

Deposition Testimony of:

Jack Carter Erwin

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Page 8:14 to 8:15

14 JACK CARTER ERWIN,
15 having been first duly sworn, testified as follows:

Page 8:18 to 9:25

18 Q. Please state your name for the record.
19 A. Jack Carter Erwin.
20 Q. Who do you work for, Mr. Erwin?
21 A. Cameron International Corporation.
22 Q. How long have you worked for Cameron?
23 A. Approximately 14, 15 years.
24 Q. Okay. And what do you do for Cameron?
25 A. My current position?
1 Q. Sure.
2 A. I'm -- I'm currently the manager of
3 after-market operations for Aberdeen, Scotland.
4 Q. Okay. And what does that mean?
5 A. I'm responsible for any repair associated with
6 drilling equipment in the North Sea sector at our
7 Aberdeen location.
8 Q. How long have you had that job?
9 A. Since August of 2010.
10 Q. And before August 2010, what was your job?
11 A. I was the sale -- a sales guy -- sales
12 representative for Cameron.
13 Q. Tell me where and --
14 A. In Houston, Texas.
15 Q. Servicing what area?
16 A. Houston.
17 Q. Was that Cameron International, or was that a
18 different --
19 A. It --
20 Q. -- Cameron?
21 A. It was Cameron International Corporation.
22 Q. Okay. And what did you sell?
23 A. Drilling equipment, blowout preventers,
24 valves, various items associated with the drilling
25 industry.

Page 10:09 to 10:24

9 Q. Did you ever work on the Deepwater Horizon?
10 A. Yes, sir.
11 Q. Okay. How many times?

12 A. When I was a service technician, in the
13 neighborhood of five or so.
14 Q. Okay. Called out for routine maintenance?
15 A. Called out for repair of equipment.
16 Q. And, actually, were you actually a person who
17 actually participated in putting the test RAM for
18 converting the lower VBR on the Deepwater Horizon BOP to
19 a test RAM in 2004?
20 A. I believe at the time I was a service manager
21 when that took place.
22 Q. And so you did participate in it?
23 A. I -- I was a service manager at the time, so I
24 dis- -- dispatched a technician to the location.

Page 14:11 to 16:20

11 Q. Right. Just tell me very briefly where you
12 were born, raised, went to high school and to college.
13 A. I was born in Fort Worth, Texas. I went to
14 high school in Berwick, Louisiana, and I went to college
15 at Sam Houston State University in Huntsville, Texas.
16 Q. Okay. When did you graduate from Sam Houston
17 State?
18 A. 1997.
19 Q. Okay. And with what degree?
20 A. A degree in industrial technology.
21 Q. Okay. And did you go to work for Cameron from
22 that point forward?
23 A. I went to work for myself to start with and
24 then I went on to work for Global Santa Fe for a year
25 and after that, I went to work for Cameron.
1 Q. Okay. What did you do for yourself?
2 A. I was a karate instructor.
3 Q. Okay. What did you do for Global -- what's
4 the name?
5 A. Santa Fe.
6 Q. Santa Fe.
7 A. I was a roustabout.
8 Q. Okay. Offshore or --
9 A. On the -- it was the -- the first job was on
10 the Celtic Sea, which was a conversion from a vessel to
11 a drill sh- -- a semi-submersible drill ship.
12 Q. Okay. How long did you stay with Global
13 Santa Fe?
14 A. Approximately a year.
15 Q. And then where did you go?

16 A. I went on to Cameron after that.
17 Q. Tell me very briefly how -- I kind of want to
18 just take you through your career at Cameron in terms of
19 your various job responsibilities and where you were
20 stationed.
21 A. Okay.
22 Q. So it sounds like it must have started
23 about '98?
24 A. That's correct, somewhere around there.
25 Q. Okay. Tell me what was your first job, how
1 long you held it, where were you.
2 A. My first job, I was a s- -- in a sales
3 training program for two years in Liberty, Texas.
4 Q. Okay. Second job, starting about 2000?
5 A. Second job was -- I was a service technician.
6 Q. Okay. Working where?
7 A. I was working globally at the time,
8 started out of Liberty, Texas, but I worked on many rigs
9 globally, a lot in Berwick during the build cycle at
10 that time.
11 Q. Offshore and onshore?
12 A. Yes, sir.
13 Q. Okay. Blowout preventers or any particular
14 field of equipment?
15 A. Blowout preventers.
16 Q. Okay. Well, okay. How long did you -- were
17 you a service tech?
18 A. I think until -- I -- I don't recall the year
19 I became service manager. It was two -- se- -- quite a
20 few years, but I don't remember the specific year.

Page 17:05 to 17:12

5 Q. As a service manager, where were you
6 stationed?
7 A. I was stationed in Liberty, Texas, as well as
8 Houston, Texas.
9 Q. Okay. And as a service manager, were you only
10 working BOPs, or were you working other Cameron
11 materials also?
12 A. The majority of the time it was BOPs.

Page 17:21 to 19:05

21 Q. Okay. All right. And how long did you stay a
22 service manager?

23 A. Until 2000, I believe, '8.
24 Q. Okay. And then what did you --
25 A. And then -- and then from there I went on to a
1 sales position.
2 Q. Okay. And where were you stationed?
3 A. Houston.
4 Q. And where did you work?
5 A. I worked in the Greater Houston area.
6 Q. Okay. And what were you selling?
7 A. I was selling blowout preventer equipment.
8 Q. Okay. So how much of your time was spent with
9 blowout preventers as opposed to Christmas trees or post
10 production, things like that?
11 A. A hundred percent.
12 Q. Okay. Uh-huh. Cameron does make other
13 equipment other than blowout preventer systems, correct?
14 A. That is correct.
15 Q. When I say a blowout "presenter" system, do
16 you take that to mean, for example, annulars and RAMs
17 and shear RAMs and casing shear RAMs? Would you include
18 all that within a blowout preventer system?
19 A. That's a fair statement.
20 Q. Would you also include the control system;
21 namely, the software on the rig floor and the tool
22 pusher station that actually activates the BOP?
23 A. Yes.
24 Q. And would you include within that the choke
25 and kill lines?
1 A. Yes.
2 Q. Okay. And would you include within that the
3 MUX cables and the rigid conduit that would run from a
4 rig down subsea?
5 A. Yes.

Page 21:23 to 21:25

23 Q. Okay. So on the Deepwater Horizon, you would
24 have mostly dealt with what, Transocean?
25 A. Transocean.

Page 22:15 to 22:24

15 Q. Okay. All right. Are you familiar generally
16 with the stack that was on the Deepwater Horizon?
17 A. I am.
18 Q. Matter of fact, that stack was actually sold

19 by Cameron to R.B. Falcon and Transocean back in about
20 1999?
21 A. That is correct.
22 Q. Were you involved in that transaction?
23 A. I was not involved in the transaction. I did
24 work on the equipment while it was in Berwick.

Page 23:18 to 24:11

18 Q. Are you familiar with API 53?
19 A. API RP 53?
20 Q. I think API 53 is what I'm thinking.
21 A. I'm not familiar with API 53.
22 Q. What about API 16?
23 A. API 16A?
24 Q. Yes.
25 A. I'm fam- -- vaguely familiar with it. I
1 understand it's a industry specification that drives
2 equipment design and requirements.
3 Q. Okay. Is it your understanding -- what about
4 the CFRs? In the -- when you're in the Gulf of Mexico,
5 there's a bunch of Code of Federal Regulations --
6 A. Uh-huh.
7 Q. -- promul- -- and regulations promulgated by
8 the MMS. Are you familiar with those?
9 A. I am not.
10 Q. Okay. Those aren't part of your job duties?
11 A. No, sir.

Page 24:16 to 24:23

16 Q. Okay. I will tell you, one of the
17 requirements in the CFRs in API 53 is having a blowout
18 preventer that will deal with maximum anticipated
19 surface pressure. Have you ever heard that term?
20 A. I have heard that term before.
21 Q. Sometimes the acronym for it or the
22 abbreviation is M-A-S-P. Have you ever heard that?
23 A. Yes.

Page 25:10 to 28:04

10 Q. But go ahead and tell me what you think
11 "maximum allowable surface pressure" is.
12 A. The highest pressure that a -- a component can
13 see. That's my understanding of the -- of the term.

14 Q. Okay. Does Cameron have -- Cameron have
15 pressure ratings on its equipment?
16 A. Yes, it does.
17 Q. Okay. Uh-huh. And does Cameron let its
18 customers know what those pressure ratings are?
19 A. Yes, we do.
20 Q. I assume the customer base that Cameron is
21 dealing with are sophisticated, knowledgeable companies.
22 Correct?
23 A. I would definitely classify them as
24 sophisticated. They understand the equipment.
25 Q. Right. And, of course, the blowout preventer
1 itself is a safety-critical piece of equipment, right?
2 A. The blowout preventer is one of many
3 safety-critical components within a -- that a drill ship
4 has.
5 Q. I agree. But -- by the way, did you ever deal
6 with diverter systems?
7 A. Only in regards to the fact that our control
8 system supplies pressure fluid to activate them.
9 Q. Okay. What about the mud gas separators?
10 A. No, sir.
11 Q. Okay. So any information you would have about
12 the diverter system and the way BP or Transocean
13 operated their diverter system and their mud gas
14 separator, that's not really something you'd know about?
15 A. That's correct.
16 Q. Okay. That's beyond your area of knowledge?
17 A. That -- I would -- I would say that, yes.
18 Q. Okay. Because that wasn't really -- even
19 though you, I guess, have software within your control
20 system that will operate the diverter?
21 A. Yes.
22 Q. That's what you're telling me?
23 A. That is correct.
24 Q. But that's not really part of what your job is
25 for Cameron?
1 A. That's correct.
2 Q. What about the control system itself, is it
3 really part of your job to do the control system?
4 A. The -- the pod itself or --
5 Q. Yeah.
6 A. -- or the surface control system for -- yes.
7 Q. Okay. Are you familiar with the software that
8 runs it or just the method of hooking up -- hooking it
9 up mechanically?

10 A. I'm familiar vague -- I'm vaguely familiar
11 with the -- with the software. I understand -- I
12 understand what it does, but I -- I'm not one who writes
13 the code.
14 Q. Okay. The -- for example, do you know what
15 the term "EDS1" means?
16 A. Yes, sir.
17 Q. What's "EDS1"?
18 A. Emergency disconnect option 1.
19 Q. Okay. And what is that generally understood
20 to be?
21 A. It's generally understood to be a sequence of
22 events that's predetermined, so if somebody pushes EDS1,
23 whatever those events that are preprogrammed will take
24 place, and it --
25 Q. Okay.
1 A. Typically a disconnect.
2 Q. All right. So what happens is the customer
3 specifies what they want their EDS1 system to be?
4 A. That is correct.

Page 29:20 to 32:12

20 Q. All right. All right. What would be another
21 common way that EDS1 would work?
22 A. To EDS, you could close -- if you had enough
23 accumulated volume, you could close a super shear, as
24 well. There's multiple -- any variable that you -- the
25 customer wants, you could -- you could have.
1 Q. All right. I will tell you that it's my
2 understanding that the Deepwater Horizon --
3 A. Uh-huh.
4 Q. -- had an EDS1 program whereby it would close
5 the blind shear RAMs, okay --
6 A. Okay.
7 Q. -- and disconnect the LMRP. Does that sound
8 right or not right to you?
9 A. That sounds -- that sounds right.
10 Q. Okay. And I heard -- I've been told that
11 there was a second EDS possibility called EDS2 on the
12 Deepwater Horizon --
13 A. Uh-huh.
14 Q. -- that would close the casing shears, then
15 close the blind shears --
16 A. Uh-huh.
17 Q. -- then disconnect the LMRP. Does that sound

18 right?

19 A. That sounds -- that's a possibility, yes.

20 Q. Okay. What would be the advantage of that,

21 what I'm calling ED -- what on Deepwater Horizon was

22 EDS2 --

23 A. Uh-huh.

24 Q. -- what would be the advantage?

25 A. My understanding of the system, a -- a system

1 set up with a EDS that closes the casing shear would be

2 in the event that the -- the rig is running casing

3 through the BOP and they had to disconnect from the --

4 from the system, they would want to close the casing

5 shear RAMs first to cut any casing that the shear RAMs

6 weren't capable of and then close in the shear RAMs and

7 disconnect the connector and move off location.

8 Q. Because the casing might not be able to be

9 severed by the blind shear RAMs, correct?

10 A. That is correct.

11 Q. Okay. So any time you are running -- do you

12 know what "shearability" means or "shearing" means?

13 A. Yes, sir.

14 Q. As used with BOPs?

15 A. Yes, sir.

16 Q. Okay. And, of course, if a blind shear RAM

17 operates -- to be operated effectively, it needs to

18 completely sever a piece of pipe and seal; that's what

19 blind shear RAMs do when they're working perfectly?

20 A. That is correct.

21 Q. Okay. Casing shear RAMs will sever a piece of

22 pipe but will not seal, correct?

23 A. That's correct.

24 Q. Okay. So any time you have a piece of pipe in

25 the hole that is not shearable, the preferred method

1 would be to use -- close the casing shear RAMs first,

2 then close the blind shear RAMs, correct?

3 A. Yeah -- any time you have a piece of pipe in

4 the hole that's not shearable, you would want to use the

5 set of RAMs that is capable of shearing it. If it's

6 casing shear RAMs, then, yes, it would be -- you'd want

7 to fire those casing shear RAMs.

8 Q. Okay. How do you determine if it's shearable

9 or not?

10 A. The one method would be to perform a shear

11 test on the specimen to determine what shear pressure it

12 will shear at.

Page 33:03 to 33:09

3 Q. (BY MR. WILLIAMSON) Real quickly, let's go
4 back over your history right quick. In 2008, you went
5 from being a service manager to being a sales --
6 A. Representative, account manager.
7 Q. Right, account manager. And whose accounts
8 were you managing?
9 A. Transocean and Seadrill.

Page 38:07 to 39:19

7 Q. Okay. What about -- I notice Cameron has
8 something they call "EVO," E-V-O. Could you tell me
9 what that is?
10 A. That is the latest version of our blowout
11 preventer. It stands for "evolution."
12 Q. Okay. And what's the advantage of it?
13 A. The advantage, it has ROV operable locks,
14 locking system. It's lighter, so you can put more
15 cavities and -- and -- and have less weight.
16 Q. So you could have more redundancy --
17 A. You could --
18 Q. -- for the same amount of weight?
19 A. Approximately.
20 Q. Okay. Any other advantages to the EVO system?
21 A. I -- I believe fluid consumption is less, as
22 well.
23 Q. Meaning it takes less hydraulic fluid in order
24 to activate the pistons in order to activate the
25 functions?
1 A. Meaning it would require less accumulation to
2 activate the functions and then, so, therefore, it would
3 continue -- reduce the weight even more of the overall
4 system.
5 Q. Okay. By -- by "less accumulation" do you
6 mean less force in terms of psi, or do you mean less
7 volume?
8 A. Less volume.
9 Q. Okay.
10 A. Same -- same force. Same psi required.
11 Q. Okay. Okay. Has BP ordered any of your new
12 EVO systems for any rig?
13 A. Not that I'm aware of.
14 Q. Okay. But they're available if they wanted to
15 order them?

16 A. Yes, sir.
17 Q. How long have y'all had EVO available?
18 A. I believe two years, two and a half, three
19 years.

Page 44:08 to 45:20

8 Q. (BY MR. WILLIAMSON) Okay. Do you know what
9 Cameron's position is -- when you were selling this
10 stuff, did you talk to customers about EDS1 or EDS2 or
11 different c- -- configurations of EDS?
12 A. Only in regards to und- -- understanding what
13 they wanted. If they were coming in for a quote, what
14 their requirements were.
15 Q. All right. What did Cameron recommend to them
16 in terms of whether they should get, gee, close the
17 blind shear RAMs or close the casing shear RAMs
18 first and then close the blind shear RAMs, or what did
19 Cameron reper- -- recommend on those courses of action?
20 A. I don't recall us ever recommending any
21 specific sequence. It was always the customer's
22 initiative or -- to -- to drive that requirement --
23 Q. Okay.
24 A. -- from their client or from themselves.
25 Q. Speaking of that, would you turn to tab
1 No. 12? It'll be in the first book. While you're
2 there, would you mind putting Exhibit No. Sticker 7001
3 on it somewhere where it doesn't cover up any writing.
4 Okay.
5 A. Okay.
6 Q. Do you recognize that document?
7 A. I do.
8 Q. What is it?
9 A. It's Engineering Bulletin 852D for the shear
10 RAM product line for Cameron.
11 Q. Okay. The -- does this describe different
12 shear RAMs that are available from Cameron?
13 A. Yes, sir, it does.
14 Q. Which ones are on the Deepwater Horizon?
15 A. Shearing blind RAMs.
16 Q. Okay. The first ones that are in
17 Exhibit 7001, those are the first ones?
18 A. Yes, sir.
19 Q. Okay. Does Cameron have products that work
20 better than the shearing blind RAMs?

