

Deposition Testimony of:

Richard Coronado

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Page 294:06 to 294:08

00294:06 RICHARD CORONADO,
07 having been previously sworn, testified as
08 follows:

Page 294:19 to 295:17

00294:19 Q. Tab 73 has been marked as
20 exhibit 5161.
21 A. Okay.
22 Q. And I want to focus on the page
23 ending in 2552. That should be the first
24 page, right?
25 A. Yes.
00295:01 Q. Okay. Now, it's -- exhibit 5161
02 is a circuit diagram multiplex modular
03 control pad (sic) for the EXPLORER, right?
04 If you look in the right-hand corner, it says
05 EXPLORER.
06 A. Yeah, I mean --
07 Q. Do you see that?
08 A. I do see EXPLORER, yes.
09 Q. So does this circuit diagram
10 accurately reflect the -- the circuitry for
11 the Mark II system that is currently on the
12 EXPLORER?
13 A. To my -- to my knowledge,
14 actually, the system on the EXPLORER is a
15 Mark I system.
16 Q. A Mark I system?
17 A. That is -- that is correct.

Page 297:17 to 298:02

00297:17 Q. But -- but looking at the
18 drawing, it appears that, at least from this
19 hardware diagram, that for this Mark I
20 system, that the riser control box has the
21 ability to measure voltages, correct?
22 A. No. I -- I -- I couldn't say
23 that. Couldn't say that without looking at
24 the riser control box drawings. And for the
25 that matter, to my knowledge, based on my
00298:01 knowledge of the EXPLORER, it does not have
02 any monitoring capabilities.

Page 299:03 to 299:06

00299:03 Q. So -- so -- so you're saying an
04 open circuit voltage, you could monitor --
05 monitor that based on these wires that say
06 battery test?

Page 299:13 to 300:03

00299:13 A. -- just to clarify something,
14 you can monitor this while it's on the --
15 while it's on the surface. You know, you
16 could disconnect this and you can, you know,
17 connect the test connector and then monitor
18 what's on the surface. As to -- if it's --
19 if it's -- you know, again, you don't -- we
20 don't have a schematic for the riser control
21 box, so I don't know where these signals are
22 going to.
23 Q. So you --
24 A. But -- I'm sorry, can I finish?
25 Q. Uh-huh.
00300:01 A. But based on my experience or my
02 knowledge of the EXPLORER, there is no
03 monitoring real-time for those batteries.

Page 307:21 to 308:07

00307:21 Q. Did -- did you look at batteries
22 other than the Lithium iron-type batteries?
23 A. For?
24 Q. To determine whether or not
25 rechargeable batteries were available in the
00308:01 1990s?
02 A. I mean, as far as looking at it,
03 I mean, we -- we never really had a formal
04 request to actually, you know, look at
05 batteries. So, you know, we had our -- we
06 had the batteries that -- we were using the
07 standard Lithium manganese dioxide batteries.

Page 308:13 to 309:05

00308:13 A. Well, again, you know, if we
14 would have gotten, you know, a formal request
15 or -- or something that -- or, you know, our
16 customers are -- you know, know their
17 systems, know what they need to use them for,
18 you know, they're sophisticated, they're
19 knowledgeable. So they -- you know, if they
20 would have wanted that type of technology,
21 you know, they would have formally requested
22 it.
23 Q. But what I'm asking you is, you
24 say that rechargeable batteries were
25 unavailable in the 1990s?
00309:01 A. Yes, they were --
02 Q. So I'm asking --
03 A. They were unavailable to meet --
04 they were unavailable to meet the -- the

05 needs of our subsea system.

Page 309:16 to 309:20

00309:16 A. We -- you know, as long as
17 the -- the recommended guidelines are
18 followed for our batteries, the -- the -- per
19 our procedures, they're properly operated and
20 maintained, our batteries will do their job.

Page 318:21 to 319:23

00318:21 Q. Yeah. What's the definition you
22 use as an electrical engineer for emergency?
23 A. Well, something that's, you
24 know, that's -- you know, that's -- that's a
25 problem, that's -- that's critical. You
00319:01 know, something that's -- that's not normal.
02 Q. Okay. Problem, critical and not
03 normal, right?
04 A. Right.
05 Q. Okay. And I assume if you have
06 an emergency shutdown system, then it's
07 critical that it works and shut it down?
08 A. For the systems that I was
09 working with, yes. I mean, it -- it --
10 for -- for those systems that I was working
11 on, it was -- there were -- they were
12 designed to -- to put the, whatever we were
13 monitoring, whatever we were designing it
14 for, into a safe state.
15 Q. All right. Did you have -- did
16 you ever design with a safety margin in mind?
17 A. You know, those -- those
18 specifications were given to us by the
19 customer and, I mean, I don't recall
20 specifically what --
21 Q. While you were at Cameron, did
22 you ever design with a safety margin in mind?
23 A. Sure. Sure.

Page 321:07 to 321:10

00321:07 Q. Okay. And what is your title?
08 A. Presently, it's engineering
09 manager for the software group of drilling
10 control systems.

Page 321:21 to 322:09

00321:21 Q. Okay. The -- when you -- were
22 you involved in the design of the Mark III
23 system? The Mark III control system subsea

24 deepwater, were you involved in that?
25 A. I was -- I was part of a team
00322:01 that was involved with that design.
02 Q. Sure. What's the safety margin
03 on the batteries for the Mark III system, do
04 you know?
05 A. I don't -- I don't recall
06 specifically, but I know that we have a
07 document with all those --
08 Q. Okay.
09 A. -- all those details.

Page 322:15 to 322:23

00322:15 Q. No, what did you, Richard
16 Coronado recommend for a safety margin for
17 Mark III subsea batteries?
18 A. I can't recall specifically.
19 Q. What did -- what do you think
20 the safety margin should be for Mark II
21 subsea batteries? You, Richard Coronado,
22 what do you think that safety margin should
23 be?

Page 322:25 to 323:03

00322:25 A. You know, again, I don't -- I
00323:01 wasn't involved in the Mark II design.
02 Q. I'm asking you what you think it
03 should be.

Page 323:05 to 323:08

00323:05 Q. Or do you know?
06 A. You know, I don't have a --
07 Q. Is there --
08 A. I don't have an opinion.

Page 324:01 to 324:04

00324:01 Is there a higher-ranking
02 electrical engineer at Cameron, or do you
03 know?
04 A. I -- I don't know.

Page 324:10 to 324:22

00324:10 And by the way, I'm talking
11 about rechargeable batteries that would be
12 suitable for application in subsea deepwater
13 drilling applications.
14 Do we have an understanding of

15 what I mean by battery?
16 A. For the -- for the --
17 Q. For an application such as a
18 blowout preventer, such as was on the
19 DEEPWATER HORIZON.
20 A. For the drilling control system?
21 Q. Right.
22 A. Okay.

Page 326:07 to 330:02

00326:07 Q. The question is, when were those
08 batteries available, rechargeable subsea
09 batteries?
10 A. That -- that would meet our
11 needs, our requirements for -- for subsea
12 use, and that -- that we needed the power
13 that we had -- the power density required, I
14 would say probably around -- you know, around
15 the time we were probably developing the
16 Mark III.
17 Q. And when was that?
18 A. It was around 2005.
19 Q. Okay. So by 2005, y'all thought
20 y'all could find rechargeable batteries that
21 would meet your needs and requirements for
22 subsea use?
23 A. Yes.
24 Q. Okay. Now, in -- do you
25 remember what happened in September 2004 with
00327:01 the battery manufacturer for the DEEPWATER
02 HORIZON?
03 A. I -- I recall something about
04 the batteries -- types of batteries had --
05 had changed or were no longer available.
06 Q. Right.
07 A. And so we had to -- you know,
08 had to reconfigure or make some mounting
09 brackets or mounting equipment to -- to
10 remount the batteries in the SEM.
11 Q. Sure. The original batteries
12 that were on the DEEPWATER HORIZON blowout
13 preventer were FRIWO, F-R-I-W-O? Does that
14 sound right?
15 A. That -- that sounds right.
16 Q. Okay. And FRIWO quit making
17 those batteries some time in about 2004,
18 correct?
19 A. Sounds about right.
20 Q. And in late 2004 and early 2005,
21 Cameron had to change their battery system to
22 the SAFT battery, S-A-F-T, correct?
23 A. That sounds -- yeah, sounds
24 right.
25 Q. Okay. And Cameron had to come

00328:01 up with the ability to put the SAFT battery
02 system in subsea blowout preventers, correct?
03 A. In -- in the SEMs, in the Mark I
04 and Mark II SEMs.
05 Q. Sure. Did you -- and so what
06 you had to do is, you had to change your
07 system to accommodate the SAFT batteries
08 because the FRIWO batteries were no longer
09 available, correct?
10 A. That sounds -- that sounds
11 right, yes.
12 Q. And you had to upgrade your
13 customers' blowout preventers with this new
14 battery system so that they would have
15 batteries available, correct?
16 A. Yes. We -- we had to update the
17 bills of material, find space, redo the
18 mounting.
19 Q. Sure. Did you test the SAFT
20 batteries?
21 A. I believe, actually, SAFT tested
22 those batteries.
23 Q. Okay. And did Cameron test the
24 SAFT batteries?
25 A. Cameron provided the same tests
00329:01 that were -- that were done on the -- on the
02 original batteries to SAFT so they can test
03 them.
04 Q. Okay. And that was where you
05 came to the realization that the nine-volt
06 battery would discharge faster than the
07 27-volt battery?
08 A. If I'm not mistaken, in our --
09 in our design calculations, we -- that was --
10 that was supported on that -- in those design
11 calculations.
12 Q. Right. That's what y'all
13 concluded, that the nine-volt battery would
14 discharge faster than the 27-volt battery?
15 A. Right.
16 Q. Okay. So at this time, you're
17 in late 2004, early 2005, and you realize the
18 Mark II system needs a new battery system,
19 correct?
20 A. Well, we realized --
21 MR. JONES: Object to form.
22 A. We realized that the Mark II
23 system needed to accommodate the -- the
24 different style of battery which was provided
25 by SAFT --
00330:01 Q. Sure.
02 A. -- in lieu of FRIWO.

00330:12 Did Cameron tell its customers,
13 late 2004, early 2005, we have to change your
14 battery system, anyway, it would be better to
15 go to a rechargeable battery because that
16 technology is now available?

Page 330:21 to 330:25

00330:21 A. Yeah, I -- I'm -- first off,
22 I'm -- I'm -- that's -- you know,
23 rechargeable batteries, to put rechargeable
24 batteries in the system is not a trivial
25 thing.

Page 331:05 to 331:08

00331:05 Q. I asked, did Cameron go to its
06 customers and say, we have to change the
07 system, anyway, let's go to a rechargeable
08 system? Did Cameron do that?

Page 331:10 to 332:02

00331:10 A. I mean, again, you know, we just
11 can't, you know, change --
12 Q. I didn't ask what you could or
13 could not change. I asked, did you ask your
14 customers?
15 A. If our customers would have
16 wanted rechargeable batteries, then they
17 would have told us they wanted rechargeable
18 batteries. Our customers are sophisticated.
19 They're knowledgeable about our system and
20 what they desire.
21 Q. Did Cameron ask?
22 A. Again, you know, our customers
23 are sophisticated --
24 Q. Did -- did Cameron ask? What --
25 I'm asking about what Cameron did, to your
00332:01 knowledge.
02 A. I'm --

Page 332:04 to 332:06

00332:04 Q. Can you tell me whether Cameron
05 did or didn't, or do you know?
06 A. I do not know.

Page 332:09 to 333:06

00332:09 Q. Now, Cameron's the industry
10 leader in MUX cable systems, aren't they?

11 A. They are one of three leaders in
 12 the MUX -- providing a --
 13 Q. Cameron --
 14 A. -- MUX control system.
 15 Q. Cameron holds itself out as the
 16 industry leader in MUX cable control systems,
 17 doesn't it?
 18 A. MUX -- drilling control systems.
 19 Q. Right. So Cameron considers
 20 itself the industry leader in the world on
 21 MUX cable control systems, correct?
 22 A. I know we're one of three
 23 leaders. As to whether we're the -- we're
 24 the leader or the head of the pack, we're one
 25 of three companies that provides drilling
 00333:01 control systems.
 02 Q. Would you please turn to tab
 03 number 12, previously marked in this
 04 litigation as exhibit 5175.
 05 See that?
 06 A. Yes.

Page 333:15 to 333:24

00333:15 Q. Yeah, exhibit 5175.
 16 Okay. Show the camera that --
 17 take that book [sic] out of the booklet
 18 and show the camera what the last page of
 19 Cameron's PowerPoint presentation, dated
 20 May 30th, 2008. Would you please show the
 21 camera what that says and tell the camera
 22 what it says.
 23 A. The industry leader in MUX
 24 control systems.

Page 335:16 to 336:17

00335:16 Q. Yeah. Exhibit 5175, current
 17 build cycle. This is May 2008, correct?
 18 That's the date of the e-mail that this
 19 PowerPoint is attached to, is May 2008,
 20 right, exhibit 5175?
 21 A. May -- you said May 8th?
 22 Q. I said May 30th.
 23 A. Okay. Yeah. I'm sorry. I
 24 thought you said May -- May 8th. Yeah,
 25 May 30th.
 00336:01 Q. That's what I intended to say.
 02 Current build cycle. Right
 03 there it shows that you're building several
 04 systems at that point in time, correct?
 05 A. Yes, it looks like.
 06 Q. Almost all of them have the
 07 Mark III system, correct?

08 A. The majority of them have them,
09 yes.
10 Q. Okay. And you also show on the
11 page before that, that you've actually
12 installed the system on the THUNDER HORSE for
13 BP, correct?
14 A. That was back in 2004.
15 Q. All right. So in 2004, you had
16 actually installed a system on the THUNDER
17 HORSE for BP?

Page 337:13 to 337:24

00337:13 Q. In 2004 when Cameron was
14 building the THUNDER HORSE project for BP,
15 did Cameron tell BP, we're working on a
16 rechargeable battery system?
17 A. I mean, I think that this
18 presentation, you know, could have -- could
19 have been put -- put forth --
20 Q. Do you know? Do you know
21 whether you ever told BP that?
22 A. I think, as far as rechargeable
23 batteries, no, BP didn't want a --
24 Q. Okay. Did you tell BP that?

Page 338:03 to 338:10

00338:03 A. Not quite.
04 To my knowledge -- I mean, when
05 I -- when I worked on this project, BP did
06 not want a, you know, electric AMF. They
07 wanted a different AMF system.
08 Q. Okay. The -- the question is,
09 did Cameron tell BP, in 2004, we're working
10 on a rechargeable battery system?

Page 338:12 to 340:18

00338:12 Q. You don't know?
13 A. I don't know. I don't recall.
14 Q. Did you, did you, Richard
15 Coronado, tell them that?
16 A. Umm.
17 Q. I'm sorry, the answer was no?
18 A. Well, I'm trying to recall. I
19 mean, that was a long time ago.
20 Q. Okay. I'll change the question.
21 Do you recall whether you told
22 them you were working on a rechargeable
23 battery system?
24 A. No, I can't -- can't say that I
25 recall.

00339:01 Q. Okay. I will tell you, another
02 part of this same exhibit, 5175, you talk
03 about the Mark III system and you say the pie
04 connectors are eliminated.

05 Is that true, are pie connectors
06 eliminated in the Mark III system?

07 A. Yes. We no -- we no longer use
08 pie connectors on the Mark III system.

09 Q. Why?

10 A. I mean, the system design for
11 the -- for the Mark III system was -- you
12 know, was based on different hardware. The
13 hardware that was used on the Mark III did
14 not -- you know, did not require pie
15 connectors.

16 Q. Okay. Why? Why not use pie
17 connectors?

18 A. It just didn't -- you know, it
19 was different hardware.

20 Q. Why did you develop the Mark III
21 system, by the way?

22 A. It was developed because the
23 components for the Mark II system, some of
24 the components were no longer available.

25 Q. Which ones?

00340:01 A. In particular, the processor for
02 the Mark II system, and Mark I's, the
03 processors.

04 Q. Okay. Why did you switch to a
05 rechargeable battery? If the Mark II system
06 was so good with non-rechargeable,
07 non-monitorable batteries, why did Cameron
08 choose to switch to a rechargeable battery?

09 A. That was -- that was based on,
10 you know, customer input. Customers felt
11 that, you know, they wanted rechargeable
12 batteries and the ability to monitor those.

13 Q. Okay.

14 A. So that's why.

15 Q. When did you start getting that
16 input?

17 A. Around the time that we were
18 developing the Mark III.

Page 341:08 to 342:12

00341:08 Q. Do you, Richard Coronado, think
09 rechargeable batteries are better than
10 non-rechargeable batteries?

11 A. I think they both, you know,
12 have a -- have a purpose and -- and, you
13 know, if -- if the non-rechargeable batteries
14 will -- will fill the needs of -- of
15 customers who want that particular technology
16 and -- and non- -- or the rechargeable

17 batteries will fill the needs of other
 18 customers who want that technology.
 19 Q. My question is, you, Richard
 20 Coronado, do you have an opinion? I'm asking
 21 for your, Richard Coronado's, opinion as to
 22 whether rechargeable batteries are better
 23 than non-rechargeable batteries.
 24 A. I -- I -- I, Richard Coronado,
 25 think that either one of those technologies,
 00342:01 when used properly operated and maintained,
 02 will do what its intended -- its intended
 03 function.
 04 Q. Okay. So rechargeable
 05 batteries, according to you, Richard
 06 Coronado, are no better than
 07 non-rechargeables as long as you use the
 08 system properly?
 09 A. Uh-huh.
 10 Q. Correct?
 11 A. That -- and -- and if the
 12 customer wants those.

Page 342:19 to 343:16

00342:19 Q. You -- you do realize you've got
 20 to sell reliable equipment no matter what the
 21 customer wants, don't you?
 22 A. Sure.
 23 Q. You do realize you've got to
 24 sell safe equipment no matter what the
 25 customer wants, don't you?
 00343:01 A. We have to sell equipment that
 02 meets API 16D specifications and that --
 03 Q. Okay. You don't have --
 04 A. And meet the customer
 05 specifications.
 06 Q. You do have to sell safe
 07 equipment that's going to work when it's
 08 called upon and is fit for its intended
 09 purpose? You do agree with that, don't you?
 10 A. Oh, I agree we have to meet
 11 API 16D --
 12 Q. Okay.
 13 A. -- and customer specifications.
 14 Q. So if you meet API 16D, but it's
 15 not safe, you can go ahead and sell it
 16 anyway?

Page 343:18 to 343:22

00343:18 A. Again, if it meets API 16D, and
 19 API 16D is what we build our equipment to.
 20 Q. All right. Is there any other
 21 criteria you use, Cameron uses, to build

22 subsea blowout preventers other than API 16D?

