 20 move to admit Dr. Beck's expert report, or revised expert

11:18 21 report, at TREX-8140.

11:19 22 **THE COURT:** Yes. I'm going to conditionally admit it

11:19 23 with the understanding that it may have to be redacted. We've

11:19 24 done that with at least one or two of the expert reports, as I

11:19 25 recall. Okay?

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11:19 1 **MR. HILL:** Understood, Your Honor.

11:19 2 For completeness the revised expert report -- by  
11:19 3 the way, so that you know it's revised, because he fixed some  
11:19 4 citations early on in the case, that's why it's redlined. But  
11:19 5 that's one that's on the Court's list.

11:19 6 And his report is at 8140; the rebuttal is at  
11:19 7 TREX-61117; and the Appendix C mud logging report is identified  
11:19 8 as TREX-8154. And those are the three documents we would move  
11:19 9 for admission, Your Honor.

11:19 10 **THE COURT:** Okay.

11:19 11 **BY MR. HILL:**

11:19 12 **Q.** Dr. Beck, to start out, I'd like to turn to the issue of  
11:19 13 an operator in this case, BP's authority with respect to well  
11:20 14 construction, okay?

11:20 15 As a former company man, what is your opinion as to  
11:20 16 the level of authority that an operator like BP exercises over  
11:20 17 its service contractors?

11:20 18 **A.** Well, the operator in our business is the boss. They  
11:20 19 command and control operations in terms of the strategies and  
11:20 20 down all the way to some particular tactics that are used in  
11:20 21 drilling the well. You know, they provide designs, they  
11:20 22 provide supervision, just a variety of things.

11:20 23 But the short answer is the operator is the boss of  
11:20 24 the drilling operation.

11:20 25 **Q.** Let me ask you this: In your opinion, could Halliburton



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11:20 1 pump a cement job without BP knowing about that job and  
11:20 2 approving it?

11:20 3 A. In my opinion, no.

11:20 4 Q. Okay. Do you find that this relationship between the --  
11:20 5 in your experience between the operator and the service  
11:20 6 contractor is consistent industry-wide?

11:20 7 A. In my experience, it has been the operator maintains  
11:20 8 control of operations and to qualify that, when these  
11:21 9 operations are conducted on what's called a day work drilling  
11:21 10 basis, which is what was happening on the *Deepwater Horizon*.

11:21 11 Q. Explain what that term means.

11:21 12 A. Well, "day work" meaning the contractual basis that the  
11:21 13 operator basically rents the rig on a day-by-day basis and this  
11:21 14 is opposed to what I spoke of earlier, turnkey drilling basis  
11:21 15 where an operator pays a fixed price for drilling a well and a  
11:21 16 contractor delivers the well at that fixed price.

11:21 17 Q. Now, as part of the analysis of the review that you've  
11:21 18 conducted, did you look at portions of the BP/Halliburton  
11:21 19 contract for the Gulf of Mexico?

11:21 20 A. Yes, I did.

11:21 21 MR. HILL: Dave, could you bring up TREN-4477,  
11:21 22 please.

11:21 23 Let's go to Section 29.3, which is on the page Bates  
11:21 24 ending 5608.

11:22 25 Can we pull this out right here, please.

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11:22 1 BY MR. HILL:

11:22 2 Q. Dr. Beck, have you seen this Section 29.3 before?

11:22 3 A. Yes, I have.

11:22 4 Q. It says: "The contractor may give company the benefit of  
11:22 5 its judgment based on its experience interpreting information  
11:22 6 and making recommendations. . . "

11:22 7 Before I read further, what is your understanding as  
11:22 8 to who the contractor is in this language?

11:22 9 A. Well, the contractor in this situation would be  
11:22 10 Halliburton.

11:22 11 Q. And who would the company be?

11:22 12 A. The company would be the operator, BP.

11:22 13 Q. All right. So starting again: "Contractor may give  
11:22 14 company the benefit of its judgment based on its experience  
11:23 15 interpreting information and making recommendations, either  
11:23 16 written or oral, as to data or amount of material or type of  
11:23 17 oilfield service to be provided by contractor, or the manner of  
11:23 18 performance or in the prediction of results."

11:23 19 Did I read that correctly?

11:23 20 A. Yes, you did.

11:23 21 Q. All right. The next sentence says: "Notwithstanding the  
11:23 22 foregoing, all such recommendation and/or predictions shall be  
11:23 23 received by company as opinions only, and no warranty expressed  
11:23 24 or implied shall be inferred by company from such  
11:23 25 recommendations and/or in view of the impracticability of

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11:23 1 obtaining firsthand knowledge of the many variable conditions,  
11:23 2 the reliance on inferences, measurements and assumptions which  
11:23 3 are not infallible and/or the necessity of relying on facts and  
11:23 4 supporting oilfield services provided by others."