Page 45:22 to 47:11

22 A. Cameron has several shear RAMs that op- --
23 operate or perform differently depending on the
24 circumstances.

25 Q. (BY MR. WILLIAMSON) Well, there's another RAM
1 called the VV shear RAMs, correct? I think it's on
2 Page 6.

3 A. Page 6. That's correct.

4 Q. And it says it is the VV shear RAMs. I guess
5 one feature is that both the upper RAM block and the
6 lower RAM block have a V shape when you're talking about
7 the VVs?

8 A. That is correct.

9 Q. That's the name. That's where you get the
10 name?

11 A. That's correct.

12 Q. Whereas, the shearing blind RAMs that were on
13 the Deepwater Horizon had one V-shaped RAM block and one
14 straight RAM block?

15 A. Yes, sir, that is correct.

16 Q. Okay. Which cuts m- -- more pipe? Which is
17 more efficient at cutting pipe?

18 A. From my understanding, the VV shear RAM is
19 more efficient than the shearing blind RAM.

20 Q. Okay. So for the same amount of pressure,
21 we'll say 4,000 psi, you're going to get more cutting
22 ability from the VVs?

23 A. You should get more cutting ability from the
24 VVs.

25 Q. I've seen some numbers that indicate that it's
1 approximately 20 to 25 percent more cutting force from
2 the VVs.

3 A. Uh-huh.

4 Q. Does that sound right?

5 A. I'd have to run the calculations on the
6 pipe -- the specific pipe, but that sounds reasonable.

7 Q. Okay. All right. Did BP ever upgrade the
8 Deepwater Horizon RAMs --

9 A. Uh-huh.

10 Q. -- from the blind shear RAMs to the VV shear
11 RAMs?

Page 47:13 to 47:13

13 A. I -- I don't know if they did.

Page 47:18 to 48:01

18 Q. (BY MR. WILLIAMSON) Okay. To your knowledge,
19 did they?
20 A. Not to my knowledge.
21 Q. Okay. Would that be an improvement?
22 A. I would say it would -- it would be an
23 improvement.
24 Q. Okay. Did Cameron sell any VV RAMs to any of
25 their customers during this time period?
1 A. Yes.

Page 48:04 to 48:22

4 Q. Okay. And what was the sales point? You were
5 the sales manager. I guess this is one of the products
6 you wanted to sell --
7 A. Uh-huh.
8 Q. -- correct?
9 A. Yeah, on -- on shear RAMs, that is typically
10 something that the customers would -- I wouldn't be
11 privy to all of the configurations of their rig, but
12 they'd understand what our offerings were and come to us
13 and ask for a specific RAM configuration.
14 Q. Okay. Well, your customers would have known
15 of the existence of the VV shear RAM and that it was
16 available, right?
17 A. I believe it was widely understood in the
18 industry that it was available, yes.
19 Q. Okay. So as far as you could tell, Transocean
20 and BP probably knew that there were VV RAMs available
21 if they wanted to upgrade?
22 A. Yes.

Page 49:09 to 51:08

9 Q. Okay. Do the subsea BOPs in the North Sea
10 have acoustic triggers?
11 A. Well, most of the subsea equipment I deal with
12 in Aberdeen is coming from the west coast of Africa.
13 Most of the work in the North Sea is platform work.
14 So --
15 Q. So they're surface BOPs?
16 A. Yes.
17 Q. So they're not subsea BOPs?
18 A. For -- in the North Sea region, that's

19 correct, most of the equipment is platform. There --
20 there might be some -- there are some BOPs. My
21 understanding, especially in the Norwegian sector, that
22 acoustics are a requirement.

23 Q. Okay. The -- does Cameron have an acoustic
24 system available?

25 A. We do provide a acoustic control system.

1 Q. Does it work?

2 A. In my opinion, yes, it does.

3 Q. Okay. Does it do a good job?

4 A. I believe it performs the task it's asked to
5 do.

6 Q. Right. And what is the task that an acoustic
7 trigger system is asked to do?

8 A. Again, that's one of the requirements that can
9 be driven by the customer. It would close a set of
10 RAMs, possibly pipe RAMs; it could close shear RAMs; it
11 could --

12 Q. Activate the EDS, for example?

13 A. It could -- well, it -- in that case it is
14 the -- the last resort. It could -- it could disconnect
15 the LMRP connector. There's multiple options it could
16 do.

17 Q. Okay. So it can perform the functions that it
18 is programmed to perform?

19 A. That is correct.

20 Q. That's what an acoustic trigger could do?

21 A. That's correct.

22 Q. Okay. Did BP ever order a single acoustic
23 trigger for any of its rigs working in the Gulf of
24 Mexico?

25 A. I don't recall.

1 Q. Okay. Do you remember one?

2 A. Sir?

3 Q. Does the Thunder Horse have an acoustic
4 trigger?

5 A. I -- I don't recall if it does or not.

6 Q. Did the Deepwater Horizon have an acoustic
7 trigger?

8 A. No, not to my knowledge.

Page 51:19 to 52:04

19 Q. Okay. But to your knowledge, no Transocean
20 rig and no BP rig or BP-managed rig in the Gulf of
21 Mexico has an acoustic trigger?

22 A. Not to my knowledge.
23 Q. Okay. Uh-huh. Do any of your customers ever
24 order two sets of blind shear RAMs?
25 A. Yes, sir.
1 Q. Okay. Who?
2 A. I -- I can't recall specifics. I'd have to --
3 I'd have to sit here and -- I'd have to go through the
4 different systems we sold to give you specifics.

Page 52:08 to 53:08

8 Q. When you were selling, did you tell customers
9 that it was a good idea to have two sets of blind shear
10 RAMs?
11 A. At the time I was selling, the customers that
12 I were dealing with were -- I think they all understood
13 that the -- the -- they were trying to get the most
14 config- -- the most number of cavities in one stack
15 possible because they understood the m- -- the more
16 shear RAMs you have, the -- the -- the better the stack.
17 Q. Okay.
18 A. So at that point in time, that was the big
19 deal. That's why the EVO was developed, so you could
20 fit more into a smaller space.
21 Q. Sure. So when you were selling -- if I
22 remember right, you were in sales from, oh, '08
23 through -- well, '08 through '10, right?
24 A. I believe that's correct.
25 Q. Okay. You remember actually telling customers
1 that there might be advantage to having two sets of
2 blind shear RAMs up on a BOP stack?
3 MR. JONES: Object to form.
4 A. I remember having multiple conversations -- I
5 don't recall specifics -- but with customers about
6 different configurations of BOPs and boosters, tandem
7 boosters, not boosters to -- to provide them with the --
8 the most optimal configuration they were looking for.

Page 53:13 to 55:08

13 Q. -- what would be the advantage of having two
14 sets of blind shear RAMs in a stack?
15 A. My understanding of the -- of the advantage of
16 that would be you'd have an additional shear RAM to --
17 to shear pipe.
18 Q. Redundancy?

19 A. You could say so.
20 Q. Okay.
21 A. Yes.
22 Q. And some of your customers wanted that
23 redundancy?
24 A. Some of -- some of our customers do have that.
25 Q. All right. Did BP during the time period you
1 were with Cameron to your knowledge ever try to get
2 double blind shear RAMs on any rigs that they were
3 managing?
4 A. I don't recall.
5 Q. Okay. Did Transocean?
6 A. I would -- I -- I don't recall specifically,
7 but I would say either the Jack Ryan or the C.R. Luigs
8 would have -- would have two shear RAMs.
9 Q. C.R. Louise?
10 A. "Luigs," L-u-i-g-s, or the Jack Ryan.
11 Q. Okay. And what you're telling me is normally
12 that request came from the customer to you as to how
13 they wanted the BOP stack to be configured?
14 A. Yes, the customers would s- -- submit the
15 configuration based off of the -- their operator
16 requirements.
17 Q. All right. Did you think that was a good
18 idea?
19 A. They understand the method and how they're
20 going to drill the well, so I -- I think that was a good
21 idea that they provide the information or the
22 configuration they're looking for.
23 Q. By the way, when you -- when you make the
24 change on the test RAM, the lower VBR --
25 A. Yes, sir.
1 Q. -- is it possible to make that change
2 bi-directional? Can you make that RAM bi-directional so
3 it'll hold pressure both ways?
4 A. At this point in time, yes, you -- that is an
5 option now.
6 Q. Okay. When did that become an option?
7 A. Around, I th- -- I think, 2006, '7. I
8 don't -- I don't remember the specific year.

Page 55:18 to 55:24

18 Q. Okay. I've seen a document by Wild Well that
19 indicate that a bi-directional RAM is available in 2007.
20 Does that sound consistent with what you're saying?

21 A. That would sound about right.
22 Q. All right. Did BP ever order a bi-directional
23 RAM for their lower VBR?
24 A. Not that I'm aware of.

Page 56:06 to 56:19

6 Q. BP never ordered a bi-directional test RAM for
7 the Deepwater Horizon before this explosion, correct?
8 A. Not that I'm aware of.
9 Q. BP never ordered an acoustic trigger for this
10 Deepwater Horizon before the blowout, correct?
11 A. Not that I'm aware of.
12 Q. BP never ordered or tried to upgrade the blind
13 shear RAMs to a VV system before this explosion,
14 correct?
15 A. Not that I'm aware of.
16 Q. Okay. And BP never asked to re-program their
17 EDS system so that the casing shears went first and then
18 the blind shears went, did they?
19 A. Not that I'm aware of.

Page 57:05 to 58:19

5 things I was saying. Cameron also has service
6 available, right?
7 A. That is --
8 Q. They will provide ongoing service for their
9 products, right?
10 A. That is correct.
11 Q. It's a program they call CamServ?
12 A. That's one of the programs we call -- offer,
13 CamServ.
14 Q. All right. Was CamServ being used on the
15 Deepwater Horizon?
16 A. When you say CamServ, are you speaking
17 about --
18 Q. Was any Cameron service program being used on
19 the Deepwater Horizon?
20 A. Cameron technicians were called out from time
21 to time to assist with issues that the rig might be
22 experiencing or to help with a rig move.
23 Q. Okay. But in terms of having a
24 regularly-scheduled maintenance program that Cameron was
25 responsible for, the Deepwater Horizon didn't have that?
1 A. That's correct.

2 Q. Okay. The -- and, also, isn't there a
3 five-year recertification? Doesn't Cameron recommend
4 that you get a blowout preventer recertified within five
5 years?
6 A. There is a engineering bulletin that says --
7 well, I'd have to review the exact document, but it says
8 three to five years on -- on that equipment, and it
9 refers to API RP 53.
10 Q. Okay. And API RP 53 recommends that you get
11 recertified every five years?
12 A. I believe it does. I'd have to review the
13 document, but that's my understanding.
14 Q. Okay. And that's also Cameron's
15 recommendation?
16 A. That's correct.
17 Q. Okay. Did BP know that, or do you know?
18 A. I would -- I would as -- assume that they
19 understood that to be the case.

Page 58:23 to 59:02

23 document. Let's mark this one as 7002.
24 Guys, this is one of the documents I
25 handed out. It's Bates stamp numbers -- the last Bates
1 stamp number are 1160032, and it's an October 6th, 2009,
2 e-mail, e-mail chain.

Page 59:09 to 60:05

9 Q. (BY MR. WILLIAMSON) The -- this is an e-mail
10 between two BP employees. Okay?
11 A. Okay.
12 Q. And Mr. -- well, actually, three BP employees
13 named Mr. Wong, Mr. Sprague, and Mr. Thierens. Do you
14 know Mr. Wong or Mr. Sprague or Mr. Thierens?
15 A. Mr. -- I do not recall those names.
16 Q. Okay. Well, I'll represent to you they're BP
17 people. But the -- I want you to turn to the second
18 page of Exhibit 7002. You'll note that the date on this
19 e-mail is October 2009, about five months before the
20 explosion that killed the people and sank the rig,
21 right?
22 A. Yes, sir.
23 Q. Turn to the second page. A BP engineer is
24 writing this. It says, Test, middle, and upper RAM
25 bonnets are original and out with OEM and API five-year

1 recommended recertification period. Do you see that?

2 A. I do.

3 Q. Okay. So, apparently, BP did know that the
4 RAM bonnets and the BOP had not been recertified within
5 the five-year period?

Page 60:07 to 60:21

7 A. It appears to -- to state that.

8 Q. (BY MR. WILLIAMSON) All right. Does Cameron,
9 in fact, recertify their equipment? In other words, if
10 someone brings it back to you, will you look at it and
11 recertify it?

12 A. If they bring it back to us, we will recertify
13 it to the specification requested.

14 Q. Okay. And will -- in the course of doing
15 that, will you inform the customer of any upgrades that
16 are available?

17 A. That is typical.

18 Q. Okay. So if BP had chosen to comply with
19 their engineer's request of October 2009, Cameron, I'm
20 sure, would have been happy to sell them this upgraded
21 equipment?

Page 60:23 to 65:07

23 A. At the time of whatever the situation would
24 have been, if there was an upgrade, we would have
25 offered that to them at the time.

1 Q. (BY MR. WILLIAMSON) All right. And one of
2 the upgrades would be a Cameras -- Cameron maintenance
3 program, right?

4 A. That offering would have been -- was a
5 commonly understood offering in the industry at the
6 time.

7 Q. Okay. And we didn't talk about it, but one of
8 the possibilities, of course, was to make this stack a
9 six-cavity stack instead of a five-cavity stack,
10 correct?

11 A. That is an option.

12 Q. Okay.

13 A. But Cameron wouldn't have made that
14 recommendation.

15 Q. Okay. All right. Cameron wouldn't have
16 recommended that one way or the other?

17 A. That's correct.

18 Q. Cameron -- you might have told them, look, all
19 our other customers are ordering VV BSRs --
20 A. Uh-huh.
21 Q. -- now? You might have informed them of that
22 fact?
23 A. Well, I think from my understanding, it's a
24 small industry. These -- these -- most of the guys jump
25 rig to rig. So it would be a commonly understood thing
1 in the industry at the time.
2 Q. Okay. You commonly understood it that --
3 A. Uh-huh.
4 Q. -- most of the rigs had double BSRs by 2009,
5 2010?
6 A. By that time they had double -- double shear
7 RAMs.
8 Q. That's what I --
9 A. Yes.
10 Q. -- mean.
11 A. Yes.
12 Q. I said "BSRs."
13 A. Any -- any configuration of double shear RAMs,
14 yes.
15 Q. Right. You said it better than I did. By
16 2009, 2010 when Mr. Wong notes that they're out of
17 five-year certification, most of the rigs that you were
18 seeing had double blind shear RAMs at that time?
19 A. I don't know the specifics, if they were DVS
20 RAMs. I would assume by 2009, 2010, from my
21 understanding, DVS was a much more used RAM than the
22 SBR.
23 Q. Right. And that would kind of be the best in
24 practice at that time?
25 A. I -- I believe so.
1 Q. Okay. Do you know how many wells in the Gulf
2 of Mexico did not have double BSRs at that time?
3 A. I don't know.
4 Q. And, by the way, when we're talking about the
5 Deepwater Horizon --
6 A. Uh-huh.
7 Q. -- the EDS system functioned the blind shear
8 RAMs, correct?
9 A. That's correct.
10 Q. The BSR function functioned the blind shear
11 RAMs, correct?
12 A. The -- the BSR function?
13 Q. Yeah, if you hit the BSRs, if you hit the

14 button on the control panel that was for the blind --
15 A. Oh.
16 Q. -- shear RAMs, that would work the blind
17 shear --
18 A. Yes.
19 Q. -- RAMs --
20 A. Yes.
21 Q. -- right?
22 A. That's correct.
23 Q. If you had -- if the auto shear system
24 activated, that would work the blind shear RAMs?
25 A. That's correct.
1 Q. Okay. And you also had ROV intervention for
2 the blind shear RAMs?
3 A. Yes, that's correct.
4 Q. Okay. Did you have any emergency activation
5 to seal the well-bore other than going through the blind
6 shear RAMs?
7 A. There was the deadman system.
8 Q. Okay. The AMF -- what Cameron calls an AMF
9 system, right?
10 A. That's correct.
11 Q. Okay. Automatic -- automated mode function?
12 A. That's my understanding.
13 Q. And Cameron would call that "AMF" or sometimes
14 call it "AMF deadman"?
15 A. That's correct.
16 Q. Okay. And would that system also work the
17 blind shear RAMs?
18 A. If it were programmed to function that --
19 that -- the blind shear RAMs, yes, it would.
20 Q. Okay. So the way all of the emergency
21 activation systems were programmed on the Deepwater
22 Horizon, they all went to one component; namely, the
23 blind shear RAMs?
24 A. That's -- that's my understanding.
25 Q. And on April 20th, 2010 -- I just want to make
1 sure I understand -- the auto shear system, the EDS
2 system, and the AMF system all activated a single
3 component, the blind shear RAMs?
4 A. Well, the deadman al- -- activated several
5 other components as well through the sequence of events,
6 but the blind shear RAMs was the last function, from my
7 understanding, that it performed.