Page 343:24 to 344:11

00343:24 Q. Any other benchmark other than
25 API 16D?
00344:01 A. Well, we also follow customer
02 specifications.
03 Q. Okay. Other than customer
04 requests and API 16D, does Cameron have any
05 other benchmark for selling a piece of
06 equipment to be used subsea?
07 A. Again, you know, we -- we follow
08 API 16D and --
09 Q. I know. Anything else?
10 A. We follow general, you know,
11 engineering practices.

Page 344:19 to 345:21

00344:19 Q. So as you sit here in your
20 deposition, the second day of your deposition
21 in the largest oil spill in history, you
22 cannot think of anything that Cameron designs
23 to, other than API 16D, customer requests,
24 and general engineering principles? That's
25 it?
00345:01 MR. JONES: Object to form.
02 A. (Moves head up and down.)
03 Q. Do I understand you right,
04 Mr. Coronado?
05 A. That's correct.
06 Q. Okay. Has anybody at Cameron
07 said, no, no, Mr. Coronado, we need to design
08 safe equipment? Has anybody ever said that
09 to you?
10 MR. JONES: Object to form.
11 A. Again, we design per API 16D.
12 Q. Has anyone said to you that we
13 need additional criteria for our minimums?
14 Anyone other than API 16D, has anyone at
15 Cameron ever said that to you,
16 Mr. Coronado --
17 MR. JONES: Object to form.
18 A. Again, we -- we design --
19 Q. Has anyone said it?
20 A. We design -- we -- we stated
21 that we design our equipment per API 16D.

Page 345:25 to 346:20

00345:25 Q. What person has told you, these
00346:01 are the minimums we design to?

02 A. Again, we design per API 16D.
03 Q. I'm looking for the name of a
04 person.
05 A. I -- we design per API 16D.
06 Q. You can't understand -- I'm
07 looking for the name of a person who tells
08 you how to do your job.
09 Who is that person?
10 A. API 16D is our recommended
11 guidelines.
12 Q. Okay. I'm going to tell you,
13 I'm going to want to play this to Judge
14 Barbier, and I'm going to ask you one more
15 time, because I'm going to want this
16 question: What person told you the safety
17 criteria you should design to at Cameron?
18 A. That's the safe -- that's the
19 specification, plus the customer
20 specifications, plus our general guidelines.

Page 347:02 to 347:05

00347:02 (Exhibit Number 8048 marked.)
03 Q. I'm going to hand you what's
04 been marked as 8048.
05 MR. WILLIAMSON: For the gallery, it

Page 347:19 to 349:11

00347:19 This is an e-mail. Ray Jahn and
20 Ed Gaude are obviously Cameron employees in
21 2005, right?
22 A. That's -- that's correct.
23 Q. And this is January 31st, 2005,
24 and they're writing one of the customers and
25 saying the original battery pack design can
00348:01 no longer be supplied, as the manufacturer of
02 the battery has discontinued the battery.
03 Did I read that correctly?
04 A. Yes.
05 Q. And that's true, you just told
06 me that a while ago?
07 A. Right. Yes.
08 Q. Y'all are going to have to come
09 up with a new original -- a battery pack
10 design, correct?
11 A. We're going to have to -- yes,
12 going to have to mount that new battery pack
13 somewhere in the -- in the SEM. That was
14 probably around the same --
15 Q. Did Ed Gaude come to you and
16 say, when we redesign this system, here in
17 early 2005, we need to make it rechargeable?
18 Did Ed Gaude say that to you?

19 A. No, I don't -- don't recall
20 that, no.
21 Q. Sure. Did Ray Jahn come to you
22 and say, we're getting complaints from the
23 customers about the batteries, you know,
24 we're going to need to make sure we have a
25 rechargeable battery system? Did Ray Jahn
00349:01 come to you and say that?
02 A. I don't recall that.
03 Q. Did Don King -- who's Don King?
04 A. Don King, I believe, is VP of
05 operations.
06 Q. Sure. Did Don King come to you
07 and say -- or Mr. Chiasson or Mr. David
08 McWhorter, did any of them come to you and
09 say, we have complaints from the customers
10 about the batteries, we need to make these
11 batteries rechargeable?

Page 349:13 to 349:15

00349:13 Q. Did anyone -- did any of those
14 individuals come to you and say that in early
15 2005?

Page 349:17 to 349:18

00349:17 A. I mean, not -- not that I can
18 recall, but --

Page 350:02 to 355:11

00350:02 A. I was going to say, but -- but
03 that was around the same time we were
04 developing the Mark III, you know, system
05 with rechargeable batteries.
06 I mean, if the customer would
07 have wanted that technology, you know -- and,
08 in fact, Steno, which this e-mail looks like
09 it's in refer -- you know, refers to, they
10 have two systems that have Mark III systems
11 with rechargeable batteries.
12 Q. Okay. So if the customer had
13 wanted the rechargeable system, y'all would
14 have accommodated the customer?
15 A. Again, with the Mark III system.
16 Q. Because you've said that's your
17 criteria, if the customer wants it, you will
18 accommodate the customer?
19 A. Based on his --
20 Q. That's your --
21 A. Based on his needs.
22 Q. Right. And, of course, if he

23 thinks he needs that for the safe operation
24 of the system, then -- then Cameron will be
25 happy to comply with that, based on the way
00351:01 you understand they do business?
02 A. Yes.
03 Q. All right. I'd like you to turn
04 to now, to tab number 1, which was previously
05 marked in the deposition as exhibit 5155.
06 Actually, I think I have a copy
07 here for you, so you can just use my copy.
08 Exhibit 5155.
09 Do you remember seeing this
10 e-mail back in 2005? Do you remember ever
11 seeing that e-mail chain before?
12 And I will tell you, to my
13 knowledge, your name does not appear in the
14 e-mail chain, in fairness to you.
15 Do you remember ever seeing this
16 before?
17 A. I mean, actually, my name does
18 appear on it.
19 Q. Oh, I'm sorry.
20 A. On the third page.
21 Q. I'm sorry. So you have seen
22 this e-mail chain before?
23 A. Yeah. I may have -- well, that
24 was -- 2005 was, you know, six years ago,
25 but --
00352:01 Q. Yeah. You have a customer in
02 2005 asking you to retrofit rechargeable
03 batteries to their blowout preventer, don't
04 you?
05 A. Well, it looks like that
06 they're -- they're asking the question. I
07 mean --
08 Q. Third page.
09 Who's Brian Williams?
10 A. Brian Williams, to my knowledge,
11 you know, worked -- still works -- could
12 still work at Transocean.
13 Q. Yeah. He was a Transocean
14 employee, correct?
15 A. Right.
16 Q. And Brian Williams, on
17 August 3rd, 2005, says, can you quote what it
18 would take to retrofit this solution to our
19 SEMs?
20 That's what Brian Williams with
21 Transocean asked Cameron in August 2005,
22 correct?
23 A. Well, actually, on the third
24 page, he starts out by, Steve, does Cameron
25 have any plans to develop a retrofit
00353:01 rechargeable AMF battery module?
02 And I think, you know, the

03 answer was, if -- if you're interested in it,
04 then -- then, you know, give us a formal
05 request and -- and we'll look into it.
06 Q. All right. Let's read exactly
07 what was said as opposed to you paraphrasing
08 it.
09 The question -- does he say,
10 Brian Williams, August 3rd, with Transocean,
11 say, can you quote what it would take to
12 retrofit this solution to our SEMs? Is that
13 a question that he wrote to Ray Jahn and
14 Richard Coronado, August 3rd, third page of
15 the -- of exhibit 5155?
16 A. Well -- I'm sorry. Maybe -- can
17 you -- can you --
18 Q. Sure. Right there in the
19 middle --
20 A. Okay. Okay.
21 Q. -- of the e-mail.
22 A. Right.
23 Q. Is that one of the sentences in
24 his e-mail?
25 A. Yes, can you quote --
00354:01 Q. And did --
02 A. -- what I would take to retrofit
03 this solution to our SEMs?
04 Q. And then he had actually written
05 earlier, on July 28th, 2005, a few days
06 earlier, he said -- he starts the sentence by
07 saying, because the AMF battery life does not
08 appear to meet Cameron's specifications.
09 Right?
10 A. Again, I -- I -- I don't know --
11 you know, I don't have details with regards
12 to --
13 Q. I'm not asking you if you have
14 details. I'm asking if that's what Brian
15 Williams --
16 A. Oh.
17 Q. -- with Transocean, your
18 customer, told you.
19 A. That's what it appears to
20 reference here in this e-mail.
21 Q. Sure. Now, let's talk to
22 Mr. Gaude's answer, the last e-mail in the
23 chain, August 25th. Ed Gaude, your boss,
24 says, the answer to Transocean concerning the
25 rechargeable battery packs for old system is,
00355:01 we do not plan to develop it.
02 That's what Ed -- did I read
03 that sentence correctly?
04 A. Yes.
05 Q. Okay. So your customer
06 requested a rechargeable battery. Your
07 customer said he didn't think the AMF

08 batteries were working appropriately and
 09 Cameron had to come up with a new system for
 10 the battery and Cameron refused to develop a
 11 rechargeable battery. Do I have it right?

Page 355:13 to 356:05

00355:13 A. No.
 14 Q. Okay. What's wrong with that --
 15 what I -- I just said in this question?
 16 A. Well, in the second sentence,
 17 Ed's response says, Transocean feels strongly
 18 enough about needing a rechargeable system,
 19 then we would try to quote one.
 20 Q. Okay.
 21 A. But we never got any response on
 22 this, are you really interested, can you
 23 submit a formal request for it.
 24 Q. Okay.
 25 A. I mean, based on this e-mail, it
 00356:01 just -- it just died here.
 02 Q. Okay. So the way Cameron sees
 03 it, if Transocean wants that sort of battery
 04 system on their blowout preventer, that's
 05 Transocean's responsibility to ask for it?

Page 356:07 to 356:21

00356:07 A. Yes.
 08 Q. Okay. Cameron doesn't have any
 09 responsibility to tell Transocean, you need
 10 this system because it's better?
 11 MR. JONES: Object to form.
 12 A. It's -- both systems do what
 13 they're intended to do. We have a Mark I,
 14 Mark II system that will function when -- as
 15 appropriately maintained and our guidelines
 16 are followed. And of course the Mark III
 17 system will do the same thing.
 18 Q. Okay. Did you ever follow up on
 19 Mr. Williams' comment that the battery
 20 systems were not functioning as they were
 21 intended?

Page 356:23 to 357:18

00356:23 Q. Mr. Williams earlier in that
 24 e-mail chain says he doesn't think the
 25 Cameron batteries are performing up to specs.
 00357:01 Do you remember an investigation into
 02 Mr. Williams' comment?
 03 A. No, I do not remember. I -- I
 04 do not know if that was -- you know, what --

05 what the issue was with that.
 06 Q. Okay. The -- and what was --
 07 while we're on batteries, 'cause I'm
 08 assuming, by the way, you don't have any
 09 testimony to give anybody about the ram
 10 blocks or DVS blocks or shear ability or
 11 MISB. Those are not subjects on which you
 12 profess expertise; am I correct about that?
 13 A. You are correct.
 14 Q. Or accumulators or accumulator
 15 capacity or volumetric accumulator
 16 requirements. Those sorts of things are
 17 things that you do not profess expertise?
 18 A. You are correct.

Page 361:03 to 362:14

00361:03 Q. Do you have a professional
 04 engineering -- do -- have you ever received
 05 any honorary degrees?
 06 A. No.
 07 Q. Okay. Can you think of any
 08 professional associations of which you're a
 09 member?
 10 A. No, I can't recall any.
 11 Q. Okay. Have you applied
 12 membership in any professional associations?
 13 A. When I was going to -- to
 14 university, I was -- I was a member of IEEE.
 15 Q. Okay. What's IEEE?
 16 A. Institute of Electrical --
 17 Electrical Engineers.
 18 Q. Has Cameron requested that you
 19 join a association?
 20 A. They haven't requested it, but
 21 they've encouraged.
 22 Q. Okay. But you haven't done it?
 23 A. I haven't done it.
 24 Q. The -- any other thing you can
 25 tell me that would add to your professional
 00362:01 qualifications in terms of your formal
 02 education, other than what you have told me?
 03 A. Besides my 13 years of
 04 experience with Cameron?
 05 Q. Yeah. I meant formal -- I said
 06 education.
 07 A. Okay. I've had -- I've had
 08 some -- some training PLCs. I think I
 09 mentioned that in my -- in my CV or risumi.
 10 So I've had some training with that. Had
 11 some training with some other PLCs.
 12 Q. And by PLC you mean?
 13 A. Program -- programmable logic
 14 controller.

Page 363:07 to 363:18

00363:07 Q. Okay. Has Cameron ever -- ever
08 reprimanded you for that and said, look, we
09 just need you to get more professional
10 training?
11 A. No.
12 Q. What about safety management
13 courses, ever taken any of those?
14 A. No.
15 Q. What about critical risk courses
16 or process safety, ever taken any of those
17 courses?
18 A. Not to my knowledge, no.

Page 364:01 to 364:10

00364:01 Q. Okay. Other than your half a
02 day course that one of your vendors provided
03 on general principles of safety, have you
04 ever taken any other training on critical
05 risk, risk management safety, safety process,
06 anything like that?
07 A. No.
08 Q. And Cameron's never requested
09 you to do so?
10 A. Cameron's never requested.

Page 364:15 to 365:22

00364:15 Q. Okay. Can you test these
16 batteries when the BOP is on the deck of the
17 ship?
18 A. For which system?
19 Q. For the AMF system. I'm sorry.
20 A. For the DEEPWATER HORIZON?
21 Q. Yeah.
22 A. Yes.
23 Q. I'm assuming you mean Mark II?
24 A. Right.
25 Q. Okay. I meant generically Mark
00365:01 II.
02 A. Okay.
03 Q. But Mark II's what's on the
04 HORIZON, correct?
05 A. Right. Right.
06 Q. Can you test the batteries when
07 you were on the deck of the ship?
08 A. You can -- you can -- you could
09 connect through the pie connector a -- some
10 sort of test equipment to -- to monitor the
11 batteries and -- and actuate the AMF system
12 and record that voltage over the sequence.

13 Q. Okay. Would that tell you if
 14 the batteries are working?
 15 A. That might give you some -- some
 16 valuable information as to -- as -- if the
 17 batteries are working or not.
 18 Q. Okay. Would -- would you have
 19 to place a load on the batteries in order to
 20 test them?
 21 A. You would have to run the
 22 sequence, yes.

Page 366:03 to 371:24

00366:03 Q. Okay. So in order to test the
 04 batteries, you have to partially discharge
 05 the batteries?
 06 A. Yeah, you have to run a
 07 sequence, which would use up some of the
 08 capacity on the batteries.
 09 Q. Okay. The -- does Cameron
 10 recommend that sequence? Does Cameron
 11 recommend that you run that test when it's on
 12 deck?
 13 A. I mean -- I mean, we have those
 14 testing in our FATs for our SEM.
 15 Q. I know. Does Cameron --
 16 A. So -- so that's right, that's
 17 in -- that's in the FAT. And the FAT --
 18 Q. How often does Cameron say you
 19 should run a factory acceptance test?
 20 A. I mean, Cameron runs it every
 21 time the battery -- every time the system
 22 comes back into a refurbishment. I mean, as
 23 for -- I mean, how -- how often, I mean, that
 24 would be dependent on the customers.
 25 Q. I know. What's Cameron's
 00367:01 recommendation. Here's my question. I own a
 02 blowout preventer, I have Mark II batteries,
 03 they're not monitorable when they're subsea
 04 and they're not rechargeable, right? True,
 05 right?
 06 A. Correct.
 07 Q. Okay. What does Cameron
 08 recommend in terms of how often they should
 09 be tested?
 10 A. (Moves head side to side.)
 11 Q. No recommendation?
 12 A. I -- I haven't seen a document
 13 or anything.
 14 Q. Okay. What does Cameron
 15 recommend in terms of how to stump test them?
 16 How to do it when the BOP is on the deck of
 17 the ship?
 18 A. Well, again, I mean, that's --
 19 that's up to the customer. I mean --

20 Q. No. I'm asking what Cameron
21 recommends. Nothing?
22 A. I have no knowledge.
23 Q. Okay. Okay. Now, once you get
24 the blowout preventer on the bottom of the
25 ocean, okay, what -- does Cameron have a
00368:01 procedure to test the batteries at that
02 point?
03 A. I mean -- I mean -- I mean,
04 that's dependent on your customers, how they
05 operate the equipment.
06 Q. Does -- I know. Does -- is
07 there a way to test the battery when it's on
08 the bottom of the ocean?
09 A. I mean, there is -- I mean, you
10 can do that, that is possible.
11 Q. Okay. How?
12 A. You can obviously run -- run the
13 AMF sequence.
14 Q. All right.
15 A. So, again, that would be
16 dependent on the customer and -- and his
17 needs and -- and, you know, he -- how he
18 operates the equipment.
19 Q. Okay. So the only way to test
20 the battery once it's on the bottom of the
21 ocean is to run the AMF sequence, right?
22 A. Correct.
23 Q. Which of course discharges, in
24 part, the battery?
25 A. Correct.
00369:01 Q. Okay. Did I understand you
02 correctly that says -- let me ask you
03 something about arming. As I understand, the
04 AMF system has to be armed, doesn't it?
05 A. Correct.
06 Q. Okay. And what happens is, you
07 put the blowout preventer on the bottom of
08 the ocean and then you arm the AMF?
09 A. That depend -- that would depend
10 on our customers, how they -- when they arm
11 it.
12 Q. Okay. Well, does Cameron
13 recommend -- before I leave testing. I'm
14 sorry. I'm going to revert for a second
15 before I switch you to AMF sequencing. Okay.
16 On testing, does Cameron recommend that the
17 batteries be tested when they're on the
18 bottom of the ocean?
19 A. I have no knowledge of that. I
20 mean, our customers are sophisticated, they
21 know our equipment.
22 Q. I'm asking about Cameron.
23 This -- okay. What if the blowout
24 preventer's on the bottom of the ocean for a

25 year, does Cameron have a recommendation for
00370:01 the way to test the batteries then?

02 A. I mean, our -- our -- our
03 customers know our equipment, they are
04 familiar with our equipment.

05 Q. I'm sorry. I'm asking about
06 Cameron. Does Cameron -- anything you can
07 think of?

08 A. I can't think of anything.

09 Q. All right. Let's go to the AMF.
10 Okay. You'd said you have to arm the AMF for
11 it to be operative when you need it, right?