11:23 5 Did I read that correctly?

11:23 6 A. Yes, you did.

11:23 7 Q. Can you explain what your understanding of what this means  
11:23 8 in terms of the recommendations provided by the service  
11:24 9 company? What does it mean to you?

11:24 10 MR. REGAN: Your Honor, I object to that question.  
11:24 11 He can read the contract. He's not a legal expert.

11:24 12 THE COURT: I sustain the objection.

11:24 13 BY MR. HILL:

11:24 14 Q. Let me ask you this way: In this case there has been a  
11:24 15 lot of -- first of all, do you understand that Halliburton can  
11:24 16 actually provide recommendations on cementing, for example to,  
11:24 17 BP?

11:24 18 A. Yes.

11:24 19 Q. Okay. Do you understand that those are actually  
11:24 20 considered by BP to be opinions only without express warranties  
11:24 21 applied to them?

11:24 22 MR. REGAN: That's speculation.

11:24 23 THE COURT: I sustain the objection.

11:24 24 BY MR. HILL:

11:24 25 Q. Why don't you explain your understanding -- your

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11:24 1 understanding in the industry of what a recommendation provided  
11:24 2 by a service contractor is?

11:24 3 A. Well, first off, I'd like to say that, you know, we  
11:24 4 conduct business on a daily basis under MSAs, under master  
11:24 5 service agreements with this similar type of language. And  
11:24 6 this type of language establishes a relationship between the  
11:24 7 contractor and the company where the company may ask the  
11:24 8 contractor for their opinions and for services to be conducted.  
11:25 9 And the response from the contractor is, yes, we're glad to  
11:25 10 help, we'll do our best, but we can't deliver a warranty on  
11:25 11 this work because we're not in a position to know all of the  
11:25 12 information that we may need to know to be able to provide  
11:25 13 something as a warranty.

11:25 14 So --

11:25 15 **MR. REGAN:** Your Honor, I move to strike that answer  
11:25 16 as basically back door of the same question he just asked. And  
11:25 17 also, it's not a disclosed opinion that he's an expert in the  
11:25 18 legal relationships between how operators and service providers  
11:25 19 work.

11:25 20 **MR. HILL:** Your Honor, he has been a well site  
11:25 21 leader. He actually manages wells. He's talked about he's  
11:25 22 very familiar with -- even in his report, about the  
11:25 23 relationship between the contractor and the service provider.

11:25 24 **THE COURT:** I'll allow the testimony.

11:25 25 **MR. HILL:** We'll move on.

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11:25 1           **THE COURT:** With the understanding that when the  
11:25 2 witness starts talking about warranties and all, we're really  
11:25 3 going into legal issues that the Court will decide.

11:25 4           **MR. HILL:** Understood, Your Honor.

11:25 5 **BY MR. HILL:**

11:25 6 **Q.** Dr. Beck, with respect to the opinion that you just  
11:26 7 expressed about this relationship between operators and  
11:26 8 contractors, based on your experience, is this a common  
11:26 9 understanding of the relationship in the industry?

11:26 10 **A.** Yes, it is.

11:26 11 **Q.** Do you have any understanding as to why the relationship  
11:26 12 between the operator and the service contractor has developed  
11:26 13 this way?

11:26 14 **A.** Well, it's primarily a business relationship that's based  
11:26 15 on risk/reward. And typically, a contractor is working for a  
11:26 16 fee and it's a set fee in most cases and the company, the  
11:26 17 operator is working for a much bigger risk-based reward. They  
11:26 18 take a lot more risk, but they make a lot more reward when they  
11:26 19 start producing and selling hydrocarbons.

11:26 20 **Q.** Turning -- or shifting directions just a little bit. I'd  
11:26 21 like to discuss with you about some of the specific decisions  
11:26 22 made on the Macondo well but first talk to you, when you  
11:26 23 conducted your analysis, did you use any particular documents  
11:27 24 to, I guess, form a framework for your analysis?

11:27 25 **A.** Yes. When I looked at the information, okay, of course,

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11:27 1 as I mentioned earlier, numerous documents of data, of reports,  
11:27 2 of, you know, the Sperry data, e-mails. But one of the first  
11:27 3 things I really did when I started my analysis was to look at  
11:27 4 the governance documents provided by BP or the BP governance  
11:27 5 documents that basically set out standards and directives on  
11:27 6 how wells are supposed to be drilled.

11:27 7 **MR. HILL:** Can we bring up TREX-6121, please.

11:27 8 The cover, please, 5404.