14 Q. Okay. In terms of sealing the well-bore --
15 A. Uh-huh.
16 Q. -- the AMF only utilized the blind shear RAMs?
17 A. That's correct.
18 Q. Okay. And in terms of sealing the well-bore,
19 the EDS only utilized the blind shear RAMs?
20 A. That's correct.
21 Q. Okay. And in terms of sealing the well-bore,
22 the auto shear only utilized the blind shear RAMs?
23 A. That's correct.
24 Q. And the blind shear RAMs had not been upgraded
25 since 1999 when the rig was first ordered?
1 A. That's my understanding.
2 Q. Okay. These other customers who ordered
3 double shear RAMs so they'd have two different shear
4 RAMs in their stack --
5 A. Uh-huh.

Page 66:19 to 67:12

19 Q. The AMF system on the Deepwater Horizon --
20 A. Uh-huh.
21 Q. -- utilized batteries that were in the SEMs in
22 order to activate it, correct?
23 A. That is correct.
24 Q. And did the EDS system also utilize those
25 batteries?
1 A. No, sir.
2 Q. Okay. And the auto shear did not utilize
3 those batteries?
4 A. It did not.
5 Q. Okay. The EDS system did utilize the MUX
6 cables?
7 A. That is correct.
8 Q. Okay. Let's go to the batteries for a moment.
9 A. Okay.
10 Q. If you had an accident that disabled the
11 control panels from the rig, then the AMF should fire,
12 correct?

Page 67:14 to 69:05

14 A. You have -- you have to have three conditions
15 met.
16 Q. (BY MR. WILLIAMSON) Okay. What are the

17 conditions?

18 A. Communication from the surface, electrical
19 power, as well as hydraulics, fluid power.

20 Q. All right. So if you lose hydraulics from the
21 rig and if you lose electrical from the rig and if you
22 lose -- what was the -- oh, what was the third thing?

23 A. Communications.

24 Q. -- communications from the rig, then that will
25 fire the AMF system?

1 A. That is correct.

2 Q. Okay. So if the MUX cables were disabled,
3 would the AMF system fire?

4 A. If -- both MUX cables?

5 Q. Correct.

6 A. No.

7 Q. And why not?

8 A. They would still be -- I'd have to -- I'd have
9 to get engineering to review it, but my understanding,
10 there would still be hydraulic power on the system.

11 Q. All right. But if both MUX cables were blown
12 up, you would lose the ability to control the BOP from
13 the surface, correct?

14 A. That is correct.

15 Q. Okay. Now, is that just set up the way the
16 customer wants to program it, or is that how the system
17 just normally works?

18 A. That's how the -- from my understanding --
19 I -- I'd have to refer to engineering, but my
20 understanding, that's how the system normally works.

21 Q. Okay. So you need to lose communication and
22 you need to lose electrical and you need to lose
23 hydraulic power?

24 A. That's correct.

25 Q. And hydraulic power is supplied by the rigid
1 conduit?

2 A. In -- in this case, yes.

3 Q. Okay. The -- the MUX cables, they run through
4 the moon pool down the riser, correct?

5 A. That is correct.

Page 69:13 to 71:08

13 Q. Okay. Why would you send both MUX cables, the
14 yellow MUX cable and the blue MUX cable, into a single
15 junction box; do you know?

16 A. Typically they're sent into separate junction

17 boxes.
18 Q. Okay. Do you remember what the -- fair
19 enough. Do you remember what the configuration was on
20 the Deepwater Horizon?
21 A. I believe I recall at some point in time the
22 system was modified and it had something to do with the
23 RMJB, but I don't remember what the specifics were. I
24 think it was removing one of them.
25 Q. RM --
1 A. I don't remember.
2 Q. -- JB?
3 A. Yes, sir.
4 Q. What's the RMJB?
5 A. Riser mounted junction box.
6 Q. Okay. So you're thinking on the Deepwater
7 Horizon, there was only one junction box?
8 A. I --
9 Q. That's what your memory tells you?
10 A. Yeah, I'd have to look at the schematic to
11 determine the actual.
12 Q. And what would be the reasoning to go from
13 dual junction boxes, one for the yellow -- I assume if
14 you have dual junction boxes, one is for the yellow pod,
15 one is for the blue pod?
16 A. That's correct.
17 Q. Why would you go to a single junction box?
18 A. I would have to refer to engineering to see
19 why we would do that.
20 Q. Okay. Did Cameron do that or did someone else
21 or do you know?
22 A. To the best of my recollection, we had a
23 technician out there during the modification.
24 Q. Okay. And what was the reason given for the
25 modification, or do you know?
1 A. It was a Transocean-driven requirement.
2 Q. And do you know their reason?
3 A. I don't recall their reasoning.
4 Q. Okay. All right. When we go back on the rig
5 both of the MUX cables go through the moon pool --
6 A. Yes.
7 Q. -- correct?
8 A. Yes, sir.

Page 71:13 to 74:15

13 From the mud -- form -- from the moon pool, do

14 both of those MUX cables run to the blowout preventer
15 room, the CCU?

16 A. To the best of my recollection, they terminate
17 in the -- in the HPU room or CCU room.

18 Q. All right. The HPU room is -- or the CC -- I
19 thought CCCU -- too many questions. CCU.

20 A. Uh-huh.

21 Q. Central control unit --

22 A. Yes, sir.

23 Q. -- right? What does "HPU" stand for?

24 A. Hydraulic power unit.

25 Q. Okay. Is that referred to sometimes as the
1 blowout preventer room?

2 A. Yes, sir.

3 Q. Okay. And so both MUX cables run to that
4 room, correct?

5 A. I don't recall the exact layout on that -- on
6 that rig, but that is something that does happen on some
7 rigs.

8 Q. Okay. And then from that particular room, you
9 then run cables out to the tool pusher's control unit
10 and to the rig floor control unit?

11 A. That -- that would -- that's correct.

12 Q. Okay. As far as you remember, that's the way
13 the Deepwater Horizon was set up?

14 A. As far as I remember, that's correct.

15 Q. Okay. The -- all right. The battery monitor
16 system, the E -- the AMF is dependent upon a battery
17 that's located in the SEM subsea?

18 A. That's correct.

19 Q. And on the Deepwater Horizon, we've already
20 heard a lot of testimony that that battery system was
21 not capable of being charged while it was subsea and it
22 was not capable of being monitored while it was subsea.
23 That's true, correct?

24 A. That is correct.

25 Q. Did Cameron have an upgrade available whereby
1 you could monitor the status of those subsea batteries?

2 A. I believe on our current offering, the Mark
3 III system, I believe they're monitorable.

4 Q. Okay. I think I heard Mr. McWhorter -- do you
5 know Mr. McWhorter --

6 A. I --

7 Q. -- who works for Cameron?

8 A. I do.

9 Q. Okay. I think he said that that system became

10 available to upgrade where you could monitor those
11 batteries --
12 A. Uh-huh.
13 Q. -- became available in approximately 2005.
14 Does that sound about right to you?
15 A. That sounds about right.
16 Q. Okay. Did BP ever order the upgrade so they
17 could monitor the batteries?
18 A. Not to my knowledge.
19 Q. Okay. All right. By the way, is it -- would
20 it have been possible to outfit the Deepwater Horizon
21 with double BSRs if BP had so desired?
22 A. Yes.
23 Q. Okay. All right. Now, BP did make some
24 changes in the Deepwater Horizon blowout preventer,
25 correct?
1 A. I be- -- I believe they have over -- yeah.
2 Q. Do you remember the fact that -- that the
3 lower annular was changed from a 10,000-psi annular to a
4 5,000-psi?
5 A. I do not recall that.
6 Q. I'm going to hand you a copy of what was
7 marked in a previous deposition as Exhibit 1870. Okay?
8 MR. WILLIAMSON: I will tell you for the
9 record because of our copying service difficulties and
10 printing difficulties in London, the copy of 1870 that I
11 handed to the witness has "tab 58" in the left-hand
12 corner handwritten, the words "Mark Hay" written,
13 "3/9/06" written, "5000 psi lower annular" written,
14 "Exhibit 1870" handwritten. All of that was done by me
15 and was not part of the original 1870.

Page 74:23 to 75:06

23 Q. Okay. Okay. Looking at 1870, does that
24 refresh your recollection that, in fact, BP changed the
25 lower annular from a 10,000-psi annular to a 5,000-psi
1 stripping annular?
2 A. Yes, that does. I do recall that.
3 Q. And do you see where it's -- down there under
4 "Required Resources," it says to be paid for by BP,
5 approximately \$46,000?
6 A. I do see that.

Page 75:11 to 76:12

11 Q. Okay. The -- do you -- now, this particular
12 annular, you're familiar with this particular product
13 that Cameron sells?

14 A. I am familiar with the -- the stripping
15 packer.

16 Q. Okay. And it's only rated to 5,000 psi,
17 right?

18 A. From my understanding, it is downrated to
19 5,000 psi.

20 Q. Sure. And when you actually go over to -- go
21 to the next-to-last page. That's a Cameron information
22 sheet about this particular document, right?

23 A. That is correct.

24 Q. Now, right down the middle of the page, do you
25 see the one that says, "Because this is a special" -- do
1 you see the paragraph that says, "Because this is a
2 special surface packing element"?

3 A. Yes, sir.

4 Q. You see it has not -- Cameron tells the
5 customer it has not been tested in accordance with API
6 16A Second Edition requirements, correct?

7 A. Yes, that's what it says.

8 Q. Okay. So this particular piece of equipment
9 that BP chose to put on the Deepwater Horizon instead of
10 the lower annular is not a piece of equipment that's
11 certified by API 16A?

12 A. That is --

Page 76:14 to 76:19

14 A. -- is correct.

15 Q. (BY MR. WILLIAMSON) Okay. Why not?

16 A. Because I'm not -- I -- I wasn't involved in
17 the development with this, but my understanding is
18 because of the fact that it doesn't -- it can't hold a
19 pressure test at 10,000 psi.

Page 77:06 to 78:11

6 Q. Okay. The -- all right. So Cameron doesn't
7 recommend this -- this piece of equipment be used to try
8 to hold pressure above 5,000 psi, do they?

9 A. For this -- for this str- -- element to hold
10 pressure by --

11 Q. Yes.

12 A. -- above 5,000, we do not recommend holding

13 well-bore pressure above 5,000.

14 Q. Okay. So you wouldn't expect people to be
15 using this piece of equipment, a 5,000-psi stripping
16 annular, you wouldn't be expecting them to hold pressure
17 in a well-bore that's more than 5,000 psi?

18 A. I -- I would not expect that.

19 Q. Okay. That would not be using the Cameron
20 product in the way it's intended?

21 A. It would be outside of the -- the stated
22 parameters of the equipment.

23 Q. Okay. Did you ever become aware that that was
24 being done?

25 A. I don't recall specifically discussing that
1 particular rig with that particular element.

2 Q. Okay. Because, obviously, if you had
3 well-bore pressure that was greater than 5,000 psi and
4 you wanted to shut in the well, you would need to use a
5 piece of equipment other than this piece of equipment,
6 right?

7 A. That is correct.

8 Q. Okay. I'm going to hand you -- oh, actually,
9 I'll ask you to look in your booklet to tab No. 53.

10 MR. WILLIAMSON: Mark that as

11 Exhibit 7003.

Page 78:24 to 79:16

24 Q. Okay. I'm going to ask you to turn to the
25 Executive Summary, which is on the third page of
1 Exhibit 7003.

2 A. Okay.

3 Q. Okay. Second full paragraph. "With the" --
4 it says, "With the exception of testing, it is most
5 unusual and considered a poor practice to use blowout
6 preventers and wellhead components in excess of maximum
7 working pressure."

8 Did I read it right?

9 A. Yes, sir.

10 Q. Okay. And that's what you just agreed with,
11 it is a poor practice to use blowout preventers and
12 components in excess of their MWP, maximum working
13 pressure?

14 A. I would say it would not be wise to go above
15 working pressure, the maximum rated working pressure of
16 your component.

Page 81:02 to 83:18

2 Q. You agree that it is a poor practice to use
3 blowout preventers in excess of MWP?
4 A. I think it would not be wise to use any
5 product outside of its designed criteria.
6 Q. Okay.
7 A. Intended purpose.
8 Q. Okay. Do you know what BP claimed that the
9 maximum -- so -- and the -- on the lower annular, the
10 MAS- -- or the rating was 5,000 psi, pounds per square
11 inch, correct?
12 A. With that stripping element; that's correct.
13 Q. All right. Okay. Do you know what BP claimed
14 that the maximum pressure on this particular well was?
15 A. I do not.
16 Q. Well, let's just look. I'm going to hand you
17 what's been marked as Exhibit No. 704. I'll tell you
18 that's a document that's out of the -- it's been -- a
19 document that's been handed out. It's a document that's
20 entitled, "BP Gulf of Mexico MMS APD Worksheet."
21 MR. WILLIAMSON: I will tell all the
22 lawyers here, for the record, it's one page out of what
23 I believe to be the March 15th, 2010, MMS submission by
24 BP.
25 MR. JONES: Hey, Jimmy --
1 MR. WILLIAMSON: Okay.
2 MR. JONES: -- just for the record, I
3 think you said "704," and it showed up on the transcript
4 as "704." It's 7004, just so it's clear.
5 MR. WILLIAMSON: 7004. Thanks.
6 Q. (BY MR. WILLIAMSON) Have you ever seen a
7 document like that before?
8 A. I havenot.
9 Q. Okay. Do you know how -- have you ever heard
10 of how you calculate MASP? Is that something you've
11 ever been privy to?
12 A. No, sir.
13 Q. So you don't know whether that involves
14 carrying an entire gas column to surface or 70 percent
15 gas to surface or 50 percent gas to surface; you don't
16 know?
17 A. I -- I understand there is an equation, but
18 I -- I don't -- I don't know the whole equation.
19 Q. Okay. Well, at least what BP claims in this
20 document that they filed with the Federal government in

21 order to get the right to drill this well, BP claims
22 that their worst case MASP -- see that down at the
23 bottom where it says "MASP at surface"?

24 A. Yes, sir.

25 Q. Okay. Well, actually, go up right above that.
1 Do you see where it says using 50 percent gas and
2 50 percent liquid from ML to surface, the mud line
3 pressure is 8,404 psi; do you see that?

4 A. I -- I do.

5 Q. And below that, they say the worst case MASP
6 at the surface is 6200 psi; do you see that?

7 A. I do see that.

8 Q. Okay. Obviously, by definition, that's higher
9 than 5,000 psi, which is what the lower annular is rated
10 to?

11 A. By definition, that is correct.

12 Q. Okay. So it would therefore be very
13 surprising to you as a person who works with blowout
14 preventers --

15 A. Uh-huh.

16 Q. -- to find out that BP wants to close the
17 annulars to shut in this well because their pressures
18 might exceed 5,000 psi?

Page 83:20 to 84:06

20 A. I -- I would -- the -- the annular is not
21 rated for more than 5,000 psi.

22 Q. (BY MR. WILLIAMSON) Therefore, you would not
23 tell BP use our 5,000-psi annular to close in a well
24 that you yourself claim has over 6,000 psi?

25 A. Well, yes. I mean, I -- I think our cut
1 sheet or our alert earlier stated it clearly it
2 shouldn't be used.

3 Q. Okay. The -- well, were you aware that on
4 March 8th, 2010, the lower annular was used to close in
5 the well when they encountered a kick?

6 A. I had heard that.

Page 84:14 to 84:24

14 Q. (BY MR. WILLIAMSON) Are you aware of any
15 action that BP took -- after March 8th when they -- on
16 2010 when they took a kick and the lower annular was
17 used to shut in the well, are you aware of any action BP
18 took that said this is totally inappropriate because the

19 lower annular is only rated to 5,000 psi?
20 A. I'm not aware of any action.
21 Q. Okay. Certainly if BP had come to you and
22 asked whether they should be using the 5,000-psi to shut
23 in this particular well, you would have said no, because
24 it's only rated to 5,000 psi?