12 A. Yes.

13 Q. Okay. If it's disarmed, then
14 even if you meet the other conditions, the
15 AMF will not fire, correct?

16 A. If it's disarmed, correct.

17 Q. Okay. And arming is something
18 you actually do from the control panel?

19 A. That is correct, yes.

20 Q. It's a sequence of buttons you
21 push, I assume?

22 A. It's -- on this particular
23 system, yes, it's a two-handed operation.
24 You have to push the enable button and -- and
25 arm.

00371:01 Q. Right. In order to make sure
02 you do not get accidental arming, correct?

03 A. Yeah. In case, you know,
04 somebody accidentally, you know, hits just
05 the activate or the arm button, then it
06 doesn't --

07 Q. All right. And then at some
08 point if the customer wishes to, he can
09 disarm the unit, correct?

10 A. That is correct.

11 Q. I assume you know that if you --
12 if an AMF were to fire, that would fire the
13 blind shear rams, correct?

14 A. That if the conditions were met
15 after you armed it?

16 Q. If the AMF activates, it will
17 fire the blind shear rams, right?

18 A. That would -- for this
19 particular rig, they had the blind shear
20 closed, the high pressure blind shear ram in
21 the sequence.

22 Q. Yeah. That's what I meant.
23 The -- that would be dangerous if it were to
24 happen on deck accidentally, correct?

Page 372:01 to 372:06

00372:01 A. I mean, if you didn't want to --
02 if you didn't intend for it to fire, I would

03 think that would -- that would be an issue.
04 Q. Right. The point is, no one in
05 their right mind wants to fire the blind
06 shear rams accidentally, correct?

Page 372:08 to 374:09

00372:08 A. I can't think -- yeah,
09 that would -- again, that would be on the
10 customer, but I --
11 Q. Okay.
12 A. -- I wouldn't think so.
13 Q. Right. And that's one reason
14 you have an arm, disarm feature is so the
15 customer can disarm it so he doesn't have to
16 worry about it accidentally firing when it's
17 disarmed, correct?
18 A. Correct.
19 Q. So a normal mode of operation
20 is, you would arm it once it's on the
21 wellhead and you would disarm it when you
22 bring it on deck. Would that be a normal
23 sequence of use, or you don't know?
24 A. I -- that could be one normal
25 sequence of use. But I -- I don't know how
00373:01 the customer, you know, would -- would want
02 to use that.
03 Q. Sure. Let me ask it in terms of
04 Cameron. What does Cameron recommend in
05 terms of bringing an armed blowout preventer
06 that they manufactured to the deck of a ship?
07 What does Cameron recommend about that?
08 A. I can't recall anything.
09 Q. Sure. What does Cameron
10 recommend about whether the blowout preventer
11 should be disarmed before you bring it to the
12 deck of a ship with the workmen?
13 A. I can't recall.
14 Q. Okay. The -- all right. But
15 one possible normal sequence of events would
16 be you would disarm it when it's on the deck
17 of the ship and you would arm it when it goes
18 on the wellhead?
19 A. That could be one possible.
20 Q. Okay. Did I understand you
21 correctly yesterday, you said when you disarm
22 it that you actually activate the 27-volt
23 battery for a small amount of time?
24 A. When you disarm it?
25 Q. Uh-huh. When you hit -- when
00374:01 it's armed and you go through the disarm
02 sequence.
03 A. Oh. When it actually goes
04 through the sequence?
05 Q. Right.

06 A. Okay. When all the -- when
07 all the -- if all the conditions are met, if
08 you lose power, if you lose communication to
09 the pod --

Page 374:11 to 376:24

00374:11 Q. You're -- you're answering
12 activation. That's not what I'm asking. I'm
13 going to ask that question in a minute.
14 A. Yeah, 'cause that's what I
15 originally --
16 Q. No. Right now I'm talking about
17 disarming. We have it on the wellhead, we
18 finished drilling the oil well, everything's
19 fine. We wish to -- we wish to disarm it and
20 bring it to the surface.
21 A. Okay.
22 Q. Okay. When you disarm, when you
23 push the buttons to disarm the AMF --
24 A. Right.
25 Q. -- would that put some sort of a
00375:01 load on the 27-volt battery?
02 A. No.
03 Q. Not at all?
04 A. No. Because you're disarming it
05 using the 24-volt, the normal power you have.
06 Q. Surface power?
07 A. The power in the SEM. I --
08 Q. Okay. Where does the power in
09 the SEM come from?
10 A. It comes from the surface.
11 Q. Okay. So you're disarming it
12 using surface power?
13 A. Right.
14 Q. Okay. What about when you arm
15 it?
16 A. You arm it, you're using surface
17 power as well.
18 Q. Okay. So when you arm it, that
19 doesn't -- you can arm it with a completely
20 dead 27-volt battery, then, correct?
21 A. You could.
22 Q. You could arm -- you could
23 disarm it with a completely dead 27-volt
24 battery?
25 A. You -- you could.
00376:01 Q. Okay. And by the way, you don't
02 dispute that the battery on the -- the
03 27-volt battery on the blue pod, when it came
04 up off the ocean floor on the HORIZON, it was
05 dead, wasn't it?
06 A. You mean when they -- when they
07 retrieved it?
08 Q. Yeah.

09 A. The stack?
 10 Q. Uh-huh.
 11 A. Yeah, it looks like it was very,
 12 very low.
 13 Q. Right. Discharged. Would that
 14 be a word you're comfortable with?
 15 A. That --
 16 Q. Discharged such that it would
 17 not function properly?
 18 A. Right.
 19 Q. Is that a phrase you're
 20 comfortable with?
 21 A. Yeah, I'm comfortable with that.
 22 Q. Okay. You know, and you don't
 23 know when it discharged?
 24 A. I have no idea.

Page 377:10 to 377:10

00377:10 what I marked as exhibit 8047, and it

Page 377:22 to 378:20

00377:22 Q. Well, I just need a -- it's
 23 generally a quotation by Cameron?
 24 A. Yeah. Right. It's generally a
 25 quotation.
 00378:01 Q. Okay. For the DEEPWATER HORIZON
 02 SEM, an upgrade on the DEEPWATER HORIZON SEM?
 03 A. I -- it says Transocean Sedco
 04 Forex. I do not know -- well, I'm sorry, re:
 05 It says, HORIZON rig. So it --
 06 Q. It appears to be HORIZON?
 07 A. It appears to be.
 08 Q. Okay. Could you please tell me
 09 the date of exhibit 8047?
 10 A. September 9, 2004.
 11 Q. And what it appears to be is a
 12 quotation to upgrade the SEM on the HORIZON
 13 rig?
 14 (Exhibit Number 8047 marked.)
 15 A. You know, there's some mention
 16 about some parts, convertor, fuse. I --
 17 Q. You're right. It was
 18 upgraded -- the title is upgrading the SEM as
 19 well as a list of specific things --
 20 A. Right.

Page 379:19 to 382:10

00379:19 Q. Yeah, you're actually getting to
 20 where I'm going. But, first, let's start
 21 with pods.

22 You have three pods, the blue,
23 the yellow and the spare?
24 A. Oh, okay. I was wondering --
25 okay. Yeah, you have --
00380:01 Q. Two.
02 A. -- two pods on the -- what will
03 be used and then the spare off somewhere.
04 Q. Right. And then on each pod, I
05 thought you had two SEMs.
06 A. Yeah, you have -- in each -- in
07 each -- well, in each pod, you have a -- they
08 call it a SEM, but it's actually two
09 electronics packages. And sometimes they
10 refer to those as SEMs.
11 Q. Okay. And the -- and those
12 particular electronics packages, which are
13 sometimes referred to as SEMs --
14 A. Right.
15 Q. -- they're watertight.
16 Are they contained in one
17 watertight housing?
18 A. Right.
19 Q. Okay.
20 A. Right.
21 Q. And each of -- and each
22 watertight housing has two electronic
23 packages and two nine-volt batteries,
24 correct?
25 A. Correct.
00381:01 Q. And it has -- each watertight
02 housing, it as one 27-volt battery?
03 A. Correct.
04 Q. Now, yesterday, I was trying to
05 figure out AMF cards.
06 When you have two sets of
07 electronic units contained in one water --
08 watertight housing, how many AMF cards are in
09 that?
10 A. Two. For the DEEPWATER HORIZON,
11 two.
12 Q. Meaning, one AMF card per
13 electronics --
14 A. Right. If you have two
15 electronics packages, then you have two
16 cards, so one per electronics package.
17 Q. Okay. So -- okay. So for every
18 pod, you have two AMF cards?
19 A. That is correct.
20 Q. And you have two electronics
21 packages?
22 A. Correct.
23 Q. And you have two nine-volt
24 batteries?
25 A. Correct.
00382:01 Q. And you have one 27-volt

02 battery?
03 A. That is correct.
04 Q. And you have one solenoid 103Y?
05 They're not in the SEM. I'm
06 sorry. I switched on you.
07 A. Right, right.
08 Q. It's in the pod?
09 A. Right. And solenoid 103Y, yeah,
10 you would have one in each pod.

Page 382:21 to 387:13

00382:21 Q. Do you have a solenoid that's
22 the solenoid through which you energize the
23 high-pressure blind shear function?
24 A. I mean, you -- you could.
25 That's -- that's dependent on the customer
00383:01 and --
02 Q. The programming?
03 A. Well, it depends on the
04 customer's specifications, whether he wants
05 that or not.
06 Q. Okay. So obviously, design must
07 have taken redundancy into account?
08 A. Yes.
09 Q. Matter of fact, you're required
10 to have redundant systems on subsea deepwater
11 drilling blowout preventers, aren't you?
12 A. Yes. For API 16D, yes.
13 Q. What about the Code of Federal
14 Regulations, are you familiar with them?
15 A. Is -- you're referring to MMS?
16 Q. Right.
17 A. Yes, yes.
18 Q. The Code of Federal Regulations
19 are -- in this particular case, it would be
20 the ones -- I want to avoid the whole issue
21 about BOEMRE and all that --
22 A. Sure.
23 Q. -- so I'm going to talk about as
24 of April 20th, 2010, fair?
25 A. Okay.
00384:01 Q. I'm going to ask you about
02 regulations in existence on or before
03 April 20th, 2010.
04 A. Okay.
05 Q. Is that a fair way to define it?
06 A. Yeah, we can -- can we just
07 refer it to as MMS?
08 Q. Sure.
09 A. Okay.
10 Q. That -- that's perfectly fine.
11 A. Okay.
12 Q. And what I'm saying is, MMS
13 would pass certain regulations that were

14 binding on people who were going to drill oil
15 wells in the Gulf of Mexico, correct?

16 A. Correct.

17 Q. And one of the requirements is
18 that the BOP control system, the blowout
19 preventer control system, had to be
20 redundant, correct?

21 A. Yeah. One of -- one of the
22 requirements that I remember from API 16D
23 was, it had to have redundant pods, yes.

24 Q. I'm not asking about API 16D
25 right now. I'm asking about the Code of
00385:01 Federal Regulations, passed by MMS.

02 It requires that you have
03 redundant control systems on the blowout
04 preventer, correct, or do you know?

05 A. I know that MMS references
06 API 16D, so -- in their -- in their code of
07 specifications.

08 Q. Okay.

09 A. So --

10 Q. I will tell you, MMS reg 250.443
11 B says, quote, at least two -- two BOP
12 control stations, one station must be on the
13 drilling floor. You must locate the other
14 station in a readily accessible location away
15 from the drilling floor, unquote.

16 A. Okay.

17 Q. Are you familiar with that
18 regulation?

19 A. Yes.

20 Q. Sounds right, though?

21 A. Yes.

22 Q. That you need two BOP control
23 stations, correct?

24 A. Right. Right.

25 Q. And the purpose of that is
00386:01 redundancy?

02 A. Right.

03 Q. Okay. And 250.442 says, the
04 BO -- quote, D, 442 D, as in delta, quote,
05 the BOP system must include an operable dual
06 pod control system to ensure proper and
07 independent operation of the BOP system,
08 unquote.

09 Are you familiar with that?

10 A. Yes.

11 Q. Okay. So it is mandated if
12 you're going to put a blowout preventer in
13 the Gulf of Mexico, that you have redundant
14 control systems?

15 A. Correct. Yes.

16 Q. Okay. And Cameron designed with
17 that in mind, correct?

18 A. Correct.

19 Q. So Cameron designs its control
 20 system so that it should have redundancy?
 21 A. Correct.
 22 Q. What is redundancy?
 23 A. Redundancy is to have another --
 24 another system or piece of equipment, you
 25 know, to -- you know, to operate the system
 00387:01 in the event that the other one, you know,
 02 is -- is no longer available.
 03 Q. Okay. So there should be two --
 04 A. Two.
 05 Q. -- independent systems that work
 06 so that even if one goes down, the other
 07 continues to work?
 08 A. Right.
 09 Q. That's redundancy?
 10 A. Right.
 11 Q. Therefore, you should not have
 12 any single points of failure in -- between
 13 the two systems, correct?

Page 387:15 to 388:20

00387:15 A. I don't know about single points
 16 of -- of failure. I mean, that would -- but,
 17 I mean, you do have to have redundancy. I'll
 18 agree with that.
 19 Q. All right. Well, I'm asking
 20 you, do you know what SPOF means? Is that an
 21 accepted term to you, or have you ever heard
 22 it?
 23 A. I've heard of it before, yes.
 24 Q. Have you ever heard single point
 25 failures?
 00388:01 A. Yes, I have heard of those
 02 before.
 03 Q. Sure. Have you ever designed
 04 with that in mind?
 05 A. Yes, we have.
 06 Q. Did you design this particular
 07 unit, of which you were the lead engineer,
 08 did you look to see if you had any single
 09 point failures in your control system?
 10 A. During the initial design phase,
 11 I'm -- I may have -- may have looked for
 12 those.
 13 Q. Okay. You may have looked for
 14 them, or you did look for them, or you don't
 15 remember?
 16 A. I don't remember specifically,
 17 you know -- I mean, that was a long time ago.
 18 Q. Isn't it mandatory that you look
 19 for single point failures on your control
 20 system?

Page 388:22 to 389:06

00388:22 Q. Wouldn't that be mandatory good
23 engineering practice?
24 A. I mean --
25 Q. Or do you know?
00389:01 A. I mean, we design per API 16D.
02 Q. That's not my question.
03 My question is, do you consider
04 it to be mandatory that you identify any
05 single point failure in the BOP control
06 systems?

Page 389:08 to 390:12

00389:08 A. I mean, as -- as a general
09 practice, we -- we try to adhere to -- to
10 eliminate single point failures.
11 Q. Okay.
12 A. But I -- it's -- you know, based
13 on my experience, you know, sometimes, you
14 know, you can't -- it's just not possible,
15 because of the equipment, to eliminate.
16 Q. All right. Did you identify --
17 before we get to whether we can eliminate
18 them or not, to see if we have any.
19 Did you identify any single
20 point failures in connection with the BOP
21 control system on the DEEPWATER HORIZON when
22 you were designing it from 1998 to 2001? Did
23 you identify any?
24 A. I don't -- I don't recall if
25 I -- if I found any.
00390:01 Q. Sure.
02 A. I may have -- may have looked
03 for it, but I don't recall if I found any.
04 Q. Okay. You cannot tell the jury
05 or the judge in this case of a single --
06 single point failure that you can think of in
07 the control system of the DEEPWATER HORIZON?
08 'Cause if you can think of one, I want you to
09 tell me what it is.
10 A. I can't -- at the moment, I
11 can't think of anything on the electrical
12 side of it.

Page 390:19 to 391:02

00390:19 Q. By the way, have you spent much
20 time on a drilling rig?
21 A. I've spent some time, but not --
22 not much time.
23 Q. Tell me what some time is.

24 More than a day?
25 A. Actually, no. I haven't
00391:01 actually been on a drilling rig when it's
02 been deployed.

Page 392:17 to 392:25

00392:17 Q. Sure. Why don't you look at
18 exhibit 8037 that you were asked questions
19 about by counsel yesterday.
20 A. What tab is that?
21 Q. It's the schematic. It's a
22 schematic --
23 MR. JONES: Tab --
24 Q. I think you described it as a
25 simplified schematic.

Page 393:15 to 393:20

00393:15 Q. Okay. Do you see down there
16 where it says -- it shows the cable reels and
17 then it shows the MUX cables going down to
18 the side of the riser, down to the BOP,
19 correct?
20 A. I see that on here. I don't --

Page 394:02 to 396:24

00394:02 Q. Sure. Well, the MUX cables on
03 the DEEPWATER HORIZON did meet at the top of
04 the riser in the moon pool and go down the
05 riser to the blowout preventer, correct, or
06 you don't know?
07 A. I don't -- I don't know.
08 Q. Okay. You don't how you routed
09 the MUX cables?
10 A. No, I don't.
11 Q. Okay.
12 A. I don't know how they mounted
13 them.
14 Q. Sure.
15 A. I mean, I do know, generally
16 speaking, that they go down the riser.
17 Q. Okay. Did you ever give a
18 thought to how the -- where the MUX cables
19 were located? Was that part of your job
20 responsibilities?
21 A. Located as in?
22 Q. Located as in whether they went
23 through the moon pool or whether they went
24 through the riser.
25 Did you ever give that a part --
00395:01 a thought as part of your job

02 responsibilities?
03 A. No. I mean, that was --
04 Q. Okay. Did you ever give a
05 thought to protecting them in any way,
06 armoring them or protecting them?
07 A. Well, if I remember, all the MUX
08 cables that Cameron sells have -- have an
09 armor -- stainless steel armor between the
10 inner jacket and the outer jacket.
11 Q. Okay. And to what, a fire or
12 explosion proof? Do you know?
13 A. I'm not -- not aware of that.
14 Q. Sure. Did you ever give any
15 thought to protecting the MUX cables as they
16 entered the top of the riser? Did you ever
17 give any thought as part of your job to
18 protect them from fire explosion?
19 A. I mean, that was --
20 Q. Is the answer no?
21 A. I do not know.
22 Q. Okay.
23 A. Don't know.
24 Q. Did you -- you know whether you
25 gave it thought or not?
00396:01 A. Well, but --
02 Q. Did you do it? Did you try to
03 protect the MUX cables as they entered the
04 top of the riser from fire or explosion?
05 A. Well, usually, that's -- that's
06 something we --
07 Q. The question is, did you? Is
08 that a no? You're shaking your head no.
09 A. I can't -- I can't recall.
10 Q. Okay. Did anybody else at
11 Cameron, to the best of your memory, ever
12 discuss with you that they would be subject
13 to fire or explosion right there? Not that
14 you remember?
15 A. Not that I can recall, no.
16 Q. Sure. Now, let's look Cameron's
17 diagram.
18 What's the date of this diagram?
19 A. It looks like 4-24-00, or 2000.
20 Q. Sure. So this is Cameron's
21 document that they did on the DEEPWATER
22 HORIZON blowout preventer inner connections
23 as of sometime in 2000, right?
24 A. Right.