11:28 9 **BY MR. HILL:**

11:28 10 **Q.** Is this the document you're talking about?

11:28 11 **A.** Yes, it is.

11:28 12 **Q.** Can you explain to the Court what it is, please?

11:28 13 **A.** I couldn't understand you.

11:28 14 **Q.** Can you explain what it is?

11:28 15 **A.** Oh. This -- this is a governing document. It's a  
11:28 16 drilling and well operations practice, which sets forth a  
11:28 17 framework under which to conduct your drilling and well  
11:28 18 operations.

11:28 19 **Q.** All right. Let's look at a couple specific provisions.

11:28 20 Is there a provision that you found in this document that  
11:28 21 addresses the design standards to which BP's engineers are  
11:28 22 expected to design wells?

11:28 23 **A.** The whole document is basically design standards, so there  
11:28 24 are specific provisions which dictate that, yes.

11:28 25 **MR. HILL:** Bring up Section 1.2, ends on Bates

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11:28 1 page 4512.

11:28 2 **BY MR. HILL:**

11:29 3 **Q.** The first sentence says: "BP is committed to conducting  
11:29 4 its business in a manner which ensures that wells are designed,  
11:29 5 drilled, completed, and maintained to high and consistent  
11:29 6 standards."

11:29 7 Did I read that correctly?

11:29 8 **A.** Yes, you did.

11:29 9 **Q.** Is this one of the provisions that you relied on for  
11:29 10 purposes of an interpreted framework for your opinions?

11:29 11 **A.** Absolutely. I think it begins to set a framework and a  
11:29 12 theme for how business is expected to be conducted.

11:29 13 **Q.** Did you see a provision in this DWOP document where BP  
11:29 14 spoke to managing risk?

11:29 15 **A.** Yes, I did.

11:29 16 **Q.** Okay.

11:29 17 **MR. HILL:** Can we please bring up Section 3.3.1, ends  
11:29 18 Bates page 4519. Bring that up.

11:29 19 **BY MR. HILL:**

11:29 20 **Q.** Can you please read to the Court the first sentence. Is  
11:29 21 this one of the provisions that you looked at?

11:29 22 **A.** It is, and it's one of the key provisions. "All risks  
11:30 23 shall be managed to a level which is as low as reasonably  
11:30 24 practicable."

11:30 25 **Q.** Is that a good thing, Dr. Beck?

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11:30 1 A. I think it is, yes.

11:30 2 Q. Is there a provision in this DWOP where BP prioritizes the  
11:30 3 safety considerations in its activities?

11:30 4 A. Yes. Yes, there is.

11:30 5 MR. HILL: Can you bring up Section 2.3, please, of  
11:30 6 this DWOP document, page ending at Bates 4516.

11:30 7 BY MR. HILL:

11:30 8 Q. Can you explain to the Court what you learned about BP's  
11:30 9 DWOP -- DWOP guidance to its engineers about how to prioritize  
11:30 10 safety concerns?

11:30 11 A. Well, it's very clear that -- you know, the priorities are  
11:30 12 set forth as listed here: People first; right? Protect  
11:30 13 people, protect the environment, protect an installation, and  
11:30 14 then you worry about what's happening to the economic aspect of  
11:30 15 your investment, the reservoir, and the actual well that you're  
11:31 16 drilling.

11:31 17 Q. In terms of delivering a well, where does it rank in this  
11:31 18 list of priorities?

11:31 19 A. Well, it's last.

11:31 20 Q. What is your opinion, generally, regarding what you  
11:31 21 reviewed in the DWOP in terms of guidance to drilling  
11:31 22 engineers?

11:31 23 A. Well, I think that it establishes a spirit that -- you  
11:31 24 know, the spirit of the document is to be safe and to do the  
11:31 25 right thing, all the way down to details in the document that



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11:31 1 tell you some very specific tasks to do to be safe. So I think  
11:31 2 the document is actually quite a good framework under which the  
11:31 3 engineers can function and safely drill wells.

11:31 4 Q. And we're going to talk about specific examples, but I  
11:31 5 would like to ask you just generally before we get into it:  
11:32 6 What is your opinion as to the BP decision-making on the  
11:32 7 Macondo well, whether it was consistent with the spirit and the  
11:32 8 letter of the provisions, some of which we just discussed, in  
11:32 9 the DWOP?

11:32 10 A. Well, I looked -- I looked at a period of time, you know,  
11:32 11 probably a week period of time, and looked at several critical  
11:32 12 decisions. And in doing my analysis, I mean, I began to be  
11:32 13 concerned that there were a series of decisions that were made,  
11:32 14 not just one decision, not one decision taken, you know, out of  
11:32 15 context, but a series of decisions that were made that seemed,  
11:32 16 in my opinion, to be overly concerned with well delivery and, I  
11:32 17 think in many of the cases, less concerned with safety than  
11:32 18 they should have been.