Page 85:01 to 85:01

1 A. If -- if they would have come in, we'd have --

Page 85:03 to 86:23

3 A. -- definitely brought engineering into it and
4 sat down and had a discussion.
5 Q. (BY MR. WILLIAMSON) Okay. And, of course,
6 they actually have a component to shut the well in
7 that's rated more than 5,000 psi, correct? They have --
8 on this particular BOP stack they have VBRs that are
9 rated at 15,000 psi?
10 A. That is cor- --
11 Q. At least static pressure, correct?
12 A. That is correct.
13 Q. Uh-huh. By the way, does Cameron give well
14 control training to companies like BP?
15 A. We do not provide well control train --
16 training.
17 Q. Okay. Now, this is a sophisticated piece of
18 equipment, right?
19 A. Yes, sir.
20 Q. This is not a crescent wrench or some other
21 easy tool; it's a very sophisticated piece of equipment,
22 right?
23 A. I would agree with that.
24 Q. And one of the things you have to do if you're
25 going to operate this sophisticated piece of equipment
1 is you have to learn how to -- well, you're going to
2 have to learn how to assemble it and set it up and
3 install it properly on the wellhead, that would -- and
4 wire it properly in terms of the plumbing, right?
5 A. I would agree with that.
6 Q. Okay. But then once you have it on the
7 wellhead and you have it appropriately assembled and
8 appropriately wired electrically and hydraulically, the
9 next thing you're going to have to learn to do is to
10 train yourself how to utilize the piece of equipment for

11 well control, right?
12 A. I believe that's a fair statement.
13 Q. Your statement is -- or your statement is,
14 gee, Cameron's not the person who trains people in that?
15 A. That's correct.
16 Q. Okay. Does Cameron recommend that people go
17 get trained in it?
18 A. Not that I'm aware of.
19 Q. Okay. The -- is that just obvious to you?
20 A. Well, it -- it's common in the industry for
21 anybody -- from my understanding, being -- having worked
22 on rigs, anybody that's responsible for that equipment
23 will go through well control school.

Page 87:06 to 88:11

6 Q. Okay. Well, let me hand you what's been
7 mar- -- what I'll mark as the next exhibit. I'll
8 represent to you this is a page out of BP's well control
9 manual. I'll hand you what's been marked 7006, 7-0-0-6.
10 Okay. Have you ever looked at BP's well control manual?
11 A. I have not.
12 Q. Same comment, the handwriting --
13 MR. WILLIAMSON: What do you need?
14 THE WITNESS: I need another one.
15 MR. ROY: He needs a copy.
16 MR. WILLIAMSON: Which one's -- what's the
17 title at the top?
18 MR. JONES: BP.
19 MR. WILLIAMSON: Okay. Title at the top,
20 for the -- for the lawyers, the last Bates stamp numbers
21 are 36252, and title at the top is "D2: Kick Whilst
22 Drilling." Okay.
23 Q. (BY MR. WILLIAMSON) Do you see down there
24 this is a drill that BP has in their well control manual
25 about how they want their rigs to run. The part I want
1 to refer you to is down below. It says, "Having been
2 instructed to do so by the company representative" -- do
3 you see where I'm reading?
4 A. Yes, sir.
5 Q. "The driller is expected to take the following
6 steps to shut in the well." And number D, it says
7 "close the annular preventer," correct?
8 A. Yes, sir.
9 Q. Okay. So if we are to believe BP's well
10 control manual, BP's preferred policy of shutting a well

11 in is to close the annular preventer?

Page 88:13 to 89:10

13 A. That's what it appears to state in this
14 document.

15 Q. (BY MR. WILLIAMSON) Sure. But let me also
16 hand you Exhibit No. 7005, which is another page out of
17 the same document, and this says shut in while drilling.
18 They say if the casing pressure is less than 1,000 psi,
19 you remain closed in on the annular if pipe movement is
20 required, correct?

21 A. It says that along with a few other var- --
22 variables, and then remain closed in on the annular,
23 that's correct.

24 Q. Okay. And then it says, "After confirming the
25 annular is holding well pressure, reduce the closing
1 pressure to the minimum required to hold well pressure,"
2 correct?

3 A. That is correct.

4 Q. Okay. And then it goes on to say how to
5 handle a situation where the casing pressure is greater
6 than 1,000 psi, correct?

7 A. Yes, sir.

8 Q. So this one -- Exhibit 7,000ths --
9 Exhibit 7005 also indicates that the way BP wants to
10 shut in the well is to close the annular?

Page 89:12 to 89:22

12 A. The document appears to say that.

13 Q. (BY MR. WILLIAMSON) Okay. Let me ask you to
14 turn to tab 47 in the book that's before you.

15 A. 47.

16 MR. WILLIAMSON: For the record I will
17 tell everybody that tab 47 has been previously marked as
18 Exhibit 2200 in another deposition.

19 Q. (BY MR. WILLIAMSON) That particular document,
20 Exhibit 2200, is called "NAX - DW Gulf of Mexico
21 Deepwater Well Control Guidelines," right?

22 A. Yes, sir.

Page 90:23 to 91:11

23 Q. That's okay. I'll go down to the part I
24 wanted to ask you about, 1.2. It says, "The

25 contractor's shut-in procedure should be reviewed by the
1 well site team," okay.
2 A. Okay.
3 Q. And then it says, No. 3, "The annular BOP will
4 be used to initially shut-in the well." Do you see
5 where BP says that?
6 A. I -- I see No. 3 stating that.
7 Q. All right. So we have Exhibit 7005 and 7006
8 and 2200, all BP policy and procedure documents, and
9 they all say use the annular to shut in the well.
10 That's what we've looked at, right?
11 A. That's what I've read.

Page 91:13 to 91:22

13 Q. (BY MR. WILLIAMSON) Okay. Can you think of a
14 reason that you would want to try to use a 5,000-psi
15 annular to shut in a well in which the psi is greater
16 than 5,000? Can you think of a reason why you would
17 want to do that, use the Cameron equipment to do that?
18 A. I'm not a well control expert, but I don't --
19 I can't think of a reason why I would do that.
20 Q. Okay. Well, according to West Engineering in
21 Exhibit 7003, that would be, to use their word, "poor
22 practice," correct?

Page 91:24 to 91:24

24 A. I believe that's what it said.

Page 92:02 to 92:20

2 well, turn -- I want to switch subjects for a second,
3 and what I want to switch the subject to shearing.
4 After all, if you're -- you're forced to use the blind
5 shear RAMs, in order to be successful you're going to
6 have to shear the pipe, correct?
7 A. That's correct.
8 Q. Okay. So it's pretty doggone important that
9 you know whether the pipe that you have in the hole is
10 capable of being sheared by the blind shear RAMs?
11 A. Yes.
12 Q. Okay. Have you ever studied the shearing
13 formulas that Cameron puts out?
14 A. I have used them before, yes.
15 Q. Okay. RAM at one time did a table where they

16 had a table of different things, and then they later
17 changed to a formula.
18 A. That's correct.
19 Q. Have you used the formula?
20 A. I have.

Page 93:03 to 94:09

3 Q. I guess the best way to figure out if a given
4 BOP configuration will shear a given piece of pipe is to
5 test it on that piece of pipe?
6 A. That would be the -- my understanding, that
7 would be the -- the best way to determine if it's
8 shearable, is to actually perform a shear test.
9 Q. All right. And are you aware that drill
10 strings, as we drill deeper into higher pressure and
11 higher temperature, the drill pipe has gotten stronger
12 and stronger and more difficult to shear?
13 A. I am aware of that.
14 Q. And that is a known problem in the industry,
15 correct?
16 A. That is known in the industry, that over the
17 years pipe becomes bigger and heavier.
18 Q. And because of that, because it may be bigger
19 pipe or it may be heavier pipe or it may merely be
20 stronger pipe, there is more of a chance that a given
21 piece of pipe can shear?
22 A. Depending on what type of bonnets you have or
23 RAMs.
24 Q. Speaking of that, on the Deepwater Horizon
25 it's my understanding that if you were going to use the
1 auto shear or the AMF that the subsea accumulators would
2 be the system that would actually operate; is that
3 right?
4 A. That is right.
5 Q. So the only pressure you would have to
6 actually activate the blind shear RAMs if you were using
7 the AMF or the auto shear would be the accumulated
8 pressure that you had in the subsea accumulator bays?
9 A. That is -- that's my understanding.

Page 94:24 to 94:24

24 A. I'd have to review the engineering

Page 95:05 to 95:16

5 Q. Okay. Back when you were selling equipment,
6 back when you were selling equipment what you know is
7 that there were 5,000 psi subsea accumulator systems
8 available?

9 A. If I recall, that was the standard that we
10 would offer.

11 Q. Oh, okay. That would kind of be best in
12 practice?

13 A. Yes.

14 Q. Okay. Did BP ever up grade their 4,000
15 accumulator system to a 5,000 psi accumulator system on
16 the Deepwater Horizon?

Page 95:18 to 95:19

18 A. I'm not -- I'm not aware of accumulators being
19 purchased by BP or Transocean.

Page 97:04 to 97:16

4 Q. You're aware of the solenoid 103 issue, aren't
5 you?

6 A. I'm -- I'm aware of solenoid 103 on the
7 Horizon.

8 Q. Yeah. And you actually were on the rig when
9 solenoid 103 was actually opened up and tested on the
10 Deepwater Horizon on the pod itself?

11 A. I was on the Q4000 at the time.

12 Q. Right. You were there when Q -- when
13 literally the -- I guess you were there when the pod was
14 opened up?

15 A. I was there when we pulled the pod to the
16 surface.

Page 98:05 to 100:03

5 Q. I know that there is a battery that send an
6 electrical charge in the event that the AMF is
7 activated, correct?

8 A. That's correct.

9 Q. And it sends that electrical charge where?
10 Does it send that electrical charge directly to solenoid
11 103?

12 A. Again, I'm not an engineer, but my
13 understanding would be the battery would turn on the --

14 the CPU in the SEM, and then if the SEM was monitoring
15 and saw nothing active from the surface, then it would
16 supply voltage to a series of events to happen that were
17 preprogrammed.

18 Q. Okay. Is solenoid 103 -- explain to me what
19 it is.

20 A. As I recall on that system solenoid 103 was to
21 fire the high pressure shear RAMs.

22 Q. Okay. Is it lo- -- explain to me for those of
23 us who aren't very familiar with BOP systems. It's not
24 actually located in the SEM, is it?

25 A. The solenoid valve?

1 Q. Right.

2 A. It is not, it's connected in the SEM.

3 Q. Okay. And does it fire from an electrical
4 signal?

5 A. It fires from an electrical current.

6 Q. And when it fires what happens? What does --
7 what is the function -- when it's working properly and
8 you send that electrical signal to solenoid 103 is
9 solenoid 103 like the hydraulic valve?

10 A. It is a electrohydraulic valve.

11 Q. Okay. So when you send an electrical signal
12 to it it actually opens up the hydraulic valve?

13 A. That's correct.

14 Q. And the hydraulic fluid releases, goes where?

15 A. To another valve. It pilot -- to a bigger
16 valve to the -- to the open position, and it allows
17 accumulation -- accumulated fluid to go to that bigger
18 valve to its end destination, in this case the shear
19 RAMs.

20 Q. Okay. And so when you're testing solenoid 103
21 what you do is make sure that you're getting an
22 electrical current that will fire that hydraulic valve?

23 A. That is one of the tests you would do to test
24 the solenoid valve.

25 Q. Okay. Because if the electrical current does
1 not fire the hydraulic valve, then the hydraulic valve
2 will not open and the AMF will not fire?

3 A. That's correct.

Page 102:15 to 102:25

15 Q. (BY MR. WILLIAMSON) When Cameron sells its
16 blowout preventer systems does it recommend any
17 particular testing on those units? Oh, and, by the way,

18 I'll limit myself to subsea units. I'm talking about
19 the units that are going to be subsea.

20 A. Uh-huh.

21 Q. Is there any particular testing that's --
22 that's recommended?

23 A. There's several tests that happen with the
24 equipment throughout its manufacturing process and prior
25 to delivery.

Page 103:12 to 105:22

12 Q. -- does Cameron have any testing regimen that
13 it recommends or that it says this would be what you
14 should do?

15 A. There is a test procedure called a system
16 integration test when it's installed on the rig that the
17 client has -- from my understanding has input in. It's
18 agreed upon, and a test is performed.

19 Q. Okay. The -- other than -- by the way, I
20 noticed that on this particular one, I've seen a
21 document whereby there was a piece of drill pipe that
22 was actually cut after the drilling rig was delivered --

23 A. Okay.

24 Q. -- to test the blind shear RAMs. Would that
25 usually be part of the system integration test?

1 A. As I recall, that would be.

2 Q. Okay. The -- okay. Any other testing
3 protocol other than the system integration test -- which
4 I guess you do upon delivery of the unit to the
5 customer?

6 A. That's correct.

7 Q. Is there any other testing protocol that
8 Cameron recommends with use of the blowout preventer?

9 A. I'm not sure I understand. There -- like I
10 said, there's tests performed on subcomponents --

11 Q. Yeah, like --

12 A. -- through the assembly process.

13 Q. You should test the annular this many times to
14 this pressure; you should test the pipe RAM this many
15 times, every so often, to this pressure. Is there any
16 testing protocol that Cameron recommends?

17 A. After -- after delivery of the equipment?

18 Q. Correct.

19 A. Oh. I would have to review the rig book to
20 understand any testing requirements. My understanding
21 is on-the-rig testing protocol is driven by regional

22 legislation and the equipment operator or lease
23 operator's requirements.

24 Q. All right. So the answer is, to your
25 knowledge, Cameron doesn't have any testing protocol
1 that it recommends that you're aware that there's
2 certain regulator- -- there's certain regulations that
3 require testing in a certain way?

4 A. In the -- I believe in the maintenance manual
5 there might be -- if you rebuild a component, you should
6 test it to -- to ensure its integrity, but my
7 understanding is most of the testing requirements for
8 the system is driven by regulation.

9 Q. By the way, where would the test RAM
10 conversion be done? Would that be done on the rig, the
11 test RAM conversion that would have been done in, like,
12 2006?

13 A. Yes, it could be done on the rig.

14 Q. I'm sorry. I apologize. It was probably done
15 in 2004. But --

16 A. Yeah --

17 Q. -- nonetheless --

18 A. -- I believe --

19 Q. -- where would it have been done?

20 A. I believe that one was done offshore.

21 Q. Okay. And you think Cameron was the one who
22 did it?

Page 105:24 to 107:05

24 A. My understanding, there was a service
25 technician that went out to -- to make the modification
1 to meet Transocean's requirement.

2 Q. (BY MR. WILLIAMSON) Okay. Okay. And the one
3 that was converted was the lowest RAM?

4 A. I believe that's correct.

5 Q. And the purpose for the conversion?

6 A. The purpose of the conversion, I believe
7 Transocean would have to specify why they wanted it.
8 But my understanding, it was so they could -- they could
9 test the BOP without pulling pipe all the way to the
10 surface.

11 Q. All right. The -- are you -- are you also
12 aware that this particular BOP unit has ROV hot stab
13 ports?

14 A. Yes.

15 Q. Were you aware that when they -- that the

16 lower RAM on this particular BOP stack had a hot -- hot
17 stab port?
18 A. At -- at the time of delivery?
19 Q. Yeah.
20 A. Yes.
21 Q. Okay. Were you aware that the hot stab port
22 when it got converted to a test RAM did not get changed
23 to the RAM right above it?
24 A. I was not aware of that until the Ap- -- in --
25 after the event.
1 Q. Yeah, after the explosion?
2 A. Yes, sir.
3 Q. Okay. Well, when you were changing the lowest
4 RAM to a test RAM, shouldn't you have also changed the
5 ROV hot stab to be the next-to-lowest RAM?

Page 107:07 to 108:19

7 A. I'm not sure at the time what was performed,
8 whose responsibility it was at the time that conversion
9 was made. My understanding, the technician that went
10 out there was sent out to do the physical flipping of
11 the RAM itself on the bonnet.
12 Q. (BY MR. WILLIAMSON) Okay. But you would
13 agree with me that if the bottom RAM is going to be a
14 test RAM and if it's not going to be bi-directional,
15 then it will not hold pressure from below, it will not
16 seal?
17 A. That is correct.
18 Q. Okay. And if the bottom RAM will not seal
19 well-bore pressure from below, then there is no reason
20 to have ROV intervention to that particular RAM?
21 A. I can't personally see any reason why you
22 would need ROV intervention.
23 Q. Okay. So if you're trying to get ROV
24 intervention, you need to have that ROV inter- --
25 intervention go to the lowest effective sealing RAM,
1 correct?
2 A. I would agree with that.
3 Q. And the lowest -- after the test RAM is set
4 up --
5 A. Uh-huh.
6 Q. -- the lowest effective sealing RAM is the
7 middle VBR?
8 A. That would be correct.
9 Q. And so the ROV hot stab should be changed to

10 the middle VBR?

11 A. It should be -- should -- changed to some
12 other location than, in my opinion, the -- the lower --
13 the test RAM itself.