Page 397:05 to 398:04

00397:05 Q. All right. Now, right there
06 where you have the risers schematically going
07 beneath the ocean floor, would you -- how did
08 Cameron label that area out there to the

09 right on exhibit 8037? Do you see that?
 10 A. Hazard -- hazardous area.
 11 Q. Sure. Could you please hold
 12 that up and show it to the camera right
 13 there? And please show -- please show the
 14 jury where it says hazardous area right
 15 there.
 16 A. Right there.
 17 Q. Yeah. Okay. So Cameron knows
 18 in 2000, according to their own diagram, that
 19 they're putting the MUX cables at the top of
 20 the riser in a hazardous area, according to
 21 this diagram, correct?
 22 A. Yeah, I'm not sure if it's
 23 referring to the reel remote control stand,
 24 or is it -- is it that whole area? I --
 25 Q. Okay. You don't even know
 00398:01 what's a hazardous area on the rig?
 02 A. Yeah, I -- that's -- that's
 03 usually defined by our -- by our customer,
 04 what the hazardous area is.

Page 398:13 to 399:16

00398:13 Do you, Richard Coronado, know
 14 what the -- the lead electrical engineer for
 15 Cameron who was the lead engineer on the
 16 DEEPWATER HORIZON configuration from 1998 to
 17 2001, do you know what a hazardous area is?
 18 A. I know that's -- that's defined
 19 by the customer, what the hazardous area is.
 20 Q. Okay. Do you know what it is
 21 independently of the customer?
 22 A. I know it's an area that's --
 23 that's, again, defined by the customer.
 24 Q. Sure. What did you tell the
 25 customer, in this case, R&B Falcon or
 00399:01 Transocean or Vastar or BP, what did you,
 02 Richard Coronado, tell the customer about
 03 whether these MUX cables should be protected
 04 against fire and explosion?
 05 A. Well, again, those -- you know,
 06 we provided the specifications of our MUX
 07 cable to the customer. I mean, that's how we
 08 communicated that.
 09 Q. What -- what did you tell the
 10 customer, Transocean and BP, about whether to
 11 protect these MUX cables from fire or
 12 explosion? Do you remember telling them
 13 anything?
 14 A. Again, I mean, the -- the
 15 hazardous area is defined by our customers,
 16 so --

Page 399:20 to 400:09

00399:20 Q. You understood that. I want to
21 know what Richard Coronado, the lead engineer
22 that Cameron assigned to help build this BOP,
23 what did you tell the customer about
24 protecting the MUX cables from fire or
25 explosion? Did you tell them anything,
00400:01 Mr. Coronado?
02 A. I've given them -- I've provided
03 the specifications for our MUX cables.
04 Q. Okay. Other than providing them
05 the specifications for the MUX cables, did
06 Cameron, the world industry leader in MUX
07 control systems, tell them anything about
08 protecting these MUX cables from fire or
09 explosion?

Page 400:11 to 400:19

00400:11 A. Again, we -- yeah, I provided
12 the specifications for those cables.
13 Q. Okay. Anything else you can
14 think of?
15 A. No.
16 Q. Okay. Now, you knew that the
17 MUX cables are a single point failure there,
18 right? A fire explosion will knock them both
19 out, won't it?

Page 400:21 to 401:08

00400:21 A. I --
22 Q. You don't know that?
23 A. No, no.
24 Q. You never thought about that?
25 A. No.
00401:01 Q. Okay. Up until this moment,
02 which is now a year, year and a half after
03 the DEEPWATER HORIZON blew up and the -- and
04 the MUX cables were destroyed in the
05 explosion, you have never given one moment's
06 thought to whether the MUX cables can be
07 destroyed in a fire or explosion on the rig
08 floor?

Page 401:10 to 402:09

00401:10 Q. Am I correct about that?
11 Today's the first time you thought about that
12 as a single point failure?
13 MR. JONES: Object to form.
14 A. Again, I mean -- you know, I'm

15 not -- you know, on the -- on the MUX
 16 cables --
 17 Q. Have you ever thought about it
 18 before today --
 19 MR. JONES: Object to form.
 20 Q. -- that the location of the MUX
 21 cables was a single point failure?
 22 A. I mean, I just don't know where
 23 else you would put them other than the moon
 24 pool.
 25 Q. I didn't ask that question.
 00402:01 A. Well, I mean --
 02 Q. I asked, did you ever think they
 03 were a single point failure?
 04 A. I mean, you have two MUX cables.
 05 They're redundant.
 06 Q. Did you ever think they're a
 07 single point failure? Did that thought cross
 08 the mind of Richard Coronado before the
 09 DEEPWATER HORIZON exploded?

Page 402:11 to 402:24

00402:11 Q. It did not?
 12 A. It did not.
 13 Q. Okay. Now, if your only
 14 solution -- you just said awhile ago, gee, I
 15 don't know where else we could put them.
 16 That's what you said, right?
 17 A. Uh-huh.
 18 Q. Of course, you've never given
 19 any thought to that solution, have you?
 20 You've never thought about rerouting the MUX
 21 cables, have you?
 22 MR. JONES: Object to form.
 23 Q. Have you?
 24 A. No.

Page 403:19 to 404:09

00403:19 Q. Okay. The question is --
 20 counsel is right. I interrupted you. But I
 21 want an answer to this question 'cause I'd
 22 like to play this question and answer to the
 23 judge.
 24 And this question is, did you
 25 ever think about protecting the MUX cables as
 00404:01 they ran through the moon pool from fire or
 02 explosion by armor? Did that thought occur
 03 to you before today?
 04 MR. JONES: Object to form.
 05 A. Again, we build the equipment
 06 per API 16D. We have redundant cables.
 07 The -- the cable's specification was given,

08 provided to the customer as -- so that was --
09 that was given to the customer.

Page 404:22 to 404:22

00404:22 in a deposition as exhibit 7581.

Page 404:24 to 405:17

00404:24 Q. Uh-huh. Okay. Would you please
25 turn to page 24 of tab 16, the bottom of the
00405:01 page, section 4.9.7, exhibit 7581.
02 Tell me when you're there.
03 A. I'm there.
04 Q. Okay. This was a report by
05 GlobalSantaFe who merged with Transocean.
06 And this is a report that apparently was
07 issued apparently April 14th, 2003. Okay?
08 And it says, quote, the only common mode
09 failure would be a major incident, such as a
10 fire in close proximity to the MUX winch
11 reels. However, the reels are located on
12 different sides of the moon pool and the
13 probability of all reels being disabled is
14 very low.
15 Did I read that sentence
16 correctly?
17 A. Yes.

Page 406:01 to 406:05

00406:01 Did the industry leader in MUX
02 control systems, Cameron Iron Works, did they
03 think -- had they figured this out by 2003,
04 that the MUX cables were subject to fire or
05 explosion?

Page 406:07 to 406:07

00406:07 Q. Had Cameron figured it out?

Page 406:09 to 406:09

00406:09 A. I'm not aware of it.

Page 406:13 to 408:19

00406:13 (Exhibit Number 8049 marked.)
14 Q. I'll hand you the exhibit
15 sticker. 8049.
16 Do you see that document?
17 A. Yes.

18 Q. Okay. I want you -- this is
19 actually comments on the DEEPWATER HORIZON,
20 and it's actually from you, right? This is
21 your correspondence dated November 4th, 1999,
22 correct?

23 A. Let me have a moment to read it.
24 It looks like my name is -- is
25 up there, yes.

00407:01 Q. Well, you're name is not only up
02 there, it says it's from Richard Coronado,
03 correct?

04 A. Right. But, again, it's -- it's
05 been awhile.

06 Q. Sure.

07 A. It's been over ten years.

08 Q. Let me tell you the part I'm
09 going to -- let me -- in fairness to you, let
10 me tell you, I'm going to be asking you about
11 paragraph or bullet point number 4 in the
12 middle of the page on exhibit 8049.

13 Do you see bullet point 4?

14 A. Yes.

15 Q. Bullet point 4, you are writing
16 to Drew.

17 Who's Drew?

18 A. Drew Weathers. He's with --

19 Q. R&B Falcon?

20 A. R&B Falcon, correct.

21 Q. Okay. So you're writing to R&B
22 Falcon and you're saying, replace all armored
23 cables with unarmored cables per R&B Falcon's
24 request. Cameron's controls comments. R&B
25 Falcon will provide documents stating ABS has

00408:01 approved use of unarmored cables in hazardous
02 locations.

03 Did I read your comment from
04 November 4th, 1999, correctly?

05 A. That's correct.

06 Q. Okay. And, of course, ABS is
07 the American Bureau of Shipping, I assume?

08 A. That's -- that's right.

09 Q. Right. You know, and so you,
10 yourself, are saying, I want confirmation
11 that ABS, the American Bureau of Shipping,
12 will approve unarmored cables in hazardous
13 locations? That's what you were saying to
14 R&B Falcon, correct?

15 A. 'Cause that was the customer's
16 request.

17 Q. Right.

18 A. So I was confirming that
19 request.

00409:09 Q. I'm just asking you, if you have
10 a hazardous location -- when you have a
11 hazardous location, isn't it better to have
12 armored cables?
13 MR. JONES: You have to let him answer
14 his question.
15 Q. Do you know?
16 A. The -- the cables -- the cables
17 being in a -- in a hazardous area, I mean,
18 it -- it -- more than likely, if you had an
19 armored cable, it's not going to make a
20 difference on an explosion.
21 Q. Okay. Have you ever
22 investigated protections that are available
23 for fire or explosion for things like the MUX
24 cables? Have you ever investigated that?
25 A. Well, in this particular case,
00410:01 it was the interconnect cables --
02 Q. No.
03 A. -- not -- not necessarily the
04 MUX cables.
05 Q. I get that. The point of this
06 is, you are making a notice that normally the
07 ABS wants cables that are in hazardous
08 locations to be armored.
09 That's the note you're making on
10 November 4th, 1999, right?

Page 410:12 to 410:19

00410:12 Q. And if R&B Falcon wants to vary
13 that, they need to kind of get you some
14 information from ABS?
15 A. Well, we were -- we were
16 building the -- the system per ABS, and a
17 request was made to use unarmored cables.
18 If -- again, we were trying to meet the
19 customer's specifications per ABS.

Page 410:22 to 411:19

00410:22 Did you ever investigate
23 protecting the MUX cables from fire or
24 explosion? Have you investigated that?
25 A. Well, that would be -- that
00411:01 would be dependent on, you know, if the
02 customer --
03 Q. I don't care whether a
04 customer's requested it or not requested it.
05 Have you ever done it?
06 A. (Shakes head from side to side.)
07 Q. I assume you're shaking --
08 A. I -- I --
09 Q. -- your head no?

10 A. Yeah, I can't say I've --
11 I've -- I've done it.
12 Q. So you don't know if that is
13 feasible or not. In 1999 or 2003 or 2005,
14 you don't know if protection for fire or
15 explosion is feasible or not feasible because
16 that's not something within your expertise;
17 is that correct, Mr. Coronado?
18 A. I -- I can just say I -- I
19 haven't -- I haven't looked at it.

Page 412:09 to 413:04

00412:09 Q. All right. I want you to turn
10 to page number 5 out of exhibit number 5094,
11 top of the page where it says loss of -- oh,
12 I'm sorry, before we do that, in fairness,
13 this is a technical position paper by Vastar
14 Resources, Inc., in connection with the
15 DEEPWATER HORIZON blowout preventer, correct?
16 That's what this document is?
17 A. That's what it states, Vastar
18 Resources, DEEPWATER HORIZON BOP stack design
19 technical position paper.
20 Q. And you'll actually notice at
21 the bottom that the Bates stamp number that's
22 been assigned to it is a Transocean Bates
23 stamp number, which means Transocean had it
24 in their files, correct?
25 A. Okay.
00413:01 Q. Okay. So it's probably
02 something that would have been seen by you
03 and Transocean and -- and Vastar back when --
04 2000, when the paper was done.

Page 413:06 to 414:20

00413:06 A. As far as Transocean and Vastar,
07 I don't -- I'm not sure about the -- about
08 Cameron, if they ever saw this.
09 Q. Sure. Well, let's see what
10 Vastar figured out in September 2000.
11 Page number 5, do you see where
12 I am on loss of power/hydraulics? Do you see
13 the section I'm at?
14 A. Yes.
15 Q. It says, this could occur due to
16 massive failure or parting of the drilling
17 riser above the LMRP and below the upper flex
18 joint, which would render control by the
19 subsea pods ineffective, unquote.
20 That's the first sentence,
21 correct?
22 A. Correct.

23 Q. And you would agree with that,
 24 if you have a parting of the riser above the
 25 LMRP, then you're going to lose your power in
 00414:01 your hydraulics?
 02 A. Right.
 03 Q. Okay. Go to the next sentence.
 04 This condition could also be caused by fire
 05 and/or explosion, which destroys the
 06 hydraulic supply and the MUX cables, either
 07 in the control room areas or in the moon
 08 pool, unquote.
 09 Did I read that sentence
 10 correctly?
 11 A. Correct.
 12 Q. So Vastar figured out, in 2000,
 13 that you could lose your hydraulics and power
 14 in the moon pool due to a fire or explosion,
 15 didn't they, if we were to believe this
 16 sentence?
 17 A. Yes, I would agree with that.
 18 Q. Did Cameron, the industry leader
 19 in MUX control systems, did Cameron figure it
 20 out?

Page 414:22 to 415:03

00414:22 A. I mean, based on this, I mean,
 23 that's -- that's -- parting of the riser
 24 would be one of the reasons why our deadman
 25 system was developed.
 00415:01 Q. Did Cameron figure out that a
 02 fire or explosion in the moon pool would
 03 render their blowout preventer ineffective?

Page 415:05 to 417:20

00415:05 A. I'm not sure.
 06 Q. Okay. The -- in -- okay.
 07 And, course it, if that
 08 happened, you could no longer activate the
 09 EDS, correct?
 10 A. If you lost power and
 11 hydraulics.
 12 Q. Right.
 13 A. That is correct.
 14 Q. Okay.
 15 A. Which would --
 16 Q. And, of course --
 17 A. Can I just finish? Which
 18 would -- that's what the deadman system was
 19 designed for.
 20 Q. Okay.
 21 A. Parting of the riser.
 22 Q. So was the deadman system --

23 well, this isn't parting of the riser. This
 24 is a different problem.
 25 Was the deadman system designed
 00416:01 for a well-control event?
 02 A. It's designed as defined per API
 03 16D, to close in the wellbore if simultaneous
 04 loss of hydraulic supply and electrical
 05 power.
 06 Q. And in Cameron's case, loss of
 07 communication between the pods.
 08 A. Yes.
 09 Q. Okay. The -- what happens if
 10 you lose the MUX cables and not the
 11 hydraulics?
 12 A. AMF will -- will not -- will not
 13 fire, will not trigger.
 14 Q. And the EDS is not available
 15 either, right?
 16 A. If you lose your MUX cables,
 17 that's correct.
 18 Q. Okay. And is the -- is the AMF
 19 card triggered to -- on hydraulics, is it
 20 triggered to when you lose hydraulic
 21 integrity at the blowout preventer, or is it
 22 triggered when you lose hydraulic pumping
 23 power at the surface, or do you know?
 24 A. It would be a transducer that's
 25 installed on the -- on the pod and that would
 00417:01 be --
 02 Q. Subsea?
 03 A. Yes. That would be monitoring
 04 the conduit, the differential between the
 05 conduit pressure and the hydrostatic head
 06 pressure.
 07 Q. Okay. So you have a -- on the
 08 pod you would have some sort of transducer,
 09 correct?
 10 A. Transducers, yes.
 11 Q. Is there a check valve above
 12 that transducer?
 13 A. I don't -- I don't believe so.
 14 Q. Okay. Do you know?
 15 A. I've -- I've looked at the flow
 16 schematics and I've asked other -- other
 17 people who are knowledgeable about that and
 18 there's no check valve above that.
 19 Q. Okay. There's -- when's the
 20 next check valve? Surely there's --

Page 417:22 to 419:02

00417:22 Q. -- check valves in that system.
 23 You have check -- you have the rigid conduit
 24 and you have, what, the hotline, is that what
 25 it's called?

00418:01 A. Yeah, I believe you're right.
02 Q. Okay. So there's two sources of
03 surface hydraulic pressure that go down to
04 the blowout preventer, right, the rigid
05 conduit and the hotline?
06 A. Right.
07 Q. Okay. And the AMF is triggered
08 in connection with hotline -- with the rigid
09 conduit. Do I understand that correctly?
10 A. I believe the hotline and the --
11 and the conduit are -- are kind of tied --
12 tied together.
13 Q. Okay.
14 A. Tied at the same point.
15 Q. The -- okay. Is there a check
16 valve somewhere on the surface so that if you
17 lose the pump you don't lose subsea hydraulic
18 pressure? I'm sure there's check valves in
19 the system, aren't there?
20 A. I'm sure there's probably check
21 valves in the system, but I'm not -- I'm not
22 sure as to what point on the surface they
23 would be installed at.
24 Q. Right. So you don't know
25 whether, when the MUX cables were blown up,
00419:01 you don't know if you destroyed the check
02 valve on the hydraulic system.

Page 419:04 to 419:06

00419:04 A. Well, I mean, I would -- if you
05 lose the -- the riser, then it's going to be
06 below wherever you're -- you're pumping.

Page 422:12 to 422:25

00422:12 Q. Okay. My question to you is, as
13 you sit here today, you don't know when that
14 check valve on the surface was destroyed or
15 damaged?
16 A. I mean, again, more than likely
17 that -- that check valve was in the surface
18 equipment somewhere.
19 Q. Okay.
20 A. It was --
21 Q. And you don't know --
22 A. But --
23 Q. -- where?
24 A. -- I don't know specifically
25 where, but that can be determined.

Page 424:22 to 427:10

00424:22 Q. Mr. Coronado, you said you were
23 involved back when the DEEPWATER HORIZON
24 blowout preventer was being commissioned,
25 right, you were attending many of these
00425:01 meetings, correct?

02 A. Yes, when it was being
03 originally designed and discussed between, at
04 that time Vastar and R&B Falcon.

05 Q. Right. And I've seen, actually,
06 a bunch of meeting minutes back from '99 and
07 2000 and you seem to be in attendance at --
08 not at every -- not necessarily at every
09 meeting, but a bunch of those meetings,
10 correct?