11:32 19 Q. All right. Let's talk -- let's jump right to -- and what  
11:32 20 I'd like to do is go through and talk about a couple of  
11:32 21 specific decisions that were made, okay? That's what we'll do  
11:33 22 up until lunch, if you're okay with that.

11:33 23 Let's talk about the drilling margin. This Court has  
11:33 24 heard lots of testimony already that BP was essentially running  
11:33 25 out of drilling margin as it got to total depth. Okay? In

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11:33 1 fact, that's not inconsistent with an opinion in your report;  
11:33 2 correct?

11:33 3 A. That's very consistent with my report, yes.

11:33 4 Q. There's been testimony about this, but I would like you to  
11:33 5 explain to the Court --

11:33 6 MR. HILL: And perhaps if we could bring up  
11:33 7 Demonstrative 8015.

11:33 8 BY MR. HILL:

11:33 9 Q. -- what were the specific circumstances that actually led  
11:33 10 to the narrowing of the drilling margin or the running out of  
11:33 11 drilling margin that we've heard so much testimony about?

11:33 12 A. Well, I think first off, I'd like to offer a concept of a  
11:33 13 drilling margin that's very simple for non-drilling engineers  
11:33 14 to understand, and that's basically that in the context of  
11:33 15 drilling a well, you need to have the flexibility at all times  
11:33 16 of increasing your mud weight to contain the pressures in the  
11:34 17 subsurface formations.

11:34 18 So when you no longer have the ability to increase  
11:34 19 your mud weight to contain pressures, you're out of drilling  
11:34 20 margin.

11:34 21 Q. Okay. So why, in this case of Macondo, was there a  
11:34 22 concern over whether or not mud weight could be increased  
11:34 23 appropriately?

11:34 24 A. Well, if you look at, you know, both this diagram and some  
11:34 25 of the facts of drilling a well, as they drilled down -- here's

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11:34 1 where they set their prior casing. So -- yeah, here's where  
11:34 2 they set the prior casing. If you look at the pressures -- and  
11:34 3 these are expressed, you know, in a fairly odd way. They're  
11:34 4 not in pounds per square inch like you normally see pressure.  
11:34 5 They're in pounds per gallon, but that's basically equivalent  
11:34 6 to pounds per square inch.

11:34 7 The pressures above the main zones were higher than  
11:34 8 the pressures in the lower zones.

11:34 9 Q. Okay. What is that called? Have you heard that referred  
11:35 10 to --

11:35 11 A. It's pore pressure.

11:35 12 Q. Have you heard it referred to as "regressive pore  
11:35 13 pressure"?

11:35 14 A. So this is -- when the pressure starts reducing, a normal  
11:35 15 situation in the subsurface is that the pressures increase with  
11:35 16 depth. In certain areas and under certain conditions, these  
11:35 17 pressures can reduce with depth. So as that pressure is  
11:35 18 reduced in these lower formations, one of the other components  
11:35 19 of a formation is its ability to support the density of the  
11:35 20 drilling fluid that's required to balance the pressure.

11:35 21 Q. Let me ask you this: The mud weight that was being used  
11:35 22 on the Macondo well, its weight was targeted to hold back what  
11:35 23 fluid formations?

11:35 24 A. Well, when you drill any zone, you have to have a weight  
11:35 25 high enough to balance the highest pressure that you encounter.

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11:35 1 So they would need 14.2 per gallon mud weight. What happened  
11:35 2 on the Macondo well was as they drilled into this lower zone,  
11:35 3 into the 12.6 pound per gallon mud weight, they began to -- the  
11:36 4 mud began to flow into these subsurface formations where the  
11:36 5 lower pressure was.

11:36 6 Q. Okay. So at this point, BP faces options; right?

11:36 7 A. Yes, they did.

11:36 8 Q. When BP figures out it's run out of drilling margin, what  
11:36 9 options are available to BP?

11:36 10 A. Well, basically you can stop and try and fix and try to  
11:36 11 repair the lack of -- the loss of margin, or you can take the  
11:36 12 chance to move forward with your operation and try to operate  
11:36 13 without suitable drilling margin.

11:36 14 Q. Based on your review, what did BP decide to do?

11:36 15 A. Well, they did not stop and repair the lack of margin;  
11:36 16 they proceeded.

11:36 17 Q. So let's talk about that concept of repairing the lack of  
11:36 18 margin. What could BP have done in order to repair this lack  
11:36 19 of margin?