14 Q. Yeah. Just bluntly put, it doesn't do any
15 good to have ROV hot stab to the test RAM?

16 A. I -- I can't see any particular reason why it
17 would be advantageous to have it there.

18 Q. So you need to go ahead and try to get that
19 ROV hot stab to one of the other VBRs --

Page 108:21 to 108:24

21 Q. (BY MR. WILLIAMSON) -- correct?

22 A. That would be a decision that the operator,
23 the equipment man- -- owner would have to determine at
24 the time based on the use.

Page 109:14 to 110:03

14 Q. Okay. But so what you need is you need ROV
15 intervention to one of the pipe RAMs that actually has a
16 sealing function?

17 A. I would expect that to be the case.

18 Q. Right. And you don't know why that didn't get
19 done?

20 A. I'm not -- I don't know if it didn't get done.
21 At the time of a -- a conversion like that, you would do
22 a complete -- a complete test of your control system
23 prior to deploying again, and at -- at that time you
24 would -- you should pick up on any anomalies in the
25 control system.

1 Q. All right. So what you're saying is somebody
2 who was doing the work should check it to make sure that
3 the ROV system is appropriately wired?

Page 110:05 to 111:07

5 A. I'm -- I'm -- I'm saying my understanding of a
6 situation like that is before you run any -- every time
7 you run the stacks subsea my understanding is they do go
8 through a complete test of all the functions to ensure
9 everything's working as it should.

10 Q. (BY MR. WILLIAMSON) Okay. That's a good
11 point. What you're saying is, in your opinion, they
12 ought to be testing every function before you deploy it

13 subsea?

14 A. My understanding is that's what they do;
15 that's part of standard procedure on the rigs.

16 Q. On the rigs you were on, that's what they do?

17 A. My -- from my understanding, that's typically
18 what happens is prior to, a pre-deployment procedure is
19 written and they test the BOP stack prior to deployment.

20 Q. Okay. So it would surprise you if on the
21 Deepwater Horizon nobody was testing the ROV hot stabs
22 before deployment?

23 A. I would expect -- from my understanding, I
24 would expect all functions to be tested to ensure
25 they're working --

1 Q. Fair --

2 A. -- properly.

3 Q. Okay. I have a slightly different question.

4 A. Okay.

5 Q. If you were changing the bottom RAM to a test
6 RAM, shouldn't you check to see if the ROV hot stab is
7 changed also?

Page 111:09 to 111:14

9 A. I think every component associated with any
10 change should be thoroughly vetted at the time.

11 Q. (BY MR. WILLIAMSON) Okay. And one of the
12 components that's related to the bottom VBR is the ROV
13 hot stab, correct?

14 A. That is correct.

Page 111:17 to 117:04

17 Q. (BY MR. WILLIAMSON) I'm going to ask you to
18 look at Exhibit -- what's been previously marked an
19 exhibit as Exhibit 599. It should be in the booklet
20 that says "Previously Marked." Okay. Do you recognize
21 that document?

22 A. I do.

23 Q. What is it?

24 A. It was a daily report of the log of activities
25 aboard the Q4000.

1 Q. All right. And did -- was this a log when you
2 flew out there after the explosion, the rig is now sank,
3 and somebody's pulling up the LMRP?

4 A. No, this is after the explosion and we are
5 pulling the -- one of the pods.

6 Q. Okay. Was the whole L -- just tell me, was
7 the whole LMRP pulled or just the yellow pod?
8 A. Just the yellow pod.
9 Q. Okay. And is the yellow pod retrievable
10 independent of the LMRP? I guess that's obvious if
11 you --
12 A. The -- it can -- it can be. In this case it
13 was at one time and then it was converted to
14 non-retrievable and then we were -- but we were still
15 able to retrieve the pod.
16 Q. Okay. So through ROV intervention, y'all were
17 able to get the yellow pod where it was retrievable, and
18 it was brought up to the -- to the surface on May 5th,
19 2000?
20 A. That is correct.
21 Q. And you -- 2010?
22 A. 2010, yes.
23 Q. That would be about 15 days after the
24 explosion?
25 A. I believe that's correct.
1 Q. All right. And you were there when it was
2 opened up and the work was done on it?
3 A. I was there when the work was performed.
4 Q. Okay. The part I'm most interested in is on
5 the third page where it says at 2140. You see the --
6 did -- you kind of put this out by time, right?
7 A. Yes, sir.
8 Q. On 2140, you say, "Simulated deadman test on
9 solenoid," right?
10 A. Yes, sir.
11 Q. "Electromagnetic pin was used but held next to
12 the solenoid valve for the casing shears," correct?
13 A. Yes, sir.
14 Q. "This was the incorrect solenoid valve as
15 during the deadman and the high-pressure blind shear,
16 Solenoid Valve 103 is the solenoid valve that
17 energizes," right?
18 A. That's correct.
19 Q. All right. Who was doing the test?
20 A. I don't recall who was -- I don't recall who
21 was on the PETU or who was at the -- who had the
22 electromagnetic pin in their hand. I -- I don't recall
23 the -- the individual's name.
24 Q. It wasn't you?
25 A. No, sir, I was taking notes.
1 Q. All right. And what you notice is they held

2 it up to the in- -- to the incorrect solenoid valve?
3 A. That's correct.
4 Q. How did you know that? Just because you've
5 worked on them before?
6 A. No, there was -- when it didn't fire, there
7 was some investigation. We tried to determine what
8 happened, and we looked at the PETU and determined that
9 the wrong -- whoever was operating it, I don't recall,
10 had fired the wrong number solenoid.
11 Q. Okay. Tell me how the PETU works, for those
12 of us who don't know anything about it.
13 A. It's -- it simulates the driller's panel or --
14 or tool pusher's panel. It's a small laptop and a -- a
15 transformer and some CPUs --
16 Q. Okay. So what --
17 A. -- with some boards.
18 Q. -- you do is you plug into the SEM?
19 A. Yes, sir.
20 Q. And you're kind of simulating the controls
21 that would normally be coming from the rig?
22 A. That's correct.
23 Q. Okay. And you have a way of testing Solenoid
24 103?
25 A. Well, at that time, we used an electromagnetic
1 pin that would detect electrical current, and then it
2 would light up if it saw an electrical current.
3 Q. Okay. Well, did the driller or the tool
4 pusher have the ability to test Solenoid 103 from the
5 rig?
6 A. Prior to deployment of the system?
7 Q. No, I meant subsea, but I'll ask the question
8 both ways. When the -- I assume when the LMRP -- when
9 the pod is on the deck of the ship before it splashes,
10 that you have the ability to test the solenoid if you
11 choose to?
12 A. Yes.
13 Q. Do you have to use a PETU to do that?
14 A. No, you can use the -- you can use a PETU, or
15 you could use the -- the control system installed on the
16 rig.
17 Q. Oh, okay. You can actually just take the
18 control system you have and push the function to
19 simulate -- I guess, what, simulate, what, AMF?
20 A. You would arm the system and then turn off all
21 associated inputs that it requires, and it would go
22 through its functions.

23 Q. All right. So you would simulate AMF by
24 turning off electrical and power and hydraulics?
25 A. That's correct.
1 Q. And then that should cause the battery to
2 fire, which should cause the solenoid to fire?
3 A. That's correct.
4 Q. Okay. And you are supposed to do that before
5 you splash the BOP?
6 A. As with anything, my understanding is they
7 would perform as- -- all associated tests prior to
8 running the BOP.
9 Q. Okay. Wouldn't that have the effect of
10 running the -- discharging the battery, running down the
11 battery?
12 A. It -- it would consume --
13 Q. Some amount of battery power?
14 A. It would.
15 Q. Okay. Of course, we don't know how much
16 battery power it would consume?
17 A. No, I -- I would have to defer that to
18 engineering on how much it consumes.
19 Q. Okay. The -- all right. So you would -- on
20 the surface you would use the driller's control panel,
21 and you could simulate an AMF by cutting off electrical
22 and cutting off power and cutting off hydraulics,
23 correct?
24 A. The three inputs required communications,
25 electrical, and hydraulics.
1 Q. And if you only cut off one of them, it
2 shouldn't work?
3 A. It sh- -- th- -- that's correct, it should not
4 fire.

Page 117:20 to 118:12

20 Q. Okay. All right. Back to the -- back to the
21 testing, can you actually see -- when you do this test
22 on the deck before you deploy the unit subsea --
23 A. Uh-huh.
24 Q. -- and use the driller's panel to simulate the
25 deadman --
1 A. Uh-huh.
2 Q. -- the AMF --
3 A. Uh-huh.
4 Q. -- do you actually see Solenoid 103 fire? Do
5 you see the valve open?

6 A. You would not see the valve itself, the
7 internal's movement, but you would see -- there would be
8 a massive amount of activity on the -- on the LMRP.
9 Fluid would be going everywhere. You would see an
10 activation -- something would have happened.
11 Q. Okay. If it's working correctly?
12 A. That's correct.

Page 118:24 to 123:05

24 Q. All right. So what you're saying is the first
25 time they tested the solenoid, they thought it didn't
1 work, but they were really testing the wrong solenoid?
2 A. Who -- who's "they"?
3 Q. Whoever was doing it. You said you didn't
4 know the name of the --
5 A. Oh.
6 Q. -- person.
7 A. Oh, here, yes.
8 Q. Yeah, back on your document.
9 A. Okay.
10 Q. Which is Exhibit 599.
11 A. Uh-huh.
12 Q. So at 2140, you're saying they tested the
13 solenoid, but they weren't testing the correct solenoid?
14 A. That's correct.
15 Q. All right. So the 2146, they correct the --
16 at 2146, they test the correct solenoid; is that right?
17 A. That's correct.
18 Q. And that's Solenoid 103, correct?
19 A. That's correct.
20 Q. Okay. And, apparently, Solenoid 103 did not
21 work, correct?
22 A. That is correct.
23 Q. Why not?
24 A. At the time we -- we didn't know why it did
25 not work.
1 Q. Okay. What do you think now? What do you
2 know now about why it didn't work?
3 A. I -- as I recall, the solenoid valve itself
4 was bad.
5 Q. Okay. Is that what you concluded out there
6 that day, that the solenoid valve was bad?
7 A. Th -- well, that day -- that particular day
8 there was no conclusion drawn.
9 Q. Okay. How have you reached that conclusion

10 now?

11 A. Later on, we reinstalled another solenoid from
12 a spare pod, and the -- the circuit worked --

13 Q. When did --

14 A. -- as intended.

15 Q. -- you do that?

16 A. I don't recall. It must be in a different...

17 Q. But you did it out there on the Q4000?

18 A. Yes, sir.

19 Q. Okay. Okay. So what y'all did was -- and you
20 have on here a sentence that said, "No indications of
21 the valve firing," which was true. When they tried to
22 fire Solenoid 103 that was the Solenoid 103 that was on
23 the subsea yellow pod, it did not fire, correct?

24 A. That's correct.

25 Q. Okay. Then y'all pulled -- at some point
1 while you were still on the Q4000, y'all pulled that
2 solenoid out, put another solenoid in, and it fires?

3 A. That's correct.

4 Q. But you didn't reach an opinion about why it
5 didn't fire at that time?

6 A. Once we installed the new solenoid valve,
7 we -- we couldn't -- we didn't -- we weren't there to do
8 any necessarily investigative testing on -- on the
9 failure modes. We were just trying to get the pod back
10 up and running so we could try to send it subsea again.

11 Q. Okay. Then you say, "The valve was rebuilt in
12 February 2010 by an unknown person. It appears this was
13 done on the rig as the date was written in paint pen."
14 Tell me what you mean by those two sentences.

15 A. With a paint pen, somebody's initials and the
16 date was written on the outer body of the solenoid
17 valve.

18 Q. Okay. Was the solenoid valve a Cameron part,
19 or could you tell?

20 A. Th- -- it appeared at the -- the time of
21 investigation the e-connector portion was not purchased
22 through Cameron.

23 Q. Okay. Did you -- do you still believe that?

24 A. I do.

25 Q. Okay. And do you think the e-connector was
1 what was bad?

2 A. I don't know what was bad. We didn't -- like
3 I said, I didn't do any investigative, you know,
4 interrogation of that particular component. It was
5 taken into custody and went off.

6 Q. Okay. Let me ask you this: Did they use the
7 same e-connector when they put the other solenoid in
8 there? In other words, do you take the new solenoid --
9 A. Uh-huh.
10 Q. -- hook it up to that same e-connector --
11 A. Uh-huh.
12 Q. -- and it worked?
13 A. Well, the e-connector is part of the solenoid.
14 It's -- it bolts to the solenoid. It's part of the
15 assembly. So --
16 Q. Okay.
17 A. -- we just took another solenoid with the
18 e-connector off and installed it.
19 Q. All right. So when you removed the solenoid,
20 you removed the e-connector with it?
21 A. That's correct.
22 Q. And the e-connector is what you're saying is
23 not a Cameron part?
24 A. That's correct.
25 Q. But the solenoid itself, other than the
1 e-connector, was Cameron?
2 A. The best I could tell, yes.
3 Q. Okay. Okay. And what part did you say had
4 been -- had the paint pen on it?
5 A. It was on the -- the solenoid body itself.

Page 124:03 to 124:16

3 Q. Oh, by the way, your upper annular, the upper
4 annular on this particular BOP stack is not a stripping
5 annular, is it?
6 A. That's my understanding.
7 Q. So should you strip out of it?
8 A. There is a engineering bulletin that Cameron
9 produces regarding stripping practices.
10 Q. All right. Well, what does Cameron say about
11 whether you should strip out of a non-stripping annular?
12 A. Well, I'd have to -- I'd have to review the
13 document, but to the best of my recollection, it -- it
14 is not recommended to strip through non-stripping on
15 pi- -- it has some -- it revolves around pipe sizes, but
16 I -- I'd have to review the documentation again.

Page 125:04 to 125:12

4 Q. I'm going to hand you -- or, actually, ask you

5 to look in that book to Exhibit 598. There's an e-mail
6 on 598. The fir- -- the second e-mail on the page says,
7 "Last August when I was last out here, there was a group
8 of solenoids that was regularly giving break
9 conditions." See that? What's a break condition?

10 A. From my understanding a break condition is a
11 increase in resistance in a -- that circuit associated
12 with that solenoid.

Page 127:05 to 127:11

5 Q. Okay. So if you're having solenoid problems,
6 you'll know it from looking at the panels?

7 A. There will be indications at the panels.

8 Q. Okay.

9 A. The event logger will show it.

10 Q. But according to you, even if you're having
11 these, the system should still work?

Page 127:13 to 130:08

13 A. My understanding is that if you're having a
14 coil fault, that the system can still work. That's an
15 alert on the event logger that shows you that there is
16 something that needs to be addressed.

17 MR. WILLIAMSON: Okay. While we're on
18 this subject, let's please mark this, the next exhibit,
19 as 7007. Okay. You can hand the document to him.

20 Q. (BY MR. WILLIAMSON) Have you ever seen that
21 document before, that you know of?

22 A. I was a service manager at the time of this.

23 Q. Okay.

24 A. I don't remember the specifics, but based on
25 the date.

1 Q. All right. Apparently, this document is done
2 by J. Van Lue. Who's Mr. Van Lue?

3 A. Jason Van Lue is a -- a Cameron employee.

4 Q. And what does he do?

5 A. His current position is field service manager.

6 Q. And, by the way, the first thing I noticed on
7 this, this is July 13th, 2007, for the Deepwater
8 Horizon, correct?

9 A. That is correct.

10 Q. And, in fact, the Deepwater Horizon had a
11 problem with their blowout preventer because they had
12 cement in the RAM, correct?

13 A. I don't recall.

14 Q. You see the second sentence where it says,
15 Open bonnets on middle pipe rounds and found cement
16 compacted in RAM, causing RAM not to fully close on
17 5-inch pipe?

18 A. I do see that.

19 Q. Okay. So, apparently, they were having a
20 problem with the cement coming in and clogging up the
21 BOP?

22 A. That's what it looks like.

23 Q. And that's a known risk of BOP; if you get a
24 cement up in the BOP, it may not work properly?

25 A. From my understanding, the industry is aware
1 that any debris that interferes with the RAM rubber seal
2 will have a -- decrease its ability to seal.

3 Q. Sure. Well, you're part of the industry, so
4 you're aware of it, too, I guess?

5 A. Yes.

6 Q. Okay. The -- and then it -- below that, it
7 says, "Have several coil faults that I will address when
8 the RAMs are completed. Suspect problem to be with pie
9 connectors due to system working okay when stack was in
10 the water." What does that mean?

11 A. That is talking about when the stack is on the
12 surface the coil faults are not seen, but when it hits
13 the splash zone, then the coil faults will come back.