11 A. Right. I was in attendance.
12 I'm not exactly sure how many, but, you
13 know --

14 Q. Several.

15 A. Yeah.

16 Q. Okay. The -- and the records
17 are what the records are. They'll show your
18 name.

19 Generally, I assume, when you
20 were in attendance your name showed up on the
21 attendance list, correct?

22 A. Correct.

23 Q. Okay. Back then, what -- well,
24 tell me, what was Cameron selling? What
25 product was Cameron selling?

00426:01 A. At that time we were selling --
02 or we were --

03 Q. To R&B Falcon.

04 A. Yeah, to R&B Falcon. It was a
05 drilling control system, along with the --
06 with the BOP stack.

07 Q. Along with the LMRP?

08 A. LMRP, which -- yeah. Typically
09 some people refer to the stack, it -- it
10 encompasses the lower stack and the LMRP.

11 Q. Okay. So Cameron was kind of
12 giving the whole shebang, the blowout
13 preventer stack, the LMRP, which was on top
14 of the blowout preventer, and the control
15 system that worked those cavities?

16 A. Correct.

17 Q. Okay. And, of course, then you
18 would also, I guess, have some sort of
19 wellhead connector and then you would have
20 also some sort of a riser system that would
21 go with that?

22 A. A riser system being, like --

23 Q. The flex joint.

24 A. Ah.

25 Q. The riser connection. The lower
00427:01 riser --

02 A. Yeah. I -- I consider that to
03 be part of the LMRP in the stack.
04 Q. Okay. Do you consider the LMRP
05 generally to be from the flex joint all
06 the -- or, I'm sorry, from the --
07 A. Lower stack -- upper --
08 Q. From the lower annular all the
09 way up to the rig floor where you have the
10 upper flex joint --

Page 427:12 to 427:18

00427:12 Q. -- is that all part of the LMRP,
13 the way you think about it?
14 A. No. I mean, the way I -- I look
15 at the LMRP, it's -- it's -- it's from the
16 riser, connector and -- and on up to the --
17 to the flex joint, before the first piece of
18 riser comes down.

Page 431:03 to 431:12

00431:03 Q. Okay. And I -- I read your
04 report to say that you did not, in your
05 opinion, you know, based upon your design
06 experience, you did not think that was a
07 particularly valuable piece of information.
08 A. Not just measuring open circuit
09 voltages. If you -- you want to get some
10 valuable information, you would have to
11 actually run a sequence or load -- load the
12 SEM down as it would be loaded.

Page 431:21 to 432:01

00431:21 Q. Right. And if the battery was
22 good but about to go bad, you might still
23 show close to 27 volts on open circuit
24 voltage, right?
25 A. Yes, I would agree with that
00432:01 statement.

Page 432:10 to 432:13

00432:10 Q. Now, if the battery was bad, you
11 would not get 26, you would get some
12 number -- low number, correct?
13 A. Yeah. I mean --

Page 433:06 to 434:07

00433:06 five, will it -- if the numbers on the

07 27-volt battery is below five, is it going to
08 carry out its function, or do you even know?
09 A. I would have to say that if it's
10 below five, it's -- on a 27-volt battery
11 pack, you're speaking of?
12 Q. Uh-huh.
13 A. It's not going to be enough to
14 drive the solenoids.
15 Q. Okay. So if we get a 27, we
16 know the battery may be good or it may not be
17 good, correct?
18 A. Right, depending on what it's
19 loaded down.
20 Q. Sure. But if we get a 4, we
21 know for sure the battery's bad, correct?
22 A. For the 27-volt battery, yes.
23 Q. Okay. So a voltage open circuit
24 voltage test would give you a valuable piece
25 of information if the battery was discharged,
00434:01 correct?
02 A. I would say it would give you --
03 yes, it would give you information that you
04 could not drive the solenoids.
05 Q. Right. And it's not information
06 you could obtain anywhere else in Cameron's
07 system, correct?

Page 434:09 to 435:13

00434:09 Q. There's no other system that'll
10 give it to us, this particular blowout
11 preventer, Mark II controls?
12 A. Right.
13 Q. Okay. The -- I want to ask you
14 to look at exhibit number 3605. It's
15 engineering bullet -- Cameron's engineering
16 bulletin EB 891 delta, dated September 8,
17 2004.
18 Did you see this when it came
19 out?
20 A. I'm sorry. Yes, I've -- I've
21 seen this before.
22 Q. Okay. And this says the
23 AMF/deadman feature provides a means of
24 commanding the SEM to initiate an EDS
25 sequence if four circumstances occur
00435:01 simultaneously, correct?
02 A. Right.
03 Q. One is loss of conduit pressure,
04 right?
05 A. Right.
06 Q. And that's what we just talked
07 about, whether or not you still had pressure
08 in your conduit line down at the transducer
09 located at the bottom of the ocean?

10 A. Right.
11 Q. The other -- next one is loss of
12 hydrostatic head pressure?
13 A. Right.

Page 435:17 to 437:25

00435:17 Q. Okay. What's loss of
18 hydrostatic head pressures? Is that also the
19 rigid conduit pressure?
20 A. No. This is the ambient
21 pressure that's -- you know, how deep the
22 water depth you are, you're going to have a
23 certain hydrostatic head pressure.
24 Q. Right. And where's that being
25 measured?
00436:01 A. It's being measured on a
02 separate transducer on the -- on the pod.
03 Q. Okay. What -- and why would you
04 lose that pressure?
05 A. Well, you would not necessarily
06 use it, but that's important because the
07 difference between the conduit pressure and
08 the hydrostatic pressure is one of the
09 requirements for the deadman.
10 Q. I know.
11 What would make you lose
12 hydrostatic head pressure?
13 A. I mean, you would have some sort
14 of hydrostatic head pressure already if the
15 system is deployed subsea, so I don't -- I
16 don't --
17 Q. This is --
18 A. I'm not exactly sure why -- why
19 it was written up -- written up like that.
20 Q. I know.
21 So if you lose hydrostatic head
22 pressure on -- on -- on this transducer -- I
23 assume the transducer is on the pod?
24 A. Correct.
25 Q. And the transducer is the piece
00437:01 of equipment that measures it?
02 A. Right.
03 Q. Okay. Okay. Do you know when
04 hydrostatic head pressure was lost on the
05 DEEPWATER HORIZON on April 20th, 2010?
06 A. No, I do not.
07 Q. How would you know?
08 A. I mean, that's just one of the
09 conditions for the -- for the deadman. If --
10 if the conditions are satisfied, then it will
11 trigger the system. I myself would not know
12 that, when that happened on the DEEPWATER
13 HORIZON.
14 Q. Okay. So we don't know if it

15 happened at 9:44, 9:47, 9:49, 9:51, 10:00,
 16 10:30, 11:00? You don't know if you had a
 17 loss of hydrostatic head pressure or when it
 18 happened?
 19 A. Right.
 20 Q. How can we know? We can't know?
 21 A. We can't know.
 22 Q. Okay. Shouldn't we know?
 23 Shouldn't we know in an emergency situation
 24 where we need this thing to fire, shouldn't
 25 we know when it fires?

Page 438:02 to 438:21

00438:02 A. Well, it -- it -- it would be --
 03 you know, one of the requirements for the AMF
 04 system are such that if you lose power to the
 05 surface, if you lose power to the surface,
 06 you're not going to be able to get any -- any
 07 indications back from the system.
 08 Q. I know, but I'm trying to figure
 09 out -- I don't know when I lost hydrostatic
 10 head pressure, so I don't know when the AMF
 11 fired, correct?
 12 A. I mean -- right. But we just
 13 know that that's one of the conditions that's
 14 required to meet it.
 15 Q. And you would not necessarily
 16 lose hydrostatic head pressure just because
 17 the MUX cables blew up, correct?
 18 A. Correct.
 19 Q. Okay. And you would not
 20 necessarily lose hydrostatic head pressure
 21 just because you lost conduit pressure --

Page 438:23 to 441:15

00438:23 Q. -- correct?
 24 A. That's correct.
 25 Q. Okay.
 00439:01 A. Correct.
 02 Q. Now, you would -- if I've
 03 understood your testimony, you would lose
 04 communication between the pods if you lost
 05 the MUX cables?
 06 A. Well, if -- if you lost the MUX
 07 cables, more than likely, you've had some
 08 sort of parting of the risers, so you're
 09 going to lose conduit pressure as well, and
 10 that would -- that would satisfy the
 11 conditions for an AMF.
 12 Q. Okay. Because that would sense
 13 it as loss of communication between the pods?
 14 A. Well, you would -- if you lost

15 both MUX cables and if you lost the conduit
 16 pressure, that would -- and then, of course,
 17 you would lose communication between the pods
 18 if you lost both MUX cables. But three
 19 conditions would be satisfied, and the AMF
 20 would -- would trigger.

21 Q. Well, when would you lose
 22 hydrostatic head pressure? You don't know?

23 A. I mean, that's -- the conditions
 24 is, there has to be a differential between
 25 conduit pressure and hydrostatic pressure. I
 00440:01 mean, that would be satisfied if you had a
 02 parting of the riser.

03 Q. Well, that would be satisfied if
 04 you lost conduit pressure integrity at the --
 05 at the transducer at the pod? That's where
 06 your measuring, is at the pod, right?

07 A. Sure. But that -- that pressure
 08 is -- goes all the way back up to the -- you
 09 know, goes through the riser.

10 Q. Okay. Okay. Then when we go
 11 through this, down below it says, recommended
 12 course of action.

13 And this is talking about, the
 14 battery system is obsolete, right?

15 A. It says --

16 Q. September 8th, 2004, the battery
 17 system is obsolete, correct?

18 A. Due to obsolescence of the AMF
 19 lithium battery, the placement, and here is a
 20 listing of the -- of the parts that you need
 21 -- well, actually, it's telling you that the
 22 parts that are obsolete are the following.

23 Q. Right. And then it says Cameron
 24 engineering -- bottom of page 1, Cameron
 25 engineering, working with the new
 00441:01 manufactured -- new battery manufacturer came
 02 up with a nine-volt battery that would be
 03 used to make up the SEM nine-volt and 27-volt
 04 requirement, correct?

05 A. Correct.

06 Q. Is that true? Did Cameron
 07 engineering come up with this solution?

08 A. Yes, that is true.

09 Q. Okay. The -- and then did --
 10 and I assume you sold one of these new
 11 systems to Transocean?

12 A. I -- I don't know how many or
 13 when they were sold, but I'm -- probably
 14 pretty good -- generally speaking, I would
 15 say yes.

Page 442:14 to 443:17

00442:14 Q. Sure. What training did Cameron

15 offer in connection with this? Did Cameron
 16 try to train Transocean or BP in the -- how
 17 this should be used?
 18 A. I -- I don't recall.
 19 Q. What warnings do you get with
 20 it? When you sold the new system, did you
 21 give any instructions or warnings other than
 22 this engineering bulletin?
 23 A. Yeah, I don't recall other than
 24 this engineering bulletin. You know,
 25 obviously, you know, we -- we supply a new
 00443:01 system, it's -- it's -- has a maintenance
 02 manuals and --
 03 Q. Other than maintenance.
 04 A. -- operations manual.
 05 Q. Other than maintenance, what
 06 other instruction did you give them on what
 07 the consequences are if you don't change the
 08 batteries?
 09 A. I don't recall other than this
 10 bulletin right here.
 11 Q. Okay. So if I want to look at
 12 all the warnings and all the instructions and
 13 all the limitations that Cameron gave with
 14 respect to the new battery system that
 15 Cameron sold to Transocean around the first
 16 of 2005, all -- all you know that I should
 17 look at is exhibit number 3605, correct?

Page 443:19 to 448:15

00443:19 Q. That's all you know about?
 20 A. I -- I would agree.
 21 Q. Okay. The -- what is EDS-1 and
 22 EDS-2?
 23 A. With regards to DEEPWATER
 24 HORIZON?
 25 Q. Correct.
 00444:01 A. They're emergency disconnect
 02 sequences that are activated from the
 03 toolpusher's or the driller's panel.
 04 Specifically, on the EDS, I don't remember
 05 specifically which one is -- performs the
 06 blind shear and/or which one performs the
 07 casing and/or the blind. I don't remember
 08 specifically on the consequences.
 09 Q. Is that -- is EDS-1 and EDS-2
 10 kind of a common way to reference to that, or
 11 does other rigs use other nomenclatures or
 12 names?
 13 A. It -- it depends on the
 14 customer.
 15 Q. Fair enough. I'm going to talk
 16 about the HORIZON for a second. I will tell
 17 you -- I will refresh your memory, and

18 counsel can correct me if I'm wrong.
19 What was called EDS-1 closed the
20 blind shear rams as well as some associated
21 other lines. Okay? And what -- and then
22 released, I think, the stingers and released
23 the LMRP.
24 A. The connector.
25 Q. Right.
00445:01 A. That sounds -- sounds about
02 right.
03 Q. And EDS-2 on the DEEPWATER
04 HORIZON was set up to close the casing shear
05 rams first and then close the blind shear
06 rams and then release the LMRP. I'm just
07 giving you that for reference.
08 A. You're refreshing my memory.
09 Q. Correct.
10 A. Okay.
11 Q. 'Cause I'm telling you that's
12 what the paperwork says. Okay. Now, given
13 that definition of EDS-1 and EDS-2, I want to
14 ask you a couple of questions.
15 A. Okay.
16 Q. Okay. If EDS-2 was active, you
17 would close the casing shears and then the
18 blind shears, correct?
19 A. As -- yes, as you defined it,
20 yes.
21 Q. And in this particular stack,
22 the casing shear is set below the blind
23 shears, correct?
24 A. I -- I don't remember the exact
25 stack configuration.
00446:01 Q. Okay.
02 A. On a -- but it's -- it's
03 possible it could have been set up that way.
04 Q. Okay. Would the casing shears,
05 if they were closed first, provide protection
06 to the elastomeric elements in the blind
07 shears, or do you know?
08 A. I -- I don't know. I don't have
09 an opinion either way on that.
10 Q. Okay. Now, here's my question:
11 Back in -- back in 1999, when Cameron was
12 sitting down with R&B Falcon and Vastar and
13 BP and selling them a blowout preventer and
14 selling them these control systems, did
15 Cameron ever discuss whether EDS-1 or EDS-2
16 would be better?
17 A. No. I mean, Cameron was --
18 Q. Did --
19 A. -- was just there, you know,
20 to --
21 Q. Sure. Did Cameron provide any
22 training on that?

23 A. I mean, those -- those sequences
 24 were -- were decided by Vastar and R&B
 25 Falcon.

00447:01 Q. I know.
 02 My question becomes, I've seen
 03 documents where Vastar and R&B Falcon gave
 04 certain -- or they were in certain meetings.
 05 I'll let the three of y'all argue who did
 06 what. But my question is going to be on
 07 Cameron.

08 Did Cameron provide any warnings
 09 to R&B Falcon, Vastar, about, gee, if you use
 10 EDS-1 instead of EDS-2, this will be the
 11 danger you're facing? Did Cameron do that in
 12 any meeting you were at?

13 A. I'm -- they may have, but I --
 14 Q. That you remember?

15 A. Yeah, I -- I don't remember
 16 participating in that.

17 Q. Okay. You don't remember
 18 hearing any conversations saying, look,
 19 here's the advantage to EDS-2? You don't
 20 remember any such conversation?

21 A. No. I mean, again, that --
 22 Q. Okay.

23 A. -- sequence is generally decided
 24 by the customer. R&B Falcon and -- and --
 25 and Vastar.

00448:01 Q. And you don't know of any
 02 advantage? You, one of the two engineers who
 03 was hired to help on this rig, configure it
 04 and sell it, you don't know of any advantage
 05 of EDS-2 over EDS-1?

06 MR. JONES: Object to form.

07 A. That's -- that's not my area of
 08 expertise, so I wouldn't be able to comment
 09 about the preventers.

10 Q. I'm not faulting you for it.
 11 I'm -- I may or may not fault Cameron for it,
 12 but I'm not faulting you.

13 But I'm -- I'm asking you,
 14 Richard Coronado, have any knowledge of any
 15 advantage that EDS-2 gives over EDS-1?

Page 448:17 to 448:18

00448:17 A. Again, I -- I wouldn't have any
 18 knowledge of that.

Page 453:25 to 454:25

00453:25 Q. Speaking of that, this
 00454:01 particular rig -- I'm going switch subjects.
 02 This particular rig did not -- the

03 DEEPWATER HORIZON did not have an acoustic
04 system, correct?
05 A. You are correct. To my
06 knowledge, it did not have an acoustic
07 system.
08 Q. Now, as I understand, Cameron
09 does sell acoustic systems and did back then,
10 correct?
11 A. Yes, it did.
12 Q. And you sold several, right?
13 A. In this -- in this -- for the
14 Mark III system, we've sold some, yes.
15 Q. You sold some for the Mark II
16 also? No?
17 A. I do recall a few systems, but
18 it -- compared to this latest bill cycle, we
19 sold -- it seems like I recall selling more
20 on this bill cycle.
21 Q. Sure. On this bill cycle, since
22 the DEEPWATER HORIZON accident, Cameron's
23 business has actually went up, hasn't it?
24 A. I -- I do not know. I do not
25 know.

Page 456:11 to 459:22

00456:11 Q. Yeah. I will tell you, you've
12 answered Cameron, the lawyers. And I'm sure
13 their client, with their cooperation, the
14 answer written interrogatories in this case,
15 it says acoustic systems were for sale by
16 Cameron in 1998 and '99.
17 Does that fit your memory?
18 A. Yes.
19 Q. Okay. Has -- and as a matter of
20 fact, every blowout preventer that's in the
21 North Sea is required to have an acoustic
22 control system, correct?
23 A. That's not the only one. I
24 believe Brazil also requires an acoustic
25 system.
00457:01 Q. I'm going to get there next.
02 But the North Sea requires it,
03 don't they?
04 A. I seem to recall that it -- I
05 believe it does, yes.
06 Q. And Petrobras, the national oil
07 company of Brazil requires acoustic system
08 for every oil well drilled off the coast of
09 Brazil?
10 A. I seem to recall that it's
11 required in Brazil as well, yes.
12 Q. All right. Would Cameron sell a
13 system that it thought was a bad system?
14 A. No.

15 Q. Okay. Have y'all had good luck
16 with the acoustic systems?

17 A. I -- I mean, generally speaking,
18 the acoustic system is -- is designed by
19 others. I -- I do not get involved with
20 the -- I do not know the performance of it.

21 Q. Well, you tell me: Have you
22 heard about any complaints in terms of the
23 performance of the acoustic systems?

24 A. I mean, I've -- I've -- I can't
25 say one way or the other.

00458:01 Q. Okay. You're not aware of any
02 complaints?

03 A. I'm not aware of any complaints.

04 Q. And y'all have sold several
05 acoustic systems?

06 A. We've sold acoustic systems,
07 yes.

08 Q. Okay. As I understand, acoustic
09 systems could be programmed so that they are
10 a primary control system or a backup control
11 system.