11:36 20 A. Well, the sure repair, the most definite repair in a  
11:36 21 situation like this is to actually stop -- there's my pointer  
11:36 22 right there -- is to actually as you drill down -- now, they  
11:37 23 had drilled this well, had exposed these formations, an option  
11:37 24 would have been, then, to recognize that circulation was going  
11:37 25 to be difficult, continued operations were going to be

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11:37 1 difficult.

11:37 2 They could have filled this portion of the wellbore  
11:37 3 back up with cement, basically abandoning it temporarily. They  
11:37 4 could have run another casing string or a liner string down  
11:37 5 into this position right here above the low pressured zones.  
11:37 6 When you run that liner in and then you cement it in place, you  
11:37 7 end up isolating the wellbore from these high pressures.

11:37 8 Q. What does that do in terms of your flexibility with  
11:37 9 managing mud weight if you've isolated the higher pressures?

11:37 10 A. So once you've done that, you have reduced or eliminated  
11:37 11 the need to have the 14-pound mud in the wellbore anymore  
11:37 12 because it's now isolated by the casing in the cement and you  
11:37 13 can lower your mud weight and successfully drill these bottom  
11:38 14 zones with a much lower mud weight than you could circulate  
11:38 15 without risk of lost circulation.

11:38 16 Q. And now -- this is kind of jumping out. I know we're  
11:38 17 going to talk about this later, but I think it's important to  
11:38 18 connect this part for the Court.

11:38 19 We've heard difficulties of ECDs in designing the  
11:38 20 cement job. And you understand and you address that in your  
11:38 21 report; correct?

11:38 22 A. Correct.

11:38 23 Q. We've also heard about BP not circulating full bottoms-up  
11:38 24 because of concerns about breaking the formation. And you  
11:38 25 address that in your report as well; right?

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11:38 1 A. Amongst other reasons. But, I mean, my opinion was one of  
11:38 2 the concerns was they were scared of losing circulation if they  
11:38 3 had to circulate too much on the well.

11:38 4 Q. Had BP actually set a liner in the manner you've just  
11:38 5 described and isolated those upper sands, what, if anything,  
11:38 6 does that do to BP's flexibility with respect to bottoms-up  
11:38 7 circulation and not being worried about fracturing formation  
11:39 8 during the cement job?

11:39 9 A. Well, by lowering your mud weight -- once you set that  
11:39 10 additional liner, you can lower your mud weight and now you've  
11:39 11 returned the well to the appropriate margin, meaning you have  
11:39 12 the ability to raise mud weight. You also have the ability to  
11:39 13 circulate a lower mud weight in the well, which would allow you  
11:39 14 to circulate bottoms-up. It would allow you to do a much more  
11:39 15 conventional cement job. It would put the well back in a very  
11:39 16 safe framework for proceeding with operations.

11:39 17 **MR. HILL:** Could you please bring up D-8027.

11:39 18 **BY MR. HILL:**

11:39 19 Q. Now, is this a demonstrative you've prepared?

11:39 20 A. Yes, it is.

11:39 21 Q. I probably should have put this up earlier as you were  
11:39 22 explaining a liner option. Is this a representation of what  
11:39 23 you were talking about, about setting a liner?

11:39 24 A. Basically, it is. You can see where a liner is set in the  
11:39 25 well right here, cemented in place so the liner and the cement

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11:39 1 together isolate these higher pressures. And by isolating  
11:40 2 those formations where the pressure is higher, now you only  
11:40 3 need a mud weight appropriate to balance the 12.6 zone. You  
11:40 4 can reduce your mud weight, which reduces the potential of lost  
11:40 5 circulation as you drill ahead.

11:40 6 Q. So basically, this boils down to what you said is BP's  
11:40 7 option if they went ahead with this long string casing  
11:40 8 configuration; right?

11:40 9 A. Well, I think this is an option that could have been  
11:40 10 taken. BP proceeded, of course, when they drilled into the  
11:40 11 reservoir, to complete the well. And they had choices even at  
11:40 12 that point. Even if you didn't back up and try to repair your  
11:40 13 drilling margin, they had choices that could be made between  
11:40 14 how they proceeded to complete the well as drilled.

11:40 15 Q. Okay. Can you explain that? What other options were  
11:40 16 available?

11:40 17 A. Well, the two main options -- one would have been to run  
11:40 18 the long string like they did. The other one would be to try  
11:40 19 to install a shorter piece of casing in the well, called a  
11:40 20 liner, across that zone.

11:40 21 Q. So those are the two options, liner versus long string?

11:41 22 A. Correct.

11:41 23 Q. All right. Did you review any documents that showed that  
11:41 24 BP actually considered the tradeoff between these two  
11:41 25 production casing margins?