14 Q. Okay. And why would that be?

15 A. There could be some water intrusion to the
16 cable that's causing the resistance to go up.

17 Q. By the way, I noticed when they actually took
18 the drill cuttings out, do you see that sentence below
19 that on July 14th, you say, "I found a wash-out area on
20 the seal face of the RAM packer." Do you see that?

21 A. I do.

22 Q. So if you're going to have debris come up
23 through the BOP, you've got a chance to damage your
24 elastomeric elements?

25 A. That is a possibility.

1 Q. And if you damage your elastomeric elements,
2 of course, you may not get a seal.

3 A. It would definitely affect the ability to
4 perform that task.

5 Q. And, in fact, that happened twice in 2007 on
6 the Deepwater Horizon, didn't it?

7 A. It looks like it happened once here, that I'm
8 reading in this report.

Page 133:16 to 135:18

16 Q. All right. If I understand your testimony
17 you've told me, Mr. Erwin, this morning, you worked for
18 Cameron for about 14 years, right?
19 A. That's correct.
20 Q. Sales and service mostly have been the two
21 biggest areas you've had, right?
22 A. Yes, sir.
23 Q. And you've had some interaction with the
24 Deepwater Horizon, some interaction with Transocean, and
25 some interaction with -- with BP over those 14 years?
1 A. That's correct.
2 Q. Okay. And the Deepwater Horizon had blind
3 shear RAMs that they could have upgrade to do VVs if
4 they had wanted to?
5 A. That's correct.
6 Q. And that would have been a more efficient
7 shearing design, correct?
8 A. DBSSs are more efficient, that's correct.
9 Q. Okay. And they could have upgraded to a
10 bi-directional test RAM if they had wanted, correct?
11 A. That option is available.
12 Q. And somebody chose not to? No one ever did
13 it, right?
14 A. To my understanding it was not -- not done.
15 Q. Okay. They could have upgraded to a
16 six-cavity stack if they had wanted to, but they chose
17 not to?
18 A. That option was available.
19 Q. Okay. They could have upgraded to a battery
20 system where you can monitor the status of the
21 batteries, but they chose not to?
22 A. Through engineering that was available, yes.
23 Q. Okay. And they could have chosen, whoever was
24 making decisions for the Deepwater Horizon could have
25 chose to get double BSRs, a double set of blind shield
1 RAMs on that rig if they'd wanted to, but they chose not
2 to, correct?
3 A. That option was available.
4 Q. And nobody chose it?
5 A. That's correct.
6 Q. And they could have chose to have their EDS
7 system set up so that the casing shear RAMs cut first
8 and then the blind shear RAMs cut, but nobody chose that

9 option.
10 A. That's correct.
11 Q. Okay. And, of course, they could have went to
12 a six-cavity stack instead of a five-cavity stack,
13 right?
14 A. That was an option.
15 Q. And, of course, they could have went to your
16 EVO system, too, I guess, right, which had a better,
17 lighter, more efficient, more modern cutting design,
18 correct?

Page 135:20 to 137:02

20 A. I'm not sure about all the particulars of the
21 EVO.
22 Q. (BY MR. WILLIAMSON) Okay. But you know it's
23 supposed to be lighter and better?
24 A. It is lighter and you can fit more into an
25 envelope.
1 Q. Okay. And, of course, somebody could have put
2 an acoustic trigger on this particular unit if they had
3 chosen to, on the Deepwater Horizon?
4 A. That option was available.
5 Q. All right. And, of course, if you had an
6 acoustic trigger, even if the MUX cables get blown up in
7 the moon pool, you would still have a method to activate
8 the EDS system, correct?
9 A. If -- if there's a -- MUX cables get
10 destroyed, there is another method to control the BO --
11 function of the BOP.
12 Q. Okay. And I guess they could have asked
13 Cameron to cooperate with them in testing how certain
14 pipe would be sheared, right? In other words, to see if
15 6 and 5/8-inch, 27-pound pipe was shearable or not?
16 A. That is something we had the ability to do,
17 test -- do shear tests.
18 Q. And you would have been happy to help
19 Transocean or BP -- if they had said we want to know if
20 the drill pipe we have on board is shearable, Cameron
21 would have been happy to assist with that?
22 A. Yes, Cameron offers shear tests to customers
23 anytime they request it.
24 Q. Right. No one on the Deepwater Horizon, no
25 one ever requested it?
1 A. I'm not aware of a shear test requested for
2 that.

Page 137:21 to 139:20

21 Q. (BY MR. WILLIAMSON) Okay. Mr. Erwin, we're
22 back on the record now. Okay. Who did you deal with at
23 Transocean?
24 A. In my account representative position or --
25 Q. Sure.
1 A. I dealt with multiple people from their
2 engineering department to their technical field support
3 group.
4 Q. Sure. Tell me the person you dealt with most
5 often.
6 A. Mike Fry, Geoff Boughton, Billy Stringfellow,
7 Dean Williams. Dana Burkett. Would you like me to
8 continue?
9 Q. Does that -- that take care of most of the
10 contacts? I'm sure you talked to other people, too.
11 Does that take care of most of the people?
12 A. Those are the ones I dealt with on a more
13 regular basis.
14 Q. Right. Mr. Fry, I think, does work with BOPs
15 all the time?
16 A. That's correct.
17 Q. And so does Mr. Stringfellow?
18 A. Yes, sir.
19 Q. What about Mr. Boughton?
20 A. Mr. Boughton?
21 Q. Uh-huh.
22 A. Yes, sir.
23 Q. And then you said Mr. "Bokett"?
24 A. Dana Burkett.
25 Q. Okay. Is that a Mr. or a Mrs.?
1 A. Mister.
2 Q. Mister. And there was one more name you said.
3 Fry, Boughton, Stringfellow, Burkett?
4 A. I don't recall.
5 Q. Who were the people you dealt with most at BP,
6 or was there --
7 A. Dean Williams was the other name.
8 Q. Thank you. Who were the people you dealt with
9 at BP?
10 A. I don't --
11 Q. Any name -- any name comes to mind?
12 A. Post or pre-Macondo.
13 Q. That's a fair distinction. Pre-Macondo.

14 A. Verne Bizard.
15 Q. Okay.
16 A. That's -- that's one of them that comes to
17 mind. I can't --
18 Q. What does Mr. Bizard do for BP?
19 A. He's -- he was involved with the BP Thunder
20 Horse project.

Page 145:20 to 145:24

20 Q. Okay. Are you aware that some BOP systems do
21 fail? Do you read the studies where BOPs do have
22 failures?
23 A. I have read studies from some industry third
24 parties that make statements regarding that.

Page 146:08 to 146:18

8 Q. What kind of failure modes are you aware of?
9 In your experience of 14 years working for Cameron what
10 failure modes are you aware of with the BOP?
11 A. Oh, there is numerous modes that -- misuse of
12 equipment, there could be, as you stated previously,
13 cement or some object obstructing a RAM to close, there
14 could be a damaged seal, there just -- there's numerous
15 possibilities.
16 Q. Okay. I guess, then, how could you get a
17 damaged seal, by something coming through the BOP?
18 A. Yes, sir.

Page 146:25 to 147:09

25 asking about this industry. There is a certain rate of
1 failure in BOPs, correct?
2 A. I imagine there is. BOPs can components do
3 fail --
4 Q. Okay.
5 A. -- from time to time.
6 Q. Okay. So how do we prevent that? The BOP is
7 a safety-critical piece of equipment on a very -- you do
8 agree it's safety critical, we've agreed on that, right?
9 A. Yes, sir.

Page 147:15 to 147:19

15 Q. All right. And truth of the matter is there

16 are people out there who say that if you operate and
17 design a well properly, you won't need to use the BOP,
18 correct?
19 A. I've heard that before.

Page 147:23 to 147:24

23 Q. What's the proper way in order to minimize the
24 chance of failure?

Page 148:01 to 148:04

1 A. The proper way to do what?
2 Q. (BY MR. WILLIAMSON) Minimize the chance that
3 you're going to have a failure of the BOP when you need
4 it.

Page 148:06 to 148:24

6 A. I think routine maintenance is something that
7 should be done.
8 Q. (BY MR. WILLIAMSON) Okay. What else?
9 A. I'd have to -- I mean, there's numerous
10 documents that Cameron -- engineering bulletins that --
11 that discuss maintenance and precaution and -- and the
12 drilling contractors themselves and the operators have
13 testing regiments, federal -- the government has testing
14 requirements that have to be done to -- to ensure that
15 it's working properly.
16 Q. All right. So one thing you need to do is you
17 need to test it to make sure it's working right?
18 A. Yes.
19 Q. Okay. That's going to be an important part of
20 making sure the thing is going to be there when you need
21 it, is you have to test it to make sure it's working
22 properly?
23 A. Testing is definitely something that should be
24 done.

Page 153:08 to 153:17

8 Q. (BY MR. WILLIAMSON) Sure. If you think a
9 component has potential chance to see 10,000 psi,
10 shouldn't you test it to 10,000 psi to make sure it is
11 capable of handling that situation?
12 A. If the -- if the component is rated to handle

13 that pressure and not exceed its maximum allowable,
14 then, yes.
15 Q. Okay. Yeah, as long as that particular piece
16 of equipment is rated at 10,000 psi or higher?
17 A. Yes.

Page 153:21 to 153:21

21 Exhibit No. 1199.

Page 154:01 to 157:19

1 Q. (BY MR. WILLIAMSON) Have you seen that
2 document before?
3 A. I have.
4 Q. It's a Cameron engineering bulletin. This one
5 is 702D, as in delta, right?
6 A. That's correct.
7 Q. Okay. Have you actually performed
8 calculations under this?
9 A. I have.
10 Q. Okay. All right. And this will tell you what
11 can be sheared, right?
12 A. This gives the calculated shear pressure
13 required for a given tubular RAM configuration and
14 bonded configuration.
15 Q. All right. What's the RAM configuration on
16 the Deepwater Horizon?
17 A. My understanding, it was a set of standard
18 shear bonnets with SBRs.
19 Q. Sure. Please tell me, if you'll turn to
20 Page 3, which one of those categories would apply to the
21 blind shear RAMs on the Deepwater Horizon?
22 Are you on Page 3?
23 A. Yes, sir. Eight -- the 18-3/4 15M T, slash,
24 TL BOP would be the type.
25 Q. The last one in that first column, right?
1 A. Yes, sir.
2 Q. Okay. And then I assume we're going to go to
3 SBR?
4 A. That is correct.
5 Q. Okay. All right. And that gives us the max
6 wall thickness and the maximum diameter, right?
7 A. That is correct.
8 Q. Okay. And then if we meet the max wall
9 thickness and the maximum diameter, I guess the next

10 thing you would do is turn to page number, I think it's
11 6. 4, 5, 6.
12 A. Yes, sir.
13 Q. And tell me which one of those would be
14 correct to use for the blind shear RAMs.
15 A. That would be 18-15M T, slash, TL BOP ST-Lock,
16 operator type SB.
17 Q. All right. Repeat which one it is. 18, dash,
18 15M, right?
19 A. Yes, sir. 18-15M T, slash, TL BOP, in
20 parentheses it says ST-Lock/Manual. And off to the
21 right in operator type, it would be SB for standard
22 bonnet, according to Page 1.
23 Q. All right, fair enough. And then the two
24 constants, to make sure I'm on the right line with you,
25 the two constants would be 238 and 36?
1 A. That is correct.
2 Q. Okay. All right. The one right under that is
3 the S -- SBT. What is that?
4 A. Standard bonnets with tandem boosters.
5 Q. All right. So tandem boosters is another way
6 you could increase the shearing power?
7 A. That is correct.
8 Q. Okay. And that's another upgrade that BP
9 never ordered?
10 A. I'm not aware of them placing an order for --
11 for that RAM.
12 Q. Sure. So that -- and along with the other
13 things I've already detailed, bi-directional RAMs --
14 A. Uh-huh.
15 Q. -- VVs, things like that, the tandem booster
16 is another upgrade that was available to BP, but they
17 chose not to order it, as far as you know?
18 A. As far as I understand.
19 Q. Okay. All right. And below that I notice
20 there is something called a RAM lock. What's the
21 difference between the ST-Lock/Manual and the RAM lock?
22 A. The RAM lock was a different locking system
23 for that particular style of BOP.
24 Q. Does it also create more shearing force?
25 A. It has a higher constant than the standard
1 bonnet.
2 Q. Okay. So could you have upgraded the
3 Deepwater Horizon to the RAM lock system?
4 A. That's something engineering would have had to
5 review to -- I couldn't say explicitly, sitting here.

6 Q. And then you could also get the RAM lock
7 system with the tandem booster, right?
8 A. That is correct.
9 Q. By the way, you could have upgraded, I guess,
10 the Deepwater Horizon to the tandem booster, that was
11 possible, right?
12 A. Physically possible, yes.
13 Q. Okay. What would -- is there a reason you
14 think it couldn't be done?
15 A. We'd have -- you'd have to review the control
16 system to understand the number of available functions,
17 if there was any -- if you needed more, and also
18 footprint, you would have to review that to understand
19 if you could fit within the frame.

Page 159:04 to 159:18

4 Q. (BY MR. WILLIAMSON) BP, BP the operator,
5 could have upgraded the BOP stack on the Deepwater
6 Horizon by going to a VV blind shear RAM design,
7 correct?
8 A. It would have increased the shearing capacity
9 of -- of the bonnet.
10 Q. And that was feasible, right? You could --
11 A. Yes.
12 Q. You could change those RAM blocks without
13 having to buy an entire new BOP?
14 A. That's correct.
15 Q. And how much did those RAM blocks cost?
16 A. I -- I don't know.
17 Q. Give me a range.
18 A. 50 to a hundred thousand, maybe.

Page 159:20 to 160:12

20 you could have gotten better RAM capacity. And I won't
21 hold you to the price. That's just an estimation?
22 A. Uh-huh.
23 Q. Right?
24 A. It -- it would have increased the shearing
25 capacity of that bonnet.
1 Q. Right. Okay. And how much would it have cost
2 to do a tandem upgrade? And, again, I -- I'm not going
3 to hold you to it. I just want an estimate.
4 A. 250,000, maybe. I -- I -- I don't -- I don't
5 know.

6 Q. Okay. So for a -- so if the Deepwater Horizon
7 was a large enough vessel to accommodate it, they could
8 have put on both VVs on the blind shears and could have
9 put on the tandem booster?
10 A. Yes.
11 Q. Which would have substantially increased the
12 shearing abilities?

Page 160:14 to 160:24

14 A. It would have -- it would have increased the
15 shearing ability.
16 Q. (BY MR. WILLIAMSON) Right. And just off the
17 top of your head the cost on that is going to be in the
18 neighborhood of 350 to \$450,000, although you stand to
19 be corrected by Cameron's official price list?
20 A. That's correct.
21 Q. Okay. The -- do you have any idea why they
22 wouldn't choose to spend an amount of money that was
23 basically less than one half day of their drilling cost
24 to make their blind shear RAMs safer?

Page 161:01 to 161:01

1 A. I don't know why.

Page 166:21 to 169:10

21 (Exhibit No. 7009 was marked for
22 identification.)
23 Q. (BY MR. WILLIAMSON) Have you ever seen that
24 article before?
25 A. I do not recall seeing it before.
1 Q. The one that's been marked as 7009, do you --
2 to your knowledge, have you ever seen it before?
3 A. Not to my recollection.
4 Q. All right. Let's talk -- you notice that one
5 of the authors of this article is Mike Paine, BP
6 America, right?
7 A. I see that.
8 Q. Okay. Just going to the summary. "Drilling
9 ultradeep wells places significant requirements on the
10 drill string." Do you agree with that?
11 A. From my understanding of well operations, yes.
12 Q. Okay. Down there beneath that he says, "BOP
13 shear RAMs may also have difficulty shearing today's

14 high-strength, high-toughness drill pipe." Do you agree
15 with that?

16 A. I would agree that as drill pipe evolution
17 is -- has progressed that it becomes more of a
18 challenge.

19 Q. Okay. Okay. Turn to Page 196 at the bottom
20 right-hand corner of this article, 7009.

21 A. All right.

22 Q. See the part that says BOP pipe shearing?

23 A. Yes, sir.

24 Q. It says, "Several variables impact the BOP's
25 ability to shear drill pipe, including the outside
1 diameter, the wall thickness, its material strength,"
2 right?

3 A. Yes, sir.

4 Q. And then it also says on the next page, go
5 over to 197, 2009 says that a factor that affects
6 shearability is well-bore pressure, mud, hydrostatic
7 head, and trapped well-bore pressure equal to maximum
8 BOP working pressure. Do you see that?