12 Do I understand that correctly?
13 'Cause I'm about to ask you
14 which one y'all sold.

15 Do you sell them as primaries or
16 backups?

17 A. Yeah, to my knowledge, I believe
18 we sell them as -- as backup systems.

19 Q. Right. Which means if you lose
20 the MUX cables, an acoustic system would be
21 available to still activate the blowout
22 preventer, correct?

23 A. If -- if the acoustic system
24 was -- was designed that way, if that was one
25 of the functions, then, yes, you could

00459:01 operate -- you could use the acoustic system
02 and if the -- you operated the acoustic
03 system per their manufacturer's
04 recommended -- per their manual and per their
05 operating procedures.

06 Q. Right. So -- well, isn't that
07 generally why they're sold, as an emergency
08 backup system in case the rig operator -- in
09 case the rig controls don't work?

10 A. As a backup control system?

11 Q. Right.

12 A. Yes.

13 Q. Okay. As far as you know, you
14 haven't heard anything extraordinarily bad
15 about the acoustic systems that Cameron
16 sells?

17 A. I mean, we sell two, maybe even
18 three, types of acoustic systems -- acoustic
19 systems, but I haven't heard anything

20 that's --
21 Q. Negative about them?
22 A. Right.

Page 460:13 to 464:24

00460:13 (Exhibit Number 8051 marked.)
14 Q. Exhibit 8051 is one of those
15 exhibits -- one of those meeting minutes from
16 1999 where you attended a meeting, right?
17 A. Yes.
18 Q. Do you actually notice that your
19 name is on there and also little checkmarks
20 by your name showing you actually attended,
21 correct?
22 A. Correct.
23 Q. Would you turn to page 2 of
24 exhibit 8051 and look at item number 13?
25 It says, RBF will check with ABS
00461:01 to confirm the fact that DMS will substitute
02 for acoustic system. No answer yet.
03 Did I read that correctly?
04 A. Yes.
05 Q. Okay. RBF, of course, is R&B
06 Falcon, correct?
07 A. Correct.
08 Q. ABS, as we know, is the American
09 Bureau of Shipping?
10 A. Correct.
11 Q. And DMS is the deadman system?
12 A. Yes.
13 Q. Okay. So what somebody was
14 talking about not using -- okay. Here is the
15 first question: Obviously, the discussion of
16 an acoustic system came up on June 30th,
17 1999, correct?
18 A. Correct.
19 Q. Okay. What do you remember
20 telling them about whether they should have
21 it or not?
22 A. I don't recall if I had any
23 input or not. That -- that looks like that
24 could be an R&B Falcon action.
25 Q. I know. I'm asking about
00462:01 Cameron. It looks like R&B Falcon is going
02 to do something. So now I want to ask about
03 Cameron.
04 What did Cameron tell them as to
05 whether this was a good idea or bad idea?
06 A. I -- I don't recall.
07 Q. Well, do you recall any Cameron
08 employee talking to them saying, look, the
09 acoustic system will give you a backup in
10 case you lose MUX control, that way you still
11 can activate the blowout preventer? Did you

12 tell them that?
13 A. Well, again, you know, the
14 optional -- it's an optional safety system.
15 That's an option per API 16D.
16 Q. And I want to know, did you tell
17 them that?
18 A. We may have told them it was an
19 optional system per API 16D.
20 Q. Okay. What did you tell them?
21 Did you recommend it?
22 A. It's -- excuse me -- it's up to
23 the customer.
24 Q. Did you say to them, gee, if you
25 lose your MUX cables but you don't meet these
00463:01 others conditions, you're not going to have
02 the ability to operate the blowout preventer
03 but the AMF's not going to fire? Did you
04 tell them anything like that?
05 A. No. I don't recall that, no.
06 Q. Okay. I guess that would be one
07 of the advantages of an acoustic system, huh?
08 A. If your acoustic system was
09 properly maintained and operated, if you lost
10 the MUX cables and -- you could use your
11 acoustic system, yes.
12 Q. Well, let me ask you this --
13 let's see if I can phrase it this way: If
14 you lose the MUX cables, you do not have
15 operator control of the blowout preventer,
16 correct?
17 A. Both MUX cables?
18 Q. Uh-huh.
19 A. Yes. But the conditions for the
20 deadman would also be satisfied. If you lost
21 your MUX cables, you would also lose your --
22 your pressure and your rigid conduit and that
23 would also -- depending on the sequence --
24 would, you know, close the blind shear.
25 Q. I'm -- I'm asking a slightly
00464:01 different question. If you lose the MUX
02 cables but you don't lose hydraulic power,
03 then the AMF will not trigger, correct?
04 A. Correct.
05 Q. And if that happens, you've lost
06 operator control of the blowout preventer,
07 correct?
08 A. I do not --
09 Q. If you lose the MUX cables --
10 A. You've lost electrical power,
11 yes. But if you still have hydraulics, I --
12 Q. How are you going to operate the
13 BOP when you have hydraulic but no electrical
14 power? Can you operate the BOP?
15 A. I'm not sure.
16 Q. Really? Okay. You're saying

17 you don't know, as a control systems
18 engineer, if you lose both MUX cables but
19 don't lose hydraulic pressure, can you
20 operate the BOP? Or do you know?
21 A. No opinion either way on --
22 Q. All right. Okay. What planning
23 did Cameron Ironworks do for that
24 contingency?

Page 465:01 to 466:09

00465:01 A. I'm -- I'm not aware.
02 Q. Okay. Not aware of any planning
03 for that contingency?
04 A. I have no opinion either way.
05 Q. All right. You do agree it's
06 possible you could lose both MUX cables and
07 not lose hydraulic integrity?
08 A. If you had a parting of the
09 riser, highly unlikely.
10 Q. I didn't ask about a parting of
11 the riser. I said you could lose both MUX
12 cables and not lose hydraulic integrity;
13 isn't that true?
14 A. Highly -- highly unlikely.
15 Q. But it's possible?
16 A. Very low probability.
17 Q. Okay. You've never studied the
18 probability of it, in fairness, correct?
19 A. Well, in fairness -- that would
20 be very low probability, so --
21 Q. Have you ever studied the
22 probability of that happening?
23 A. No, I've never studied it.
24 Q. Okay. Okay. Did Cameron do any
25 planning for that occurrence?
00466:01 MR. JONES: Object.
02 Q. That you know of?
03 MR. JONES: Object to form.
04 A. I have no opinion either way on
05 that.
06 Q. And none that you know of, none
07 that you can tell me about?
08 A. I have no opinion either way on
09 that.

Page 478:04 to 478:23

00478:04 First of all, do you -- is it
05 your opinion that the BOP, as it was
06 configured on the DEEPWATER HORIZON, was the
07 best and safest technology available for
08 subsea deepwater drilling at the time it was
09 manufactured?

10 A. Yes.
11 Q. Is it your opinion that the BOP,
12 as it was configured on the DEEPWATER
13 HORIZON, was the best and safest technology
14 available for subsea deepwater drilling at
15 the time of the blowout on April 20th, 2010?
16 A. Yes.
17 Q. Is it your opinion that the BOP,
18 as it was configured on the DEEPWATER
19 HORIZON, was the best and safest technology
20 available for subsea deepwater drilling
21 now -- or is it the safest and best available
22 technology now?
23 A. Yes.

Page 479:19 to 479:22

00479:19 Q. And the solenoid valves, how are
20 they different from the Mark II?
21 A. The Mark III has single-coil
22 solenoid valves.

Page 480:03 to 481:05

00480:03 Q. And we have also discussed that
04 the Mark III system has rechargeable
05 batteries, correct?
06 A. For the AMF -- optional AMF
07 system, yes, it has rechargeable batteries.
08 Q. Okay. And does it also have
09 real-time monitoring?
10 A. Yes. It also monitors some
11 parameters of those rechargeable batteries,
12 yes.
13 Q. The Mark II system did not have
14 rechargeable batteries, correct?
15 A. Correct. Right.
16 Q. And the Mark II system did not
17 have real-time monitoring available, correct?
18 A. It -- it had the ability to
19 monitor it on the -- on the topside, but it
20 did not have real-time monitoring.
21 Q. When the BOP was subsea?
22 A. Right.
23 Q. Okay. What is -- or is there an
24 advantage to having rechargeable batteries?
25 A. If -- if the customers, you
00481:01 know, so desire that, the feature of the
02 rechargeable batteries, and -- and remote
03 monitoring, I mean, they can -- they can opt
04 for that system. I mean, both systems
05 perform their intended functions.

Page 482:10 to 487:25

00482:10 Q. Okay. Is it your opinion that
11 rechargeable batteries are better than
12 non-rechargeable batteries?
13 A. When used appropriately and per
14 our recommended guidelines, both batteries
15 will do their intended functions.
16 Q. Okay. But will -- but are
17 non-rechargeable batteries better?
18 A. I have no opinion on that.
19 Again, from my statement, it's -- what the
20 customer intends to use it for, if he's
21 comfortable with rechargeable batteries
22 and -- and follows our recommended guidelines
23 and that's suitable for them, he can use
24 those.
25 If he's -- obviously, there's a
00483:01 lot of our Mark II systems out in the field
02 as well. If he's comfortable with that
03 particular system, some customers are
04 comfortable with that particular system and
05 they use it to -- to do its intended
06 function.
07 Q. But you've never had a customer
08 come to you and say, I want the -- the Mark
09 III control system but I want it with
10 non-rechargeable batteries?
11 A. Not to my knowledge.
12 Q. And if that had happened, would
13 you know about it?
14 A. Good possibility I would, yes.
15 Q. We talked a little bit earlier
16 about Transocean approaching Cameron back in
17 2005 -- I'm sorry, 2009. No, actually
18 2005 -- about changing two rechargeable
19 batteries on the Mark II.
20 Do you recall that?
21 A. I do -- I do recall about that.
22 Q. Do you recall any companies
23 other than Transocean approaching Cameron and
24 asking about the availability of rechargeable
25 batteries on the Mark II system?
00484:01 A. I can't recall any other
02 customers.
03 Q. Okay. What are the -- are there
04 any advantages in your mind to rechargeable
05 batteries?
06 A. Again, it's -- it's up to, you
07 know, the customer, how he -- how he feels
08 with respect to rechargeable batteries. If
09 that -- if the rechargeable batteries are --
10 meet his needs with respect to his -- to his
11 rig, then he can use rechargeable batteries.
12 If he feels comfortable with the Mark II

13 system, he can use the Mark II system.
14 And if he follows our
15 recommended operations and -- and maintenance
16 for those batteries, he can use those as
17 well.
18 Q. But if a customer needs a new
19 control pod, he can't get non-rechargeable
20 batteries anymore, correct?
21 A. Again, we haven't had a customer
22 ask for that yet. But that would have to be,
23 again, looked at it from an engineering
24 perspective. At the moment, we offer the
25 Mark III with rechargeable batteries.
00485:01 Q. Doesn't Cameron typically sell
02 equipment that it believes is safe -- safe
03 and reliable?
04 A. Yes. Per -- per API 16D, yes.
05 Q. Okay. Only per API 16D, or safe
06 and reliable in general?
07 A. Safe and reliable in general.
08 Q. When Cameron replaces one
09 technology with another, isn't that generally
10 because it's considered an enhancement?
11 A. Not generally. As I -- as I
12 mentioned previously, we had to replace
13 the -- or the processors wind of life for the
14 Mark II so we had to find an alternate
15 replacement. And so at that particular point
16 in time we opted to go to a -- to another --
17 we had to go to another processor because the
18 original ones were not offered and they were
19 not going to be offered anymore.
20 Q. And were the -- those processors
21 not being offered anymore because there was
22 better technology available?
23 A. I'm -- I'm not sure. I'm not
24 sure.
25 Q. In your opinion, is the Mark III
00486:01 a better control system than the Mark II was?
02 A. Again, Mark III has a -- you
03 know, some customers may want the Mark III
04 for its features and they may prefer to use
05 the Mark III, versus some customers may
06 prefer to use the Mark II. It would depend
07 on the customer.
08 Q. Yeah. Putting aside the idea of
09 customer preference and -- and what the
10 customer is looking for, you, as a Cameron
11 engineer, do you believe that the Mark III
12 system is a better system than the Mark II?
13 A. Again, both systems -- it
14 depends on what the customer prefers. I
15 mean, both systems do their intended
16 function. I -- I feel that both systems
17 would depend on what the customer wants

18 and -- and what he feels he could -- he could
19 maintain or how he could maintain that system
20 and he feels comfortable with it. That's the
21 system we could -- we could provide him.
22 Q. Except you can't provide him
23 with a Mark II system anymore?
24 A. Because of the processors,
25 that's correct.
00487:01 Q. Okay. So -- so is it your
02 testimony, then, that the Mark III system
03 is -- that -- that Cameron has replaced the
04 Mark II system with the Mark III system and
05 they're just essentially the same?
06 A. They function the same, yes.
07 Q. Okay. What about --
08 A. Their intended -- their intended
09 purpose is the same.
10 Q. Their intended purpose is the
11 same?
12 A. Yes.
13 Q. I'm sorry.
14 A. Of course, Mark III has features
15 that the Mark II does not, and vice versa.
16 And that would be customer, which one he
17 prefers to use. There's still Mark II
18 systems out there that are -- they're being
19 used, so --
20 Q. What is the approximate lifespan
21 of a Mark II system?
22 A. I'm not sure. I -- I know of
23 systems that -- of a Mark I that were
24 designed before I started working at Cameron
25 that are still operational today.

Page 490:06 to 492:14

00490:06 Q. Okay. All right. In your
07 binder in front of you, if you could flip to
08 tab 3. And this is an exhibit that's already
09 been marked as exhibit 3344. And have you
10 seen this PowerPoint before? It's entitled
11 performance through leadership, Transocean
12 Mark I/II upgrade, March 18, 2009, Houston,
13 Texas.
14 A. Yeah. I think I've seen it
15 before, yes.
16 Q. Okay. Do you remember in what
17 context you've seen this?
18 A. Well, I saw it earlier when I --
19 when, I believe, Mr. Williams was -- was
20 asking me questions with regard to it.
21 Q. Uh-huh.
22 A. And I may have actually seen it
23 before. I think this is maybe one -- you
24 know, as I mentioned before, a comparison

25 between a Mark II and a Mark III system.

00491:01 Q. Okay. Do you recall if you saw
 02 this prior to preparing for your deposition?
 03 A. I don't specifically recall this
 04 particular document, but I -- I may have seen
 05 it.

06 Q. Were you aware of any
 07 discussions between Transocean and Cameron in
 08 the 2009 time frame regarding upgrading to a
 09 Mark III system for the DEEPWATER HORIZON?

10 A. I'm sorry, can you ask your
 11 question again?

12 Q. Uh-huh. Are you aware of any
 13 conversations or discussions between
 14 Transocean and Cameron in the 2009 time frame
 15 regarding upgrading to a Mark III system for
 16 the DEEPWATER HORIZON?

17 A. No, I don't recall any
 18 conversation with regard to DEEPWATER
 19 HORIZON.

20 Q. Okay. Are you aware of any such
 21 conversations relating to any Transocean rigs
 22 with a Mark II or Mark I system?

23 A. For some reason, I think I seem
 24 to recall some -- some possible -- maybe a
 25 quote -- I don't -- I don't remember
 00492:01 specifically which rig.

02 Q. Okay. But that was, as far as
 03 you recall, between Cameron and Transocean?

04 A. Yes. Yes.

05 Q. And it was a quote relating to
 06 an upgrade of the Mark III -- or upgrade to
 07 the Mark III?

08 A. To the Mark III, yes.

09 Q. Okay. If you flip back, it's
 10 double sided but it's one, two, three, four,
 11 five, six -- about the ninth or tenth page
 12 in. And the title of this slide is Mark III,
 13 the MUX section. I'm sorry, the pages aren't
 14 numbered.

Page 492:17 to 503:21

00492:17 A. Okay.

18 Q. Yep. There we go.

19 The first bullet says,
 20 completely repackaged for ease of
 21 maintenance.

22 Would you consider the complete
 23 repackaging for ease of maintenance an
 24 improvement on the Mark III system?

25 A. I don't remember specifically
 00493:01 what this in -- was in reference to as far as
 02 maintenance is concerned. Yeah, I don't
 03 remember specifically what they were talking

04 about with regards to maintenance.

05 Q. But wouldn't improving the ease
06 of maintenance be considered an improvement?

07 A. I mean, it could be considered
08 an improvement, but it just -- you know,
09 what -- you know, what the customer desired,
10 what he was -- what he was comfortable with.

11 Q. So are you saying that -- that
12 some of your customers may prefer less easily
13 maintained equipment?

14 A. Some customers may be
15 comfortable with equipment that they have,
16 you know, Mark I, Mark II. They're familiar
17 with it, they -- they -- they know how it
18 operates, they, you know, have -- have spare
19 parts. So they -- yeah, they may be
20 comfortable with a Mark I, Mark II system.

21 Q. Okay. So -- so the statement
22 completely repackaged for ease of maintenance
23 does not, to you, imply any sort of advantage
24 of the Mark III over the Mark II?

25 A. It -- it would just, you know,
00494:01 depend on what the customer -- how he views
02 that, you know, ease of maintenance.

03 Q. Okay. Do you consider this --
04 this slide with these bullet points -- would
05 you consider these to be selling points of
06 the Mark III MUX section?

07 A. You know, if the customer
08 desired some of these features of the -- you
09 know, of the -- of the Mark III MUX section,
10 you know, he -- he could be -- you know,
11 these things may be of interest to him if,
12 you know, when compared to a -- to a Mark II
13 system.

14 Q. But the fact that these --
15 these -- how -- how many are there? Six.
16 These six items are pulled out and put in a
17 slideshow to emphasize their availability,
18 that, to you, does not imply that that's an
19 enhancement or an improvement over the
20 previous system?

21 A. It's just a -- it's just
22 comparison, it looks like.

23 Q. Okay. If you would, flip to
24 tab 5 in your binder. Or, I'm sorry, four
25 and five. Four is going to be the cover

00495:01 e-mail.