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11:41 1 A. I did see some e-mail communications, and I believe I saw  
11:41 2 a form, a management of change form, that showed, you know, why  
11:41 3 that decision was made.

11:41 4 MR. HILL: Can we bring up TREX-901, please.  
11:41 5 Let's go up here to the date.

11:42 6 BY MR. HILL:

11:42 7 Q. This is a document dated April 14th, initiated by Mark  
11:41 8 Hafle. And the stage is "Review."

11:41 9 Can you tell the Court what your understanding of  
11:41 10 what we're looking at is.

11:41 11 A. This is the MOC, management of change. So that's a  
11:41 12 management of change document written by -- I believe Mr. Hafle  
11:41 13 was the senior drilling engineer in this situation, relative  
11:41 14 to -- I didn't get to the bottom line before you changed it  
11:41 15 right there.

11:42 16 Q. Sorry.

11:42 17 A. It's just a review stage of -- I don't -- when I see the  
11:42 18 bottom, I think it's the decision to run a long string versus  
11:42 19 the liner.

11:42 20 Q. All right.

11:42 21 MR. HILL: Can you close that out? And let's blow up  
11:42 22 this part right here, please.

11:42 23 Thank you.

11:42 24 BY MR. HILL:

11:42 25 Q. And I apologize. This is very, very small print. We'll



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11:42 1 try to blow it up as best we can.

11:42 2 Can you see that on your screen?

11:42 3 A. Yes.

11:42 4 Q. All right. As you look at this, does this look to you --  
11:42 5 does this appear to be comments or justifications for going  
11:42 6 with the long string over the liner option?

11:42 7 A. Yes, it does.

11:42 8 Q. Can you tell the Court what was given as the justification  
11:42 9 for using the long string.

11:42 10 A. Well, the justification is, at the time the -- they  
11:42 11 believed that they could cement the casing in place  
11:42 12 successfully. They believed that they could cement a long  
11:43 13 string casing in successfully.

11:43 14 And as the next line says: "The long string provides  
11:43 15 the best economic case and well integrity case for future  
11:43 16 completion operations."

11:43 17 And then right below that, it shows that if they were  
11:43 18 to choose a liner it would add 7 to \$10 million to the well  
11:43 19 costs.

11:43 20 Q. All right. The risk mitigation --

11:43 21 MR. HILL: This part right here, highlight that.

11:42 22 BY MR. HILL:

11:42 23 Q. And that's the line that you just referenced that  
11:43 24 basically identified a \$7- to \$10 million completion cost added  
11:43 25 if they went with the liner option; correct?

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11:43 1 A. Correct.

11:43 2 Q. With respect to risk mitigation, what is said there? What  
11:43 3 is identified there?

11:43 4 A. Well, the risk that was identified is "lost circulation  
11:43 5 during the cement job."

11:43 6 Q. So let me ask you this. We've already talked about the  
11:43 7 DWOP provisions that require BP to actually drill wells and  
11:43 8 plan wells, and to create risks that are as low as reasonably  
11:44 9 practical; correct?

11:44 10 A. Correct.

11:44 11 Q. Regardless of the economic case for the \$7- to \$10 million  
11:44 12 extra cost for the liner, and regardless of whether there's  
11:44 13 concerns about lost circulation in the well, are there risks in  
11:44 14 your opinion, Dr. Beck, associated with going with the long  
11:44 15 string over the liner?

11:44 16 A. Yes. My opinion is that, summarily, a liner in this  
11:44 17 situation is a lower risk completion operation than a long  
11:44 18 string is.

11:44 19 Q. Why?

11:44 20 A. Because a liner allows you to put additional barriers  
11:44 21 between the hydrocarbons and the surface in place. And more  
11:44 22 importantly, it lets you test them very effectively.

11:44 23 Q. With the long string option, is there a way to test the  
11:44 24 cement barrier directly at the very bottom?

11:44 25 A. No, there's not.

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11:44 1 Q. With the long string, what is the barrier to hydrocarbon  
11:44 2 flow?

11:45 3 A. So whenever you install casing, whether it be a liner or a  
11:45 4 long string -- but in the long string scenario it's important  
11:45 5 to remember that the casing and the liner -- and the cement  
11:45 6 together create a barrier. They have to work together to form  
11:45 7 a barrier. They're not independent.

11:45 8 Q. This concept of barriers to flow, did you see any of that  
11:45 9 risk identified in the MOC draft that we just looked at?

11:45 10 A. Not --

11:45 11 Q. The MOC draft makes it sound like I'm talking about  
11:45 12 football.

11:45 13 The draft of the MOC, the document that you  
11:45 14 identified.