9 A. I didn't see that part. Where are you at?

10 Q. Top of Page 197.

11 A. Okay.

12 MR. JONES: Left-hand column.

13 Q. (BY MR. WILLIAMSON) Left-hand column.

14 A. Oh, okay, I'm sorry.

15 Q. Do you see that?

16 A. Yes, sir.

17 Q. I'm just asking you if you agree that
18 well-bore pressure can affect the ability to shear a
19 pipe?

20 A. I think -- I'm not -- I haven't been involved
21 with the design of our particular shear RAMS, but my
22 understanding is all of those can have an effect on the
23 ability to shear.

24 Q. All right. And what I want to ask you next,
25 next page 198, very top, second paragraph, "It is
1 important during the ultradeep well planning process
2 that engineers fully evaluate the ability of the BOP to
3 successfully shear the drill pipe." Okay. Project
4 specific, full-scale shear testing with actual drill
5 pipe to be used on the project may be necessary to fully
6 answer this question. Do you agree with that?

7 A. I think that would be in the best interest of
8 those working on the project to do that.

9 Q. Sure, to use BP's own words from it own

10 manual, that would be best practice, wouldn't it?

Page 169:12 to 169:22

12 A. From what I understand it would be.

13 Q. (BY MR. WILLIAMSON) Okay. Next page on
14 Page 199 under conclusions I want you to look at
15 conclusion No. 5, okay.

16 A. Yes, sir.

17 Q. Ulta -- "Ultradeep deep drilling presents
18 increased operational considerations that require
19 attention of the well designer. Well designers should
20 work closely with OEMs to fully evaluate the performance
21 limits of these product in ultradeep applications." Do
22 you agree with that?

Page 169:25 to 170:21

25 A. I think come -- when people come to Cameron
1 they're looking -- they're typically looking for a
2 requirement to shear and ask for our input and options
3 on configurations to assist with meeting that.

4 Q. (BY MR. WILLIAMSON) Okay. Here's my
5 question: From 1999 until April 20th, 2010 when this
6 explosion occurred did BP ever come to Cameron and say
7 we want to evaluate the performance limit of this BOP
8 with all of the high strength drill pipe we now have on
9 this ship?

10 A. I wouldn't be --

11 Q. To your knowledge, did that happen?

12 A. Not to my understanding.

13 Q. Okay. Did they ever come to anybody -- first
14 of all, I guess they never had that conversation with
15 you? BP didn't come to you and say we know we need to
16 look and see if we can shear this drill pipe or not? BP
17 never said that to you, right?

18 A. That's correct.

19 Q. And as far as you know they never said it to
20 anybody within the Cameron organization, to your
21 knowledge?

Page 170:23 to 171:04

23 A. To my understanding, I'm not aware of that.

24 Q. (BY MR. WILLIAMSON) Okay. And, after all,
25 Cameron is the OEM, isn't it?

1 A. Yes, it is.
2 Q. Okay. And BP is the well designer, aren't
3 they?
4 A. From my understanding.

Page 172:23 to 173:09

23 Q. Okay. And under that situation how would one
24 be able to activate the blind shear RAMs?
25 A. In a situation where it would -- just lost
1 electrical --
2 Q. Uh-huh.
3 A. -- power?
4 Q. Yes.
5 A. I -- I guess at that time you would have -- if
6 you had an acoustic system, you could function it with
7 the acoustics, with the ROV, you could -- you could
8 function with an ROV. Those are the two I can think
9 up off the top of my head.

Page 177:08 to 177:11

8 Q. All right. Let's turn to tab 4, please, and
9 we'll mark this as Exhibit 7010. For the record, it's
10 an e-mail, I think, from you dated April 12th, 2006.
11 A. Okay.

Page 177:21 to 178:19

21 Q. Okay. First question about this is, based on
22 this document, which -- which is at least partially an
23 e-mail from you, how long does it take for the AMF
24 sequence to occur from start to finish?
25 A. According to this document, 37 plus 7 is,
1 what, 40 -- 52.
2 Q. Okay, 52 seconds.
3 A. And then plus 5. 49 -- it looks around
4 49 seconds.
5 Q. Okay.
6 A. Start T 40 -- 47 seconds, I believe. Five
7 seconds -- no, 30 -- what was my first -- 30 seconds --
8 49 seconds, I believe, according to this.
9 Q. Okay. So that's from the initiation of the
10 process to completion; is that correct?
11 A. According to this. I'd have to look at the
12 actual file to determine -- the initiation file, what

13 the actual time is.

14 Q. Okay. But under a minute, right?

15 A. From my understanding, it's somewhere around
16 there.

17 Q. Okay. And that means that from the moment
18 that AMF sequence begins to the moment that the rig is
19 disconnected that it takes less than a minute's time?

Page 178:21 to 179:17

21 A. The dead -- the deadman doesn't disconnect
22 the -- the system from -- the LMRP from the -- from the
23 BOP.

24 Q. (BY MS. DELEMARRE) Oh, okay. Tell me what
25 the -- the deadman does.

1 A. It just runs through a sequence of
2 predetermined events specified by the customer.

3 Q. Oh, okay. Do you know what the predetermined
4 events were for the blowout preventer on the Deepwater
5 Horizon for their AMF?

6 A. I would have to look at the INI file to be --
7 to get the specifics.

8 Q. What's an INI file?

9 A. That's the initiation file.

10 Q. Okay.

11 A. Or the sequence of events.

12 Q. That's a file that Cameron maintains for all
13 of its -- its blowout preventers?

14 A. It's a -- it's a file -- it's a software
15 program that we have -- depending on what -- what
16 requirements the customer had, we would write the
17 software program and then archive the file.

Page 180:10 to 181:11

10 Q. (BY MS. DELEMARRE) Okay. All right. Turning
11 to tab 9. We'll mark this as Exhibit 7011. It's an
12 e-mail followed by a couple of attachments, and we'll
13 mark it all as just one big document. For the record,
14 it starts out at TRN-MDL-00497493. Attachment 1 is
15 TRN-MDL-00497495. Next attachment is TRN-MDL-00497496.
16 Next attachment is TRN-MDL-00497498. And then lastly,
17 TRN-MDL-00497499.

18 Are you familiar with at least your e-mail
19 part of this document?

20 A. Yes, ma'am.

21 Q. Okay. What are PBOF cables?
22 A. They are cables that connect the SEM to the
23 STM.
24 Q. And what's the STM?
25 A. Subsea transducer module.
1 Q. And that is where? Where is it located?
2 A. It's located next to the SEM in the MUX
3 section.
4 Q. Okay. And what's its function?
5 A. It's -- it's pressure transducers. It pro- --
6 it reads back hydraulic pressure, and it converts
7 hydraulic pressure into electrical signal that the SEM
8 can then interpret and send to the surface.
9 Q. Okay. And this is an e-mail from you dated
10 April 21, 2010, and in that e-mail you're recommending
11 that the PBOF cables are -- are cut, correct?

Page 181:13 to 182:08

13 A. In this e-mail I was contacted by Mike Fry --
14 Q. (BY MS. DELEMARRE) Uh-huh.
15 A. -- on the 21st and was asked -- they were --
16 we were talking about the AMF and what possibilities
17 they could do to ensure the activation of the AMF took
18 place.
19 Q. Okay. So that's why you sent the e-mail, and
20 then No. 1 says cut the PBOF -- PBOF cables from STM1
21 and STM2 to the SEM on both pods, correct?
22 A. That's correct.
23 Q. This will re- -- remove the feedback from the
24 STM to the SEM that tells the system it has hydraulic
25 pressure, correct?
1 A. That's what it says, yes, ma'am.
2 Q. And then the next -- No. 2 is cut both M-U-X
3 cables. This will remove electrical power and signal
4 from the surface, correct?
5 A. Yes, ma'am.
6 Q. And once those two things have been done, it
7 was your expectation that the deadman would fire,
8 correct?

Page 182:10 to 182:23

10 A. Well, I said in here, at the beginning, to
11 fire it, if it hasn't already be -- been fired, you must
12 do this; and then I also stated that the deadman should

13 fire then if the batteries are good and the AMF was
14 enabled.

15 Q. (BY MR. DELEMARRE) All right. And at that
16 point in time would you have been able to tell if the
17 batteries were good?

18 A. No, ma'am.

19 Q. Would you have been able to tell whether the
20 AMF was enabled?

21 A. No, ma'am.

22 Q. All right. Now we'll go back to tab 8,
23 please. And tab 8 we'll mark as Exhibit 7012.

Page 182:25 to 182:25

25 A. Yes, ma'am.

Page 183:03 to 185:02

3 Q. Okay. We're going to start at the second --
4 the back page of this document, which says -- well,
5 first of all, it's an e-mail sent to Charles Curtis, Lee
6 Womble, and Glenn Chaisson, and it's -- apparently it's
7 from Mel Whitby, and it states, quote, Situation getting
8 critical. At about 3:00 a.m. BP reported two explosions
9 onboard. Rig is now listing at 30 to 35 degrees. Cut
10 all four POB -- PBOF cables at 2:00 a.m. Deadman did
11 not fire.

12 Did I read that correctly?

13 A. You -- you did read that correctly.

14 Q. Did you discuss this situation with Mr. Whitby
15 at any time?

16 A. The situation of cutting the PBOF cables?

17 Q. Correct, and then the deadman not firing.

18 A. I don't recall having a conversation that the
19 deadman did not fire.

20 Q. Uh-huh.

21 A. I know at the time we were looking -- or
22 the -- at the time the events happened we were -- we
23 were hoping that if -- if it hadn't fired it and we cut
24 the cables and did fire it, we -- we would see some
25 slow-down in the release of hydrocarbons at that time.

1 Q. Okay. At the time -- and -- and I'm taking
2 you back to April 22, 2010, did you or anyone else
3 working on the Cameron team have any understanding or
4 theory as to why the deadman didn't fire when the PBOF
5 cables were -- were cut?

6 A. Any theories to why it -- it didn't?
7 Q. Correct.
8 A. That it --
9 Q. Did not fire.
10 A. Well, referencing my other e-mail to Mike Fry,
11 the -- you know, those are the common understood -- if
12 it didn't fire, which I don't see how it's -- it was
13 able -- we're not able -- weren't able to determine at
14 that time if it didn't, then those were the only
15 possibilities that I could think of at the point -- at
16 the moment in time.
17 Q. At that time, the -- the possibility --
18 possible explanations for the AMF not firing would have
19 been, in your understanding, either the AMF wasn't armed
20 or the batteries were insufficient; is that fair?
21 A. That was my -- those are the -- the things I
22 thought of at the moment.
23 Q. Okay. But there could have been other
24 explanations, right?
25 A. There could have been, yes.
1 Q. All right. Let's turn to tab 1, please.
2 A. Yes, ma'am.

Page 185:04 to 186:25

4 Q. (BY MS. DELEMARRE) For the record, this is a
5 Cameron Controls Daily Report Sheet. It's already been
6 marked. I apologize, I don't have the previous exhibit
7 number on it, but since it's been marked I'm not going
8 to mark it again. We'll just reference it.
9 Mr. Erwin, did you participate in the drafting
10 of this document?
11 A. Yes, ma'am.
12 Q. Okay. And you drafted it based on your ab- --
13 observations at the time; is that correct?
14 A. That is correct.
15 Q. Okay. This is a -- a Cameron Controls
16 business record, a standard record?
17 A. In this instance I -- most cases a daily
18 report is filled out, but I felt it necessary at the
19 time to record as much information as we could.
20 Q. Okay. And you recorded that information
21 accurately?
22 A. To the best of my knowledge.
23 Q. All right. Let's go to the second page. It's
24 about halfway down. There's a statement that says 1616,

25 installed 1-inch hydraulic supply adapter, dash, note,
1 in all caps. It was noted at this time that the radial
2 seal in the flow meter was missing. Do you see that?
3 A. I do.
4 Q. What is -- what -- what is a radial seal in
5 the flow meter?
6 A. It is one of two seals used to ensure that
7 electrical connection is watertight when you're putting
8 it subsea.
9 Q. Okay. And if the electrical connection is not
10 watertight, I take it that has an adverse in fact --
11 impact on the "electral" -- electrical connection?
12 A. Yes, ma'am.
13 Q. Okay. And what flow meter are you referring
14 to?
15 A. This is the pod flow meter, so the flow meter
16 that -- for the supply line.
17 Q. And is that the hydraulic supply line?
18 A. Yes, ma'am.
19 Q. Okay. So that flow meter is measuring the
20 hydraulic fluid coming down from the rig to the BOP?
21 A. That's correct.
22 Q. Okay.
23 A. Through the pod and then off to the BOP.
24 Q. Is this the type of, I suppose, problem that
25 Cameron would recommend having corrected ASAP?

Page 187:02 to 190:08

2 A. If -- if -- you should do a seal test -- there
3 is a -- if I recall correctly, there is a port that you
4 can test on that particular cable. On most PBOF cables
5 now there are where you can do a seal test, and that's
6 something that is done, from my understanding, prior to
7 deployment of the system.
8 Q. (BY MS. DELEMARRE) Okay. And on Page 2, just
9 a little ways down, it says 1650, found two stinger
10 seal -- I assume that's supposed to be plural -- blown;
11 do you see that?
12 A. Yes, ma'am.
13 Q. What is a stinger seal?
14 A. This is a seal that seals the stinger to the
15 receptacle. So it's the location in the pod at which
16 point move -- flow -- or fluid moves from the pod to --
17 to the -- to the BOP.
18 Q. Okay. And it says the seal is blown. What's

19 the effect of that?

20 A. You could have a leaking function where it's
21 not getting enough supply, hydraulic supply.

22 Q. Okay. And what -- how would that impact the
23 functionality of the blowout preventer?

24 A. Depending on the degree of -- if it's
25 completely blown, then it could potentially affect its
1 performance.

2 Q. Okay. What -- what particular aspects of the
3 performance might it affect?

4 A. Its ability to make a function, either open or
5 close or what -- whatever associated function that
6 was -- that was associated with.

7 Q. Can you tell which function it's associated
8 with or -- I -- I suppose not because it says unknown
9 functions at this time. Is that right?

10 A. Well, from the part number -- functions at
11 this time, eight stinger seal... I think it was
12 function -- let's see, was able to determine that the
13 function was directly behind...

14 The fun- -- it -- it appears that the function
15 was No. 46, conduit flush.

16 Q. Conduit flush?

17 A. Yes, ma'am.

18 Q. What's that?

19 A. Where you're running a BOP subsea as you're
20 stacking the riser up, when you get to your -- the point
21 where you're fixing to land out your BOP y- -- or
22 throughout the process you would open the -- a valve at
23 the end of the rigid conduit line and flush hydraulic
24 fluid out to ensure that you're -- you're not getting
25 contamination into the BO -- the control system.

1 Q. Okay. Based on what you've recorded here
2 in -- in the Cameron Controls daily report sheet, can
3 you -- can you tell us whether or not the -- the conduit
4 flush capability would have been functional before the
5 blowout preventer was flashed on the Macondo well?

6 A. I can't. I -- we just noticed there was a
7 damage to the -- to the seal, but we didn't test its
8 seal integrity before we replaced it. We just replaced
9 the seal.

10 Q. Okay. Turning to Page 3, at 2043 it says,
11 "Deadman system was armed via the PETU," which I believe
12 is the portable electronic test unit, right?

13 A. That is correct.

14 Q. And you described that as a laptop that

15 basically simulates the functioning of the AMF as if it
16 were functioned by the control panel on the rig, right?
17 A. No, ma'am, the -- the --
18 Q. No, okay.
19 A. -- PETU is just a laptop.
20 Q. Uh-huh.
21 A. And it has a transformer. It has a CPU board
22 to cu- -- to simulate -- to allow communications between
23 the SEM.
24 Q. Uh-huh.
25 A. And with the PETU you can arm the deadman
1 circuit within the SEM, but you -- you can't fire it
2 from -- from the PETU. You just arm it from the PETU.
3 Q. Okay. How -- how then do you fire it?
4 A. Once it's armed, then you would remove
5 hydraulics and electrical communications.
6 Q. Okay. And then it automatically fires?
7 A. If -- if the system is operational, then it
8 would -- it will fire.

Page 191:01 to 191:04

1 Q. All right. Do you understand the relationship
2 between the wiring of -- of the 1- -- the solenoid coils
3 and the polarization of the coils?
4 A. Yes, ma'am.

Page 192:24 to 194:05

24 Q. Do you know whether that would be correct
25 wiring for a solenoid such as 103Y?
1 A. I'd have to pull our assembly procedure for
2 this to ensure -- to -- to --
3 Q. To check?
4 A. Yes, ma'am.
5 Q. Okay. Is this something that David McWhorter
6 would know about?
7 A. I suspect he would.
8 Q. All right. If the wiring was reversed for
9 this particular solenoid, what impact would it have on
10 the functionality of the solenoid?
11 A. My understanding -- I'm not an engineer, but
12 my understanding that two -- you have two opposing coils
13 that would then -- the armature would then be -- being
14 pulled in both directions and might not -- might not
15 move to the fully open position.