02 And you are listed as a
03 recipient on this e-mail. The Bates number
04 is CAM_CIV_0308880 going through 8888.

05 And the title of the e-mail is
06 Queiroz Galvao meeting summary. Does this
07 sound familiar to you? Do you remember this
08 e-mail? I'm sorry. It's -- the e-mail is at

09 tab 4.
10 MR. JONES: Oh, okay. Got it. Thanks.
11 MS. CHANG: Got it?
12 A. If I remember -- if I recall,
13 apparently there was some customers going to
14 be coming in and they were going to give them
15 a presentation. Yeah, there were going to be
16 some discussions, it looks like, on the -- on
17 the Mark III and the -- and the Mark II
18 system.
19 Q. Were you involved in those
20 discussions?
21 A. I don't remember specifically.
22 I may -- I may have been involved, but I
23 don't remember specifically if I was there or
24 not.
25 Q. Okay. So this is the
00496:01 February 2010 time frame, correct, end of
02 February 2010?
03 A. Yeah. Some -- it looks like
04 from the e-mail, yes.
05 Q. All right. And then if you look
06 at the bottom of the e-mail header, it says
07 attachments, Mark III improvement highlights,
08 January 2010. Do you see that?
09 A. Oh. Okay. Under attachments?
10 Q. Yeah.
11 A. Yes.
12 Q. Okay. So if you flip to tab 5,
13 the PowerPoint behind that is entitled Mark
14 III system improvement highlights, correct?
15 A. Correct.
16 Q. Dated January 2010?
17 A. Correct.
18 Q. Okay. So this is the attachment
19 to your prior -- or the prior e-mail,
20 correct, as far as you can tell?
21 A. It does seem to have a little
22 bit more pictures and -- it looks like more
23 or less the -- more or less the -- yeah, it
24 looks to have more pictures and it looks to
25 have more or less the same -- the same stuff
00497:01 on there.
02 Q. As the -- the presentation that
03 we were just looking at before, right? The
04 33 --
05 A. Right.
06 Q. -- 44, I believe it was. Okay.
07 But this is the presentation that was
08 attached to the e-mail of February 2010 that
09 we just looked at, correct?
10 A. Right.
11 Q. Okay. Do you recall looking at
12 this presentation at the time or at -- or
13 near the time you received it in

14 February 2010?

15 A. I can't -- I can't recall. I
16 can't recall if I actually looked at this.
17 Some of this -- some of this is obviously
18 taken from the -- from the original. But
19 some of it looks to be -- looks to be
20 different.

21 Q. Okay. And you see on the first
22 page the title of the presentation. And what
23 is that?

24 A. It's Mark III system improvement
25 highlights.

00498:01 Q. Okay. System improvement, does
02 that, to you, imply that the Mark III was an
03 enhanced system?

04 A. Well, again, they're making a --
05 making a comparison between the -- you know,
06 more than likely a comparison between our
07 Mark -- you know, Mark III and Mark II
08 system, or listing the features of it.

09 I mean, through the, you know,
10 evolution of technology one of the -- one of
11 the things that we've done on the Mark III
12 system that's -- that -- is replaced the
13 panel with touch panels. And, you know,
14 that's -- that's added -- as a result of --
15 of changing to that technology, the touch
16 panel, that's -- that's added some ability to
17 change or to add functions, a little easier
18 as compared to -- to a hard wired panel.

19 So -- but with the -- with the
20 change in technology, some things may have
21 improved, like I just mentioned, the touch
22 panels.

23 Q. Okay. So with the change of
24 technology, what other components of the Mark
25 III system have improved over the Mark II?

00499:01 A. Well, the touch screens, as I
02 just mentioned. You know, the -- that's
03 allowed us to -- to be a little bit more
04 flexible with our -- with our software. And
05 the -- not as much hardware is required to --
06 to add functions or change functions on the
07 driller's and toolpusher's.

08 As far as other improvements
09 with technology, you know, I'm not sure. I'm
10 sure there's probably some more in there that
11 I just -- I may not even be aware of.

12 Q. So is it your understanding from
13 this presentation that the -- the -- the
14 purpose of this presentation is to highlight
15 Mark III system improvements based on the
16 title of the presentation?

17 A. Well, it's a Mark III system.
18 Mark III system, you know, improvements. But

19 again, I -- I think it's a comparison between
20 the Mark II and a Mark III system.

21 Q. Okay. So this is highlights of
22 Mark III system improvements over the Mark II
23 system, correct?

24 A. Yeah. With the evolution of --
25 of technology and also, as I stated before,
00500:01 with the -- the comparisons between a Mark
02 III and a Mark II system.

03 Q. Okay. So -- and again, these
04 pages are not numbered. I apologize. And a
05 lot of them look alike.

06 But it -- we're about seven
07 pages back. And it's the second slide after
08 the pictures of the two pods.

09 A. This one right here? I think
10 so, yeah.

11 Q. Yes.

12 A. Which picture, this one or this
13 one?

14 Q. Yes. Yes. This one.

15 A. Okay.

16 Q. I'm sorry.

17 In the upper left-hand corner it
18 says, Mark III model 80 and model 120 (shown)
19 were developed to incorporate lessons learned
20 and enhance reliability.

21 Do you see that?

22 A. Yes.

23 Q. And do you agree with that
24 statement?

25 A. Well, as I mentioned before,
00501:01 the -- the evolution of -- of technology,
02 you -- you could have improved some things
03 with just the improvement of technology,
04 using different components. The example I
05 gave before, using touch panels versus push
06 button panels, so --

07 Q. And the Mark III incorporated
08 lessons learned and enhanced reliability over
09 the Mark II system, correct?

10 A. Well, in -- in general, whether
11 it's a Mark I or Mark II, we try to
12 incorporate lessons learned on any system.

13 Q. And you try to improve a system
14 from one generation to the next, correct?

15 A. If the hardware -- if the
16 evolution of hardware and the improvement of
17 hardware that I just may be -- just because
18 we've selected different hardware, that may
19 be an improvement.

20 Q. All right. If you flip two
21 pages back.

22 A. Back.

23 Q. Or forward.

24 A. Oh. Which one is it?
25 Q. It's the slide called Mark III
00502:01 MUX section.
02 A. Okay.
03 Q. Okay. And one of the items
04 highlighted at the bottom in the last bullet,
05 rechargeable batteries for AMF/deadman
06 system?
07 A. Uh-huh.
08 Q. Correct?
09 So that is also one of the
10 highlights of the system improvements over
11 the Mark II; is that correct?
12 A. You know, again, that's -- you
13 know, based on the -- the systems that we
14 have sold with rechargeable batteries, what
15 our customers wanted or -- or desired. So
16 that's what we've installed in the Mark III.
17 Q. But this is Cameron, correct,
18 acknowledging that the rechargeable batteries
19 for the AMF/deadman system are a system --
20 are an improvement over the Mark II system,
21 correct?
22 A. Again, it would depend on -- on
23 the customer's needs and what he desires and
24 what he -- he feels is needed for his
25 drilling operation.
00503:01 Q. So the fact that this bullet
02 point, rechargeable batteries for AMF/deadman
03 system, is in a presentation entitled Mark
04 III system improvement highlights, that, to
05 you, does not imply that Cameron thinks that
06 the rechargeable batteries are an
07 improvement?
08 A. That's -- that's a feature of
09 the Mark III system as it stands right now.
10 I mean -- I mean, it could be possible that a
11 customer could ask for non-rechargeable
12 batteries, but that's as it -- as it's
13 offered right now.
14 Q. And the Mark III's been
15 available since 2005; is that correct?
16 A. Roughly, yes.
17 Q. Okay. And so in the last, what,
18 six years, nobody has requested
19 non-rechargeable batteries for the Mark III,
20 correct?
21 A. To my knowledge, no.

Page 504:09 to 504:09

00504:09 Exhibit number -- exhibit 8036. It's already

Page 504:11 to 504:13

00504:11 On page 11, you're talking about
12 the rechargeable AMF batteries with realtime
13 remote monitoring capability?

Page 504:19 to 504:25

00504:19 find it. The -- the last lines on the page,
20 the rechargeable AMF batteries, you say that
21 the system, quote, may not be as appropriate
22 for some Cameron customers as the MK II in
23 its current configuration?
24 Is that --
25 A. Right.

Page 505:03 to 505:25

00505:03 Q. When you refer to the Mark II's
04 current configuration, what are you referring
05 to?
06 A. Mark II with the
07 non-rechargeable batteries.
08 Q. Okay. So this is just a
09 distinction between rechargeable versus
10 non-rechargeable, correct?
11 A. Correct.
12 Q. Okay. So current configuration
13 was what was in the DEEPWATER HORIZON at the
14 time of the explosion?
15 A. Mark II with non-rechargeable
16 batteries, yes.
17 Q. Okay. Would rechargeable
18 batteries ensure that the batteries are
19 properly charged at all times?
20 A. I'm sorry. Ask your -- ask your
21 question again.
22 Q. Yeah. The -- having
23 rechargeable batteries in the control system,
24 would that ensure that the batteries are
25 properly charged at all times?

Page 506:02 to 508:08

00506:02 A. Yeah, I'm not -- I'm not --
03 perhaps -- maybe ask the question in a
04 different way, perhaps.
05 Q. Okay. If you would flip to
06 tab 6 in your binder. And that document has
07 previously been marked exhibit 7576.
08 A. Okay.
09 Q. And it's entitled MK III AMF
10 battery technical description.
11 A. Okay.
12 Q. And it's dated July 6th, 2010.

13 Do you recall if you've seen
 14 this document before?
 15 A. I think I seem to recall this --
 16 this document, yes.
 17 Q. Okay. If you would flip to
 18 page 6 of 22, the last four Bates numbers are
 19 8031.
 20 A. Okay.
 21 Q. All right. Under 3.4, lifetime
 22 and storage.
 23 Do you see where I am?
 24 A. Yes.
 25 Q. Okay. It says, the batteries
 00507:01 degrade, in parens, lose charged capacity,
 02 end parens, at a slow rate that depends
 03 mainly upon voltage and temperature. The
 04 Lithium ion cells used in the AMF batteries
 05 can be expected to last for years, if handled
 06 properly.
 07 And it goes on to say, the
 08 battery should be protected from high
 09 temperatures and shock and should be checked
 10 every 6 to 12 months to maintain an
 11 acceptable indicated capacity.
 12 Correct?
 13 A. It's per the document, yes.
 14 Q. Okay. Do you agree with these
 15 statements?
 16 A. Yes.
 17 Q. If you go up to 3.2, features of
 18 the rechargeable battery, the first sentence
 19 says, in order to avoid the major drawbacks
 20 of primary batteries, the Mark II pods
 21 include a rechargeable Lithium ion battery
 22 pack.
 23 What is a primary battery?
 24 Well, first of all, do you see
 25 where I was reading from?
 00508:01 A. Yes, yes, yes.
 02 Q. And did I read that correctly?
 03 A. Let me see. I was trying to
 04 find where you were at. Okay. Yeah, at the
 05 top of the -- top of 3.2, features of a
 06 rechargeable battery.
 07 Q. Right.
 08 A. In order to avoid --

Page 508:10 to 515:20

00508:10 Q. Oh, I'm sorry. Let me read that
 11 again.
 12 A. Okay.
 13 Q. In order to avoid the major
 14 drawbacks of primary batteries, the Mark III
 15 pods include a rechargeable Lithium ion

16 battery pack; is that correct?
17 A. Right. That's correct.
18 Q. Okay. Do you know what a
19 primary battery is?
20 A. Typically, my understanding is a
21 primary battery is a non-rechargeable
22 battery; in other words, once you consume it,
23 you can't -- you cannot recharge it.
24 Q. So the battery in the Mark II
25 pod would be a primary battery?
00509:01 A. That is correct, yes.
02 Q. And the following sentence
03 reads, a continuously-operated charger keeps
04 the batteries in a proper state of charge at
05 all times.
06 Did I read that correctly?
07 A. Yes.
08 Q. And what is your understanding
09 of that sentence?
10 A. My understanding is that there's
11 a charger that -- that is mounted -- or is
12 part of the rechargeable battery that keeps
13 it charged.
14 Q. Okay. So on the Mark III
15 system, there's a charger that keeps the
16 rechargeable batteries in a proper state of
17 charge at all times, correct?
18 A. Uh-huh.
19 Q. Is that true of the batteries on
20 the Mark II system?
21 A. Well, no, the batteries in the
22 Mark II system, again, are -- are
23 non-rechargeable. But, if I may, the --
24 the -- you know, both systems, the Mark II
25 with non-rechargeable batteries and -- and
00510:01 the Mark III system with rechargeable
02 batteries, you know, they -- they both have
03 their -- you know, if -- if properly operated
04 and maintained, then they can do their
05 intended function.
06 Some customers may prefer the
07 features of the rechargeable batteries and
08 some customers may prefer the features of the
09 Mark II.
10 Q. Understood.
11 But as far as the advantages of
12 a rechargeable battery over a
13 non-rechargeable battery, one is that there
14 is a continuously-operated charger that keeps
15 the batteries in a proper state of charge at
16 all times, correct?
17 A. I mean, that's just a comparison
18 between a Mark III and a Mark II. You know,
19 obviously, we're talking about two different
20 systems here. And one of the -- one of the

21 ways that you have to keep the Lithium ion
22 battery charged is, you have to have a
23 charger.

24 Q. Right. Which comes on the
25 Mark III system, correct?

00511:01 A. Comes on the Mark III system,
02 yes.

03 Q. Okay. 'Cause you wouldn't sell
04 a system with a rechargeable battery that
05 couldn't recharge?

06 A. Right.

07 Q. Okay.

08 A. Unless the customer -- some
09 customers may want that, but not right now.

10 Q. Okay. And another feature of
11 the rechargeable battery, next sentence down,
12 the battery system is -- is designed to allow
13 testing of the battery at any time without
14 interruption of normal operation of the pod.

15 Do you see that?

16 A. Yes.

17 Q. Okay. And the very last
18 sentence in that paragraph, this can be
19 easily and safely done even with the stack on
20 the bottom, correct?

21 A. I see that sentence, yes.

22 Q. Do you agree with those
23 statements?

24 A. Well, again, you know, if
25 properly operated and maintained, the

00512:01 Mark III batteries will -- you know, may
02 be -- as I stated in my report, may be
03 desired by some customers. And some
04 customers, again, may desire the Mark II. So
05 both systems, you know, have their purpose.
06 They -- they function as -- as intended.

07 Q. I understand that they function
08 as intended, but that really wasn't my
09 question.

10 What I'm trying to get at is
11 simply whether or not you agree with the
12 statement in the second paragraph of 3.2,
13 which is, the battery system is designed to
14 allow testing of the battery at any time
15 without interruption of normal operation of
16 the pod.

17 Do you agree with that?

18 A. I think -- no, no, I don't agree
19 because you would have to do -- in order to
20 accomplish some sort of testing, I think you
21 would have to -- if you wanted to operate the
22 pod, you would -- you would have to not --
23 not operate any other functions until you did
24 that testing.

25 Q. Do you agree with the last

00513:01 sentence of that paragraph, this can be done
02 easily -- or this can be easily and safely
03 done even with the stack on the bottom?
04 A. It -- it could be done with the
05 stack on the bottom. As far as safe --
06 safely, that would have to be up to the
07 operator to do whatever steps are necessary
08 to make sure that everything was secure
09 before they did that test.
10 Q. Okay. And just to be clear,
11 then, this that we're talking about is
12 testing the battery on the Mark III system,
13 correct?
14 A. Correct.
15 Q. So that -- testing the battery
16 on the Mark III system can be done with the
17 stack on the -- on the bottom, correct?
18 A. If -- if all other safety
19 precautions are taken into account.
20 Q. Is it possible to test the
21 battery of the Mark II system while the stack
22 is on the bottom?
23 A. You -- you could. You could
24 test that system.
25 Q. How would that be done?
00514:01 A. Well, again, it would depend on
02 the system and -- and you'd have to make sure
03 other -- other things are in a safe state or
04 in a safe place. But, I mean, you could
05 satisfy the conditions for the -- you know,
06 for the AMF system by removing power and
07 bleeding off hydraulics to test that on the
08 Mark II system.
09 Q. So the -- the way to test the
10 battery on the Mark II system would be --
11 would be to run the AMF sequence?
12 A. Actually, do the function test,
13 yes.
14 Q. Okay. Is that the only way on
15 the Mark II?
16 A. Yes.
17 Q. Okay. Is there another way to
18 test the battery on the Mark III system other
19 than actually doing a function test of the
20 AMF?
21 A. I'm sorry. You said --
22 Q. I'm sorry, Mark III.
23 A. Mark -- Mark II.
24 Q. On the Mark III system --
25 A. Oh.
00515:01 Q. -- is there a way to test the
02 battery other --
03 A. Oh, okay.
04 Q. -- than doing the function test
05 of an -- of the AMF?

06 A. For the Mark III, you could do
 07 the same function test.
 08 Q. Could you --
 09 A. Do the same function test on --
 10 on a Mark II?
 11 Q. No. I understand you can do the
 12 same function test on Mark II or Mark III.
 13 A. Right.
 14 Q. On the Mark III pod, is there
 15 another way of testing the battery while the
 16 stack is subsea?
 17 A. I think I remember seeing
 18 another -- it may be in this document,
 19 some -- some other way to test the -- test
 20 the batteries.

Page 516:01 to 517:20

00516:01 Q. How does the battery life of a
 02 rechargeable battery compare with the battery
 03 life of a non-rechargeable battery?
 04 A. Well, if -- if -- on the -- on
 05 the non-rechargeable battery for the AMF --
 06 for the Cameron AMF system, we recommend to
 07 replace it after it's been in service, you
 08 know, after a year or 33, you know,
 09 operations, whichever -- whichever comes
 10 first.
 11 On the Mark III, again, you have
 12 to perform different type of maintenance.
 13 You have to make sure that it's -- that it's
 14 still, you know, charging appropriately and
 15 you have to do some different maintenance on
 16 it. But, again, it's -- it's based on our
 17 operation and maintenance procedures.
 18 I don't recall specifically. I
 19 think we -- we may have stated -- if -- if
 20 properly operated and maintained, a
 21 rechargeable battery could -- could last for
 22 a period of time, and I don't remember
 23 specifically what that -- what that number
 24 is.
 25 Q. Is it longer than one year in
 00517:01 service?
 02 A. I believe it is, yes.
 03 Q. Okay. And if you look down on
 04 that same exhibit we were just on, 7576, 3.4
 05 lifetime and storage, the last sentence in
 06 the first paragraph, the Lithium ion cells
 07 used in the AMF batteries can be expected to
 08 last for years if handled properly.
 09 A. Right. Right.
 10 Q. So that's your -- is it your
 11 understanding that the -- the Lithium ion
 12 cells referred to here are the rechargeable

13 batteries --
14 A. Right.
15 Q. -- in the -- in the Mark III
16 system?
17 A. Yes, that is correct.
18 Q. Okay. And they can be expected
19 to last for years if --
20 A. If handled properly.

Page 518:06 to 518:15

00518:06 Q. Are you aware of whether testing
07 of a rechargeable battery degrades the
08 battery?
09 A. Yes, I am -- I am aware of that.
10 Q. Does it?
11 A. Yes.
12 Q. Does it -- does testing of a
13 non-rechargeable battery degrade the battery?
14 A. Yes. It uses up its available
15 capacity.