11:45 15 A. I don't recall seeing the mention of risk or safety in  
11:45 16 that.

11:45 17 Q. Let's talk about another situation. There is a decision  
11:45 18 by BP -- and the Court's heard lots of testimony about it -- to  
11:45 19 use 6 centralizers instead of the 21 that were recommended by  
11:45 20 Halliburton.

11:45 21 You've addressed that in your report, correct?

11:45 22 A. Yes.

11:45 23 Q. When you learned about this decision for the first time,  
11:46 24 what was your reaction?

11:46 25 A. Well, my initial reaction was that I was actually very

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11:46 1 surprised that somebody would try to run a completion string in  
11:46 2 the ground with as little as 6 centralizers. That's not a very  
11:46 3 big number of centralizers, and I would have expected a lot  
11:46 4 more centralizers to be planned for and used on the well.

11:46 5 Q. Now, you understand that there were 21 centralizers -- at  
11:46 6 least with respect to the planning, it was planned to have 21  
11:46 7 centralizers at one point; correct?

11:46 8 A. At one point, I -- my recollection is that there was a  
11:46 9 recommendation to run 21, and that an additional 15  
11:46 10 centralizers were procured to be run, but the decision was made  
11:46 11 not to run them.

11:46 12 Q. All right. Now, regardless of BP's decisions for not  
11:46 13 having done it, did that decision introduce risks, in your  
11:46 14 opinion?

11:46 15 A. I believe so. I believe that any time a casing string is  
11:46 16 not fully or properly centralized, you increase the risk of  
11:47 17 having a poor cement job.

11:47 18 Q. Have you seen, in your review of the documents, any  
11:47 19 management of change analysis specific to how many centralizers  
11:47 20 to run in the well?

11:47 21 A. I do not recall a management of change on the  
11:47 22 centralizers.

11:47 23 Q. Now, have you seen any other documents in your review, BP  
11:47 24 documents, identifying risks associated with not running 21  
11:47 25 centralizers?

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11:47 1 A. I do recall a string of e-mails where the communication  
 11:47 2 between drilling engineers, and I think between drilling  
 11:47 3 engineers in the field, indicated that, you know, for reasons  
 11:47 4 of their own they weren't going to run 21 centralizers, and  
 11:47 5 that the consequence would likely be a poor cement job, or what  
 11:47 6 we would call a requirement for remedial cementing operations.

11:48 7 MR. HERMAN: Your Honor, I just realized we're at  
 11:48 8 11:45.

11:48 9 THE COURT: Is this a good time to break?

11:48 10 MR. HILL: It's a perfect time.

11:48 11 THE COURT: Let's go ahead and recess. It's about 12  
 11:48 12 minutes till. We'll come back at 1:15. Okay?

11:48 13 MR. HILL: Thank you, Your Honor.

11:48 14 THE DEPUTY CLERK: All rise.

11:48 15 (LUNCHEON RECESS)

11:48 16 \* \* \* \* \*

17 (WHEREUPON, the morning session proceedings were  
 18 concluded.)

19 \*\*\*\*\*

20 CERTIFICATE

21 I, Jodi Simcox, RMR, FCRR, Official Court Reporter  
 22 for the United States District Court, Eastern District of  
 23 Louisiana, do hereby certify that the foregoing is a true and  
 24 correct transcript, to the best of my ability and  
 25 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

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		5 1/2-inch [2] 7020/25 7048/25 5.41.1.1 [1] 6970/22 500 [3] 6934/20 6937/9 6939/16 5000 [1] 6937/19 504 [1] 6939/17 5101 [1] 6982/16