16 Q. Okay.
17 A. Or might stay stuck closed.
18 Q. And I just want to break this down and make
19 sure I understand it. If -- if the coils are -- are
20 miswired, as I understand it, the -- the coils will have
21 reversed polarities; is that correct?
22 A. That's correct.
23 Q. And so effectively the coils are working
24 against each other, if they're both energized at the
25 same time; is that correct?
1 A. That's -- that's my understanding.
2 Q. Okay. And when that happens, the valve isn't
3 going to move, right?
4 A. My understanding is the armature would --
5 would possibly just os- -- oscillate back and forth.

Page 195:23 to 196:12

23 Q. All right. Did you ever inspect solenoid 103Y
24 for the yellow pod on the Deepwater Horizon's blowout
25 preventer? I mean, did you take it apart and look at
1 it?
2 A. No, ma'am.
3 Q. Okay. Tell us what inspections and/or testing
4 of that solenoid you were personally involved in.
5 A. As I recall, we used the magnetic-like pin
6 to -- to check for the signs of a electrical field,
7 magnetic field. As I recall, in the daily report the
8 indications came back there was no magnet- -- no
9 magnetic field detected by the pin. At that point it
10 was removed and it was, as I recall, put -- taken into
11 custody by the custodian and put into a lockbox at that
12 point.

Page 198:13 to 199:21

13 Q. All right. I want to go back to a statement
14 you just recently made about the light pin indicating
15 zero magnetic field.
16 A. Uh-huh.
17 Q. Could you just take me through that process
18 step by step so that I understand what it is you did and
19 how you reached, you know, that conclusion that there
20 was no magnetic field?
21 A. Yes, ma'am. We fired the deadman system,
22 armed it, and removed power, and at the same time we had

23 a gentleman standing there with the magnetic pen --
24 electromagnetic pen up against the solenoid. And at no
25 time -- we heard other solenoids firing throughout the
1 sequence, and at no time did we see solenoid 103 turn an
2 indication on, the pen on. So th- -- that -- to us it
3 told us that there was something faulty with that
4 solenoid.

5 Q. Okay. And if that solenoid was faulty, that
6 would mean that the AMF function from the yellow pod
7 wasn't going to function; is that right?

8 A. If that solenoid was faulty, that's correct,
9 it would not fire. It's an associated function.

10 Q. Okay. So that would mean that one would have
11 to rely on the blue pod to fire the AMF if the yellow
12 pod couldn't perform that function, correct?

13 A. That's my understand.

14 Q. Okay. So based on the testing of solenoid
15 103Y, it was your understanding that the solenoid wasn't
16 functioning, correct? And this is on the date that your
17 notes reflect the testing occurred which was May 6,
18 2010, right?

19 A. I -- I believe that's --

20 Q. Tab 1.

21 A. That is correct, May 6th.

Page 202:22 to 204:25

22 Q. Okay. Going back on the fourth page at the
23 top under the 2109 entry it says note function 103 would
24 not fire using the PT SEM; do you see that?

25 A. Die.

1 Q. Could you decode that for me. What -- what
2 does that mean?

3 A. I believe it means that in that instance we
4 tried to fire 103 directly from the PETU as opposed to
5 using the AMF, but at actual pressure shear it would
6 involve directly solenoid valve.

7 Q. Okay. So that was another test to the AMF?

8 A. No, ma'am, that was just testing 103, the high
9 pressure shear circuit.

10 Q. Okay. And it did not fire, correct?

11 A. That is -- according to the document, that's
12 correct.

13 Q. Okay. And what did that mean to you?

14 A. At the time, that meant that there was -- it
15 kept leading to the point that there was something

16 potentially wrong with the solenoid valve itself.
17 Q. Okay. And just -- I -- I need you to break it
18 down for me. What is it that you actually observed that
19 led you to the conclusion that function 103 would not
20 fire, what is it that you see, saw?
21 A. I believe at that point in time we had -- I
22 believe at that time we had, let's see. I -- I don't
23 recall if we were hooked up hydraulically or if we used
24 the magnetic, electromagnetic pin again at that time
25 or -- or if we were just length for a -- a click or a
1 combination of the above. I don't recall.
2 Q. Okay. And I take it that if you'd been hooked
3 up hydraulically, you -- you would have seen a movement
4 of hydraulic fluids if the valve had fired?
5 A. Yes, ma'am.
6 Q. And if you were looking at the electro --
7 electromagnetic pin, you would have either seen some
8 type of electrical activity or not, right?
9 A. Yes, the light would have come -- come on on
10 the pen.
11 Q. Okay. And if you were just listening, you
12 would have heard the valve move?
13 A. Typically --
14 Q. Okay?
15 A. -- you can hear it shifting.
16 Q. But today you don't remember which method you
17 used in order to determine that function 103 would not
18 fire using the PETU on SEM A or SEM B; is that true?
19 A. That -- that is correct.
20 Q. But you are confident that it did not fire,
21 correct?
22 A. As -- from the tests that we did, I don't
23 recall it firing.
24 Q. Okay.
25 A. That's correct.

Page 206:05 to 206:23

5 Q. All right. And then on page 4 we have at
6 1335, solenoid valve for upper anular increase in high
7 pressure blind shear bracket No. 103 were replaced with
8 spare solenoid valves from the Transocean Nautilus POD
9 that was sent over; do you see that?
10 A. Yes, ma'am.
11 Q. Okay. So this is -- this is about -- this is
12 after someone takes custody of solenoid 103Y, correct?

13 A. Yes, ma'am.
14 Q. And then a whole new solenoid is put in?
15 A. Yes, yes, ma'am.
16 Q. And then the yellow pod is tested, correct?
17 A. At that time we continued on with the testing
18 of the pod.
19 Q. Okay?
20 A. Yes.
21 Q. And then the pod tested successfully with a
22 new solenoid in it; is that right?
23 A. Yes, ma'am.

Page 208:08 to 208:15

8 Q. Okay. And this particular test -- I just want
9 to be sure I'm right about this -- would have been
10 conducted on -- using the -- the replacement solenoid
11 103, right?
12 A. Yes, ma'am.
13 Q. All right. And, again, that replacement
14 solenoid functioned fine, correct?
15 A. Yes, ma'am.

Page 210:09 to 210:14

9 Q. (BY MS. DELMARRE) All right. Mr. Erwin, you
10 have before you an excerpt from the Deepwater Horizon
11 accident investigation report, which was obviously
12 issued by BP. We've marked it as Exhibit 7015. First
13 question, have you ever seen this report before?
14 A. I have not.

Page 210:22 to 212:07

22 Q. And I'm going to read part of it to you. It
23 says, "During the yellow pod test performed by
24 Transocean and Cameron after the accident both coils on
25 solenoid valve 103 failed to energize, suggesting
1 electrical coil faults." Do you see that language?
2 A. Yes, ma'am.
3 Q. Okay. First of all, is that testing the same
4 testing that you've already described in this
5 deposition; do you know?
6 A. That is the same as referred to in the daily
7 report --
8 Q. Okay.

9 A. -- documentation.
10 Q. Okay. And then this particular description
11 of -- of the testing, it says that both coils on
12 solenoid valve No. 103 failed to energize. Do you see
13 that?
14 A. Yes, I see that.
15 Q. Is that something that you also observed?
16 A. I observed that we were getting no -- the
17 electromagnetic pin was not illuminating, indicating
18 there was no activity on the coil.
19 Q. And is that the same as both coils failing to
20 energize?
21 A. At the time I wasn't -- I wasn't thinking of
22 both coils. I understand when we later tested it we
23 switched to A and B and didn't get a fire, either. So,
24 yes, I -- both coils did not fire?
25 Q. Okay. So you agree, then, with that
1 description in the BP report?
2 A. That is consistent with what my report states.
3 Q. Okay. And as far as the conclusion that both
4 coils failed to energize, that was based on what you saw
5 on the electromagnetic pin?
6 A. As well as the firing of function 103 directly
7 from the PETU.

Page 212:20 to 213:21

20 Q. On the same page it says, "The investigation
21 team found no evidence that this failure occurred after
22 the accident. Rather, the team concluded that this
23 failure condition very likely existed prior to the
24 accident." Do you agree with this statement?
25 A. I would say that if the records indicated that
1 the circuit was tested prior to deployment, then that
2 would give us an indication of the condition of it prior
3 to being deployed.
4 Q. Okay. And failing those kind of records you
5 don't know one way or another?
6 A. I don't see any reason why the accident in and
7 of itself would manifest itself in 103 not working.
8 Q. Okay, I see what you're saying. You're saying
9 that as far -- based in -- on your experience with these
10 blowout preventers over the course of 14 years you don't
11 understand how the explosion on the Deepwater Horizon
12 would have necessarily made solenoid valve 103Y
13 malfunction?

14 A. Correct.
15 Q. And I think we've already covered this, but if
16 solenoid valve 103Y was not functioning, it wouldn't be
17 able to activate the high pressure BSR close, correct?
18 A. That's correct.
19 Q. And that means you'd be left with the blue
20 pod, correct, to function the BSR through the AMF?
21 A. That's correct.

Page 215:04 to 215:17

4 Q. And as I understand it, the AMF function is
5 powered by batteries, right?
6 A. That's correct.
7 Q. And there are -- are the batteries
8 rechargeable?
9 A. They are not.
10 Q. Okay. And if there are insufficient batteries
11 in one of the -- insufficient battery voltage in one of
12 the control pods, then that control pod won't be able to
13 function the AMF, correct?
14 A. When the batteries are below -- I'm not sure
15 the specific voltage, but at some point they won't have
16 enough voltage to turn the system on and fire its
17 respective solenoid.

Page 216:19 to 216:22

19 Q. That's -- that's fine. No, I'm just trying to
20 find out if you were present for the examination of the
21 Deepwater Horizon's blue control pod.
22 A. Not on the blue pod, just the yellow pod.

Page 217:24 to 218:03

24 Q. But it's true, though, isn't it, that if the
25 yellow pod solenoid 103 isn't functional and if the blue
1 pod doesn't have sufficient battery charge, then the AMF
2 is not going to operate, correct?
3 A. That is correct.

Page 219:09 to 219:13

9 Q. All right. And these are Cameron's
10 recommendations for the battery replacements for the
11 AMF, correct?

12 A. This is the replacement guide for the AMF
13 deadman batteries.

Page 219:17 to 219:24

17 Q. Could you tell us what those recommendations
18 are?

19 A. It says Cameron -- it is recommended that a
20 9-volt DC and 27-volt DC battery packs are replaced
21 after one year of on-time operation when the number of
22 actuators has been exceeded for that year, in
23 parentheses, 33, five years after the date of purchase,
24 whichever of the above events happens first.

Page 220:20 to 220:24

20 Q. As far as replacing the batteries in these
21 control pods in your experience who typically does the
22 work, Cameron itself or the rig personnel?

23 A. That function is typically carried out by the
24 rig personnel.

Page 222:12 to 222:16

12 Q. As far as testing the voltage on the battery
13 banks when the blowout preventer and the pods are on
14 deck, how is that done?

15 A. On -- the system there is a spare pie
16 connector that is used to test the battery voltage.

Page 223:09 to 224:14

9 Q. Okay. Any sense of how long it might take to
10 test the batteries for the control pods on the blowout
11 preventer such as the one that was on the Deepwater
12 Horizon?

13 A. A matter of an hour, I suspect.

14 Q. Is this the type of work that you would expect
15 rig personnel to be qualified and capable of performing?

16 A. I believe most people in the industry whom
17 have Cameron control pods understand how to do that.
18 It's part of their maintenance.

19 Q. Do you know whether this is a -- or should be
20 a standard part of the process of testing or inspecting
21 the blowout preventer before it's deployed?

22 MR. WILLIAMS: Object; form.

23 A. I think each rig has their I standard
24 protocol, from my understanding, that they agree upon
25 with the operator and this is the testing they're going
1 to do between wells and before deployment. My
2 understanding that takes -- supposed to take place
3 between every deployment of the stack.

4 Q. (BY MS. DELMARRE) Okay. And I take it part
5 of the reason for that would be if you have batteries
6 that can't be monitored once the blowout preventer is --
7 is deployed subsea and it's very important to know what
8 the voltage on those batteries are before it's deployed,
9 right?

10 A. I would expect before you send your BOP
11 subsea, you would want to know the status of every
12 component.

13 Q. Okay. And including the batteries, obviously?

14 A. I would say including the batteries.

Page 237:24 to 238:15

24 Q. Turning to blowout preventer recertification,
25 as I understand it, Cameron recertifies its blowout
1 preventers, correct?

2 A. -- the BOPs can be sent in, and we've
3 certified them to API 16A or whatever the appropriate
4 specification is.

5 Q. Okay. Tell us what's involved in -- in that
6 recertification process.

7 A. It would involve full disassembly and
8 inspection of the equipment and then an engineering
9 review of what their inspection report is, what it says,
10 and then they would issue a repair procedure to repair
11 it to bring it back to first-class condition, at which
12 time it would be repaired, resembled, and tested in
13 accordance with the FAT, factory acceptance test, and
14 the customer would come in and witness that process and
15 then it would be returned to the rig.

Page 239:04 to 239:10

4 Q. Okay. Do you know whether the blowout
5 preventer on the Deepwater Horizon was ever recertified
6 by Cameron between the date of delivery, which I guess
7 was 1999 and the date of the Deepwater Horizon
8 explosion?

9 A. I'm not aware of any specific recertification

10 that occurred on specific components.

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25 gets pressure tested, of course.

1 Q. Right. I believe you said the VV
2 configuration of line shear RAM blades resulted in a

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4 the routing of the MUX cables. Does Cameron make any
5 recommendations or provide instructions with its BOP
6 regarding the routing of the MUX cables on the rig
7 itself?

8 A. The -- typically what happens is the rig comes
9 to us -- a customer comes to us with a footprint, an
10 envelope in which they need to fit this equipment, and
11 they tell us where they're going to place the MUX
12 cables. So we would then do the layout for them and
13 provide them the -- the drawing and the equipment in
14 that location.

15 Q. Okay. And so I take it from your answer that
16 that would apply all the way to the control panels
17 themselves on the tool pusher on the rig floor; is that
18 correct?

19 A. That's correct.

Page 245:07 to 245:20

7 Q. All right. I want to ask you briefly about
8 your work on the post-blowout intervention on the Q4000.
9 Would you agree with the statement that during your time
10 on the Q4000 BP was in charge of those inter- --
11 intervention efforts; is that correct?

12 MR. COLLIER: Object to form.

13 A. I would agree.

14 Q. (BY MR. POTE) Okay. And during your time --
15 well, strike that.

16 Do you know if anyone, to your knowledge,
17 operated or changed the condition of any of the ST locks
18 or the various RAMs or any other part of the BOP between
19 the time it arrived on the deck of the Q4000 and the
20 time it arrived at the "MISU" facility?

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22 the -- off the bottom of the sea floor, so I wouldn't --
23 I wouldn't have information regarding that.

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11 you if you agree with it. Would you agree that remote
12 operated vehicles take longer to activate blind shear
13 RAMs because they pump fluid at a slower rate? Is
14 that -- is that a correct statement?
15 A. From my understanding the -- the pumps on the
16 ROVs are much slower than accumulated volume.

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22 Q. Okay. And would you agree, then, that there
23 is a risk that flow, flow of hydrocarbons or other
24 materials will damage the elastomeric elements before
25 closure is complete?
1 A. My understanding is in any well control
2 situation you want to be able to activate the RAMs as --
3 as fast as you can and close in to -- to reduce any --
4 so you can close them in the shortest amount of time,
5 and in prolonged exposure in the well-bore could
6 possibly have a negative effect.
7 Q. Okay. So, in other words, to sort of
8 encapsulate that, the fact that ROVs, their operation
9 essentially involves the slow movement of the RAM
10 blocks, there is a risk of damage to elastomeric
11 elements before complete closure --
12 A. I would say --
13 Q. -- is that correct?
14 A. I would the longer the RAM blocks are exposed
15 to flow, there is a higher potential for -- for erosion
16 or any number of variable things that -- to happen.
17 Q. Okay. Would it be your understanding that BP
18 was aware of that risk prior to April 20th, 2010?

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20 A. I think -- I think at that point in time it
21 was commonly understood in the industry by -- ROVs take
22 longer to control than stored accumulator volume on a
23 stack or on a surface.

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15 Q. Okay. Would you agree with the statement that
16 closing a RAM BOP with a low volume hydraulic source
17 while a well is flowing would almost certainly result in
18 damage to the sealing components of the RAM and would
19 not be able to seal the well-bore?

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21 A. I would say that the longer you expose
22 something in the well-bore to flowing debris and fluid,
23 you're going to increase -- it increases the opportunity
24 for damage to occur.