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<p><b>6</b></p> <p>6,000-psi [1] 7003/2  6,730 feet [1] 7038/3  600 [3] 6935/10 6935/13 6938/17  601 [1] 6935/6  60654 [1] 6937/24  61 [1] 6999/18  611 [1] 6985/14  61117 [1] 7069/7  61123.14.1 [1] 6985/15  61123.27.2 [1] 6963/3  61123.27.3 [1] 6999/25  61123.95.1 [1] 6949/16  61124.19.1 [1] 6952/17  61124.24.1 [1] 6968/22  61124.28.2 [1] 7001/17  6121 [1] 7075/7  6128 [2] 7051/20 7051/25  618 [1] 6935/22  64 [1] 7039/1  6636 [2] 6951/19 6952/3  6746 [2] 6950/3 6958/22  6th of [1] 6982/9</p>	<p><b>9</b></p> <p>9-volt [1] 6970/16  90071 [1] 6938/14  901 [1] 7085/4  94005 [1] 6937/13  94102 [1] 6936/11  9:30 [1] 6991/13  9:41 [2] 6990/13 6991/11  9:49 [1] 6960/16  9:49 p.m [1] 6994/21  9th [1] 6935/13</p> <p><b>A</b></p> <p>abandoning [1] 7082/3  Abbassian [3] 7020/17 7022/6 7026/16  abbreviated [1] 7061/20  ability [7] 6989/18 7029/17 7079/18  7080/19 7083/12 7083/12 7090/22  able [3] 6969/15 6998/21 7073/12  about [125] 6944/17 6944/19 6944/20  6945/13 6945/23 6946/1 6948/3 6948/7  6948/18 6950/4 6950/4 6950/5 6950/6  6950/9 6950/10 6950/14 6951/18  6951/23 6955/9 6956/21 6960/15  6963/22 6964/13 6966/3 6967/22  6968/18 6969/1 6970/13 6971/4 6972/6  6975/18 6985/1 6985/2 6985/11  6987/25 6990/17 6990/18 6995/18  6996/13 6997/12 6997/25 6998/24  7000/3 7002/6 7003/24 7005/1 7005/3  7007/5 7010/14 7014/5 7014/9 7014/10  7015/17 7016/22 7017/21 7021/11  7023/25 7024/4 7024/14 7024/17  7025/22 7027/10 7027/10 7027/11  7027/20 7028/7 7029/6 7029/22 7031/6  7033/3 7035/17 7035/20 7039/7  7039/18 7041/5 7041/10 7042/20  7044/21 7044/25 7045/16 7045/24  7045/25 7046/1 7047/8 7048/25 7049/8  7050/4 7050/17 7052/25 7054/13  7054/15 7055/18 7057/13 7058/10  7059/17 7065/20 7070/1 7073/21  7073/22 7074/2 7074/7 7074/21  7075/10 7077/8 7077/9 7077/14 7078/4  7078/20 7078/23 7079/4 7079/11  7081/17 7082/17 7082/23 7082/24  7083/7 7083/23 7083/23 7087/6  7087/13 7088/11 7088/17 7088/18  7088/23 7090/11  above [14] 6951/14 6952/1 6953/2  6953/3 6953/16 6954/14 6954/17  6955/22 6957/4 6958/24 7030/24  7080/7 7082/5 7090/23  above-entitled [1] 7090/23  Abramson [1] 6935/5  absolute [1] 7048/6</p>	<p>across [1] 7084/20  act [2] 6956/11 7040/2  action [1] 6963/18  activate [19] 6967/8 6992/1 6996/3  6996/6 6998/4 6998/8 6998/17 6998/22  7000/9 7001/8 7014/8 7018/10 7028/4  7028/11 7042/11 7046/21 7046/22  7047/4 7053/15  activated [19] 6962/2 6962/3 6962/12  6962/16 6968/7 6978/2 6991/19 6993/3  7002/1 7004/3 7004/23 7028/18  7028/19 7030/3 7030/6 7036/24  7036/25 7046/5 7052/21  activates [1] 7029/23  activating [2] 6989/18 6992/12  activation [2] 6989/14 6991/23  activities [4] 7019/7 7058/11 7062/12  7077/3  activity [2] 6977/2 6977/9  actual [1] 7077/15  actually [47] 6947/8 6949/1 6961/3  6965/4 6965/24 6968/8 6970/14 6979/7  6980/16 6985/14 7001/8 7002/17  7006/19 7007/5 7012/6 7014/7 7015/2  7015/13 7021/1 7021/23 7022/10  7026/4 7036/9 7044/12 7044/25 7046/3  7046/5 7046/8 7046/21 7047/3 7047/6  7059/2 7059/11 7062/9 7066/5 7066/7  7072/16 7072/19 7073/21 7078/2  7079/9 7081/21 7081/22 7083/4  7084/24 7087/7 7088/25  actuate [1] 7046/22  actuated [4] 7046/22 7046/24 7046/25  7047/6  actuating [2] 6968/15 7000/15  actuations [3] 6970/18 6971/16 6972/20  Adam [1] 7055/7  add [1] 7086/18  added [2] 7063/14 7086/24  addition [2] 6942/14 7019/5  additional [4] 6942/18 7083/10 7087/20  7089/9  address [3] 7001/23 7082/20 7082/25  addressed [1] 7088/21  addresses [1] 7075/21  admission [1] 7069/9  admit [2] 7068/20 7068/22  admitted [3] 6941/20 6942/6 6942/13  advance [4] 6982/14 6984/5 6984/14  7056/3  advanced [3] 6946/6 6946/9 7059/8  advised [2] 6942/16 6972/10  adviser [1] 7023/15  advising [1] 6971/25  advisory [1] 7058/17</p>
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