Page 518:21 to 521:05

00518:21 Q. Do you have an opinion whether
22 testing of a rechargeable battery permanently
23 reduces its capacity?
24 A. Testing -- well, it -- it does
25 affect its capacity, and it does reduce its
00519:01 capacity over a period of time.
02 Q. Is that a permanent reduction?
03 A. I would say -- I would say -- I
04 would say yes.
05 Q. So a rechargeable battery is --
06 A. Every time -- every time you use
07 it and you charge it, it's -- it's going to
08 degrade over a period of time.
09 Q. Okay. If you look at tab 6,
10 where you are already. And it's the page
11 right before that at the bottom of the page
12 under 3.1, history. And it's talking about
13 the previous Cameron AMF systems. And it
14 reads -- and it's referring to the
15 non-rechargeable batteries.
16 The system was simple and
17 reliable, but it had some drawbacks. In
18 particular, the primary batteries are, one,
19 nearly impossible to passively monitor for
20 remaining capacity and, two, any test of the
21 battery permanently reduces its capacity.
22 Is it your understanding that
23 the Mark III rechargeable battery -- the
24 capacity of the Mark III rechargeable battery
25 is also permanently reduced by testing?

00520:01 A. It's going to -- it's going to
 02 affect the capacity. As far as, you know,
 03 how much, I do not know. But it's going to
 04 affect the capacity.
 05 Q. Do you know if it is going to
 06 affect its capacity less than testing on the
 07 non-rechargeable does?
 08 A. Yeah, I don't know, don't know
 09 that.
 10 Q. In your opinion, are there any
 11 advantages to rechargeable batteries?
 12 A. You know, again, if -- if the
 13 customer, you know, desires or wants those
 14 features of -- of rechargeable batteries, the
 15 ability to monitor those rechargeable
 16 batteries, then he can so get that feature,
 17 those rechargeable batteries.
 18 Q. What would those features be,
 19 though, that a customer might want from a
 20 rechargeable battery?
 21 A. Able to -- able to recharge it.
 22 On our present system, we offer the ability
 23 to monitor certain parameters, if -- if he
 24 desires those features.
 25 Q. Would increased lifetime of the
 00521:01 battery be one of those features?
 02 A. It's -- it's possible. If --
 03 Q. And would -- I'm sorry. Go
 04 ahead.
 05 A. -- if the customer desired that.

Page 521:17 to 521:17

00521:17 (Exhibit Numbers 8052 and 8053 marked.)

Page 521:21 to 522:09

00521:21 Q. Okay. Mr. Coronado, let's turn
 22 back to your report, which has already been
 23 marked, and we're going to go to page 12.
 24 At the end of that paragraph, of
 25 the first paragraph, you state, at the end
 00522:01 of -- of a rechargeable battery's useful
 02 life, an inattentive operator might think,
 03 after reviewing battery parameters displayed
 04 by a realtime monitoring system, that his
 05 rechargeable battery was in good shape, only
 06 to see it die before his eyes as soon as he
 07 placed a load on it.
 08 Do you see that?
 09 A. Yes.

Page 522:12 to 522:14

00522:12 Q. And is that still your opinion?
13 A. Yes. For a rechargeable
14 battery, yes.

Page 523:25 to 524:07

00523:25 Q. The concern that you've
00524:01 identified on page 12 of your report
02 regarding an inattentive operator thinking
03 that his rechargeable battery was in good
04 shape, does that -- is that concern a concern
05 that you have with respect to a rechargeable
06 battery being placed in the DEEPWATER
07 HORIZON?

Page 524:09 to 525:10

00524:09 A. It's -- that -- you know, I made
10 that statement based on that if -- if an
11 operator does not, you know, pay attention or
12 he -- he -- he does not look at the, you
13 know, the battery, various battery parameters
14 for a rechargeable battery when we're
15 monitoring that -- that -- that information,
16 I mean, he -- it could -- could lead him into
17 a -- if he didn't monitor that and -- and
18 when he needed it, it may not be ready to do
19 what its, you know, its intended function is.
20 Q. And is that a concern that you
21 had with Transocean?
22 A. I'm just -- in general, any --
23 any customer.
24 Q. So do you limit the customers
25 that you would make rechargeable batteries
00525:01 available to?
02 A. No. Again, that's -- you know,
03 that's -- that's -- the customer, you know,
04 he -- he decides -- he or she decides what,
05 you know, what system would work best for
06 them.
07 Q. Do you have any reason to
08 believe that a rechargeable battery would not
09 have been an appropriate choice for the
10 DEEPWATER HORIZON?

Page 525:12 to 529:03

00525:12 A. Again, just from my report,
13 just -- if the operator was inattentive, not
14 specifically as you stated, Transocean, but
15 any operator, if they weren't following the
16 proper recommended guidelines, then that
17 could be an issue for them, yes.

18 Q. So aside from the inattentive
19 operator, a rechargeable battery would be an
20 appropriate addition to --
21 A. Again, if they follow the, you
22 know, recommended guidelines that we set out
23 for the -- for the rechargeable battery, if
24 they followed the -- the maintenance and did
25 all that, I -- I have no reason to believe
00526:01 that that system would work for them.
02 Q. Would not work for them?
03 A. Would -- would work for them.
04 If they follow the recommended practices,
05 guidelines, then -- then the Mark III would
06 work for them.
07 Q. Okay. And you have -- do you
08 have any reason to believe that Transocean
09 would not follow the recommended procedures
10 or recommended guidelines for the battery?
11 A. I'm -- I -- I can't speak on
12 Transocean's behalf. I -- I don't know.
13 Q. Do you have any reason to
14 believe?
15 A. No, I have no reason to believe.
16 Q. You also note that retrofitting
17 the Mark II control system to accommodate a
18 rechargeable battery would take a significant
19 amount of work; is that correct?
20 A. That -- that is correct.
21 Q. Okay. Do you know if Cameron
22 has looked into how much work would be
23 required to retrofit the Mark II with a
24 rechargeable battery?
25 A. I've -- during the course of
00527:01 looking at some of these e-mails, there --
02 you know, there have been some informal
03 requests for -- for looking at rechargeable
04 batteries. But I don't think I really ever
05 saw a formal request to actually look at
06 installing rechargeable batteries in a Mark
07 II system.
08 Q. Do you have --
09 A. I mean --
10 Q. I'm sorry. Go ahead.
11 A. I was going to say, I mean,
12 there's -- there's, as stated in my report,
13 there's some significant engineering hurdles
14 that would have to be overcome. For one
15 thing, you'd have to get hardware to -- to
16 install. You have to look and see their
17 space. In order to monitor the parameters
18 you would have to add some sort of inputs or
19 a card to be able to monitor those. And --
20 so that's just the hardware, not to mention
21 the software required, changes required to be
22 able to do that.

23 And -- and that's all based on
24 the fact that if you have space in the
25 existing SEM to do that.

00528:01 Q. But if you replaced the Mark
02 II -- the Mark II system with the Mark III
03 system, you don't have those problems,
04 correct?

05 A. Some of those problems would --
06 would, you know, get traded for other
07 problems. Like, for example, you would have
08 to find a way to get the, you know, those
09 parameters up to the -- up to the topside.
10 With the Mark III system that we sell
11 presently, we -- that's already built into
12 the system, into the touch panels, into the
13 communications.

14 With a -- with a Mark II, or
15 trying to put a Mark III system on a Mark II,
16 you would have to look at those and see if --
17 see what would be required to get those
18 parameters to the topside.

19 Q. But Cameron can do that,
20 correct?

21 A. It can be looked at, but I don't
22 know what would be required until you
23 actually investigate that and -- investigate
24 all the hardware and the software to see what
25 would be required to do that, implement that.

00529:01 Q. Do you know whether Transocean
02 had any plans to install the Mark III system
03 on the DEEPWATER HORIZON?

Page 529:05 to 529:11

00529:05 A. I'm -- I'm not -- not aware of
06 that.

07 Q. So do you know if there had been
08 any investigation as to whether and what
09 need -- what would need to be done in the
10 event that a Mark III system was installed on
11 the HORIZON?

Page 529:13 to 532:18

00529:13 A. I'm -- I'm sorry. State your
14 question again.

15 Q. Okay. Do you know whether
16 Cameron looked into what -- what would have
17 to be done in order to upgrade the Mark II
18 system in the HORIZON to a Mark III?

19 A. I'm -- I'm not aware of us
20 investigating that.

21 Q. All right. Let's change topics
22 a little bit and talk solenoid valves.

23 What -- what is the purpose --
24 well, is there an advantage to a single coil
25 solenoid valve over a double coil solenoid
00530:01 valve?
26 A. Let me see. Refresh my memory
27 on my report here.
28 I mean, obviously there are
29 some, you know, there -- there are some
30 trade-offs between a single coil and a dual
31 coil. With a Mark II, which had a dual coil,
32 some customers may -- may prefer that
33 redundancy of having the dual coil versus a
34 single coil.
35 As -- as far as are there any --
36 are there any advantages to a single coil,
37 there may be some -- some advantages to the,
38 maybe the materials that were -- that were
39 selected for the -- for the single coil, the
40 hydraulic section of it.
41 I know it's a little
42 different -- it's a little different type of
43 coil -- it's a different type of coil on how
44 it -- it is -- it's a -- the single coil
45 that, for the Mark III, is based on a -- it's
46 in a pressure balanced compensated chamber
47 versus the -- the Mark II is in a -- has a
48 one atmosphere chamber.
49 So there are some -- there are
00531:01 some differences and some customers may, you
50 know, like the -- like the advantage of a
51 single coil versus some customers may like
52 the advantage of a dual coil.
53 Q. Would a customer be able to get
54 the Mark III pod with dual coil solenoids?
55 A. Not at -- not at the present
56 moment.
57 Q. Has anybody -- have any of your
58 customers requested that the Mark III system
59 be outfitted with dual coil solenoid valves?
60 A. Not that I'm -- not that I'm
61 aware of at the moment.
62 Q. On page 17 of your report, the
63 bottom paragraph, you state, although --
64 excuse me -- although a single coil solenoid
65 might avoid the particular failure scenario
66 alleged to have existed on the DEEPWATER
67 HORIZON, this design alternative involves its
68 own trade-off, which may make it less
69 appropriate -- make it a less appropriate
70 choice for customers for whom control system
71 reliability is paramount.
72 What trade-offs were you
73 referring to in that sentence?
00532:01 A. The fact that -- you know, the
74 fact that the Mark II system has a dual coil

03 and so some customers may view that
04 redundancy as an advantage over a single
05 coil.
06 Q. But if the two coils are -- or
07 if the coils are miswired, is there still
08 redundancy in the dual coil system?
09 A. Well, in a -- in a normal
10 operating solenoid those would not be reverse
11 wires. So in our -- in our test procedures,
12 I mean, we -- we use that -- our test
13 procedures to make sure that we don't have
14 a -- a dual, you know, to -- to make sure we
15 don't have that issue come up.
16 Q. Is it your understanding that if
17 the -- if a dual coil solenoid is miswired,
18 that it will not function?

Page 532:20 to 532:24

00532:20 A. Yes. If one -- if one of them
21 is -- is miswired, I should say.
22 Q. Correct. I'm sorry. Because
23 they're canceling each other out?
24 A. Right.

Page 533:03 to 534:20

00533:03 Do you have customers for whom
04 control system reliability is not paramount?
05 A. Some customers may -- may be
06 more familiar with the dual coil design, so
07 they may prefer it, while some customers may
08 feel comfortable with the single coil design.
09 I mean, I -- that -- that depends on the
10 customer. Both single coil and dual coil
11 accomplish the same thing at the end of the
12 day.
13 Q. Were you aware of the potential
14 for miswiring the dual coil -- dual coil
15 solenoid prior to the DEEPWATER HORIZON
16 incident?
17 A. Was I aware of -- I'm sorry?
18 Q. The potential for miswiring a
19 dual coil solenoid prior to the DEEPWATER
20 HORIZON?
21 A. Yes.
22 Q. Had you heard of your customers
23 miswiring one of the coils prior to the
24 incident?
25 A. I'm -- I'm not aware of that.
00534:01 Q. You also state that single coil
02 solenoids may not be appropriate for those
03 customers who lack confidence in their
04 organization's maintenance practices with

05 respect to solenoid valves.
06 Are you aware of Cameron
07 customers who lack confidence in their
08 organization's maintenance practices with
09 respect to solenoid valves?
10 A. I'm not aware -- I'm not aware
11 of that, but that's a possibility. There
12 could be some customers who -- who may not
13 have the confidence to, you know, to -- in
14 their -- in their maintenance practices,
15 perhaps.
16 Q. Is -- is this concern, the lack
17 of confidence, do you have any reason to
18 believe that that is a reason -- a basis for
19 Transocean sticking with a dual coil -- dual
20 coil solenoid rather than a single coil?

Page 534:22 to 535:02

00534:22 A. No. I have -- I have no reason,
23 no basis.
24 Q. Okay. So as far as you know,
25 there's no reason why a single -- single coil
00535:01 solenoid would not be appropriate for use in
02 a Transocean rig, control pod?

Page 535:04 to 535:05

00535:04 A. That would depend on -- on the
05 customer, if he saw that as appropriate.

Page 536:16 to 536:22

00536:16 Q. Is it true that solenoid 103 is
17 not activated subsea except in an emergency?
18 Is that the only time that solenoid 103 would
19 have been activated?
20 A. Solenoid 103 being the high
21 pressure blind shear close?
22 Q. Correct.

Page 536:25 to 537:10

00536:25 A. You -- you could -- that could
00537:01 also be activated whenever you're --
02 you're -- you're testing to make sure that
03 the BOP closes. It's blind pressure -- it's
04 high pressure blind shear and you can
05 activate it from the driller's or
06 toolpusher's panel.
07 Q. Would that be done while the --
08 while the BOP is on deck?
09 A. It could be done while it's on

10 deck or when it's deployed.

Page 537:18 to 538:10

00537:18 Q. Okay. Mr. Childs' report talks
 19 about the 27-volt battery in the blue pod
 20 discharging because of a continual rebooting.
 21 Do you recall that?
 22 A. Yes. I do recall that, yes.
 23 Q. Okay. And you -- do you recall
 24 Mr. Childs' explanation of how that would
 25 happen?
 00538:01 A. I think Mr. Childs -- I'm going
 02 to wait till that passes.
 03 I think Mr. Childs indicated
 04 that the 27-volt was -- was -- was low
 05 because there was a weak nine-volt and it
 06 didn't -- it didn't allow the AMF to -- to
 07 shut off and so that's what discharged the
 08 27 volts.
 09 Q. Do you agree with that theory?
 10 A. No.

Page 540:12 to 540:23

00540:12 Q. Well, is it your understanding
 13 that Mr. Childs' theory has a nine-volt
 14 battery discharging the 27-volt battery?
 15 A. If I remember Mr. Childs'
 16 report, he basically said, hey, that was a
 17 weak nine-volt battery. The -- the --
 18 because of that, the 27-volt continued to
 19 provide power to the -- to the transducers,
 20 and that's what -- that's what used up the
 21 capacity on the 27-volt battery.
 22 Q. As an electrical engineer, does
 23 that theory make sense to you?

Page 541:01 to 541:01

00541:01 A. Yeah, I mean --

Page 541:04 to 541:17

00541:04 A. Yeah, I'm going to -- I can't
 05 answer that.
 06 Q. Okay. But I'm just asking, you
 07 know, you, based on the experience that you
 08 have and the education you have, whether
 09 Mr. Childs' theory makes sense.
 10 MR. BAAY: Object to form.
 11 A. Again, I'm going to -- I'm going
 12 to have to -- I can't answer that based on

13 privileged information.
14 Q. So as an electrical engineer and
15 a designer of the Cameron control systems,
16 you cannot tell me whether or not this
17 rebooting theory of Mr. Childs makes sense?

Page 541:19 to 541:22

00541:19 A. No, again, based on privileged
20 information.
21 Q. Do you have any evidence to
22 indicate that this rebooting happened?

Page 541:24 to 542:12

00541:24 A. I haven't seen -- based on the
25 DEEPWATER HORIZON?
00542:01 Q. Any evidence whatsoever?
02 A. I mean, from the DEEPWATER
03 HORIZON, no, I haven't seen any -- any
04 evidence.
05 Q. And you don't believe that it --
06 it could happen, correct?
07 A. Again, I can't answer that based
08 on privileged -- privileged information.
09 Q. Have you discussed Mr. Childs'
10 theory, rebooting theory, with anyone other
11 than attorneys for Cameron?
12 A. No.

Page 543:19 to 544:04

00543:19 Are you aware of the fact that
20 Transocean conducted independent testing of a
21 miswired solenoid?
22 A. Is this the Greg Childs' report?
23 Q. Correct.
24 A. Yes. Yes, I'm aware of that.
25 Q. Okay. So other than reading
00544:01 about that fact in Mr. Childs' report, have
02 you done anything to review that testing and
03 analyze it yourself?
04 A. No, no.

Page 545:14 to 547:16

00545:14 Have you done anything to
15 analyze the independent testing that
16 Transocean performed on a miswired solenoid?
17 A. No.
18 Q. And you have no opinions in your
19 report about that specific testing that
20 Transocean did on the solenoid?

21 A. Correct. I have no opinions.
22 Q. Which means at the time of
23 trial, you're not going to come and offer
24 opinions about the adequacy of that testing,
25 are you?
00546:01 A. I'm -- unless new information
02 comes to light that -- that could possibly
03 change it. But at this particular point in
04 time, no.
05 Q. At this point in time, it's not
06 in your report and you don't intend to offer
07 opinions on Transocean's testing of the
08 solenoids?
09 A. Correct.
10 Q. Same questions related to the
11 testing on the batteries that Transocean did,
12 other than reading about the fact that they
13 did it in Mr. Childs' report, have you done
14 anything to analyze the data that Transocean
15 collected in its test of the battery?
16 A. No, I've not done any testing.
17 Q. Have you done anything to
18 analyze the -- the question was a little bit
19 different. Sorry. Let me go back to that.
20 You haven't done anything to
21 analyze the data Transocean collected in
22 their testing of the battery; is that right?
23 A. No. Yeah. No, I haven't done
24 anything.
25 Q. And you haven't analyzed,
00547:01 yourself, the testing process that Transocean
02 followed to test the batteries, have you?
03 A. Not -- not as part of my report,
04 no. No.
05 Q. And you don't have any opinions
06 in your report?
07 A. I don't have any about that,
08 that's correct.
09 Q. You don't have any opinions in
10 your report about Transocean's testing of the
11 batteries, right?
12 A. That is correct.
13 Q. And so you don't plan to offer
14 opinions at the time of trial about
15 Transocean's testing of those batteries?
16 A. That's -- that's correct.

Page 547:20 to 548:04

00547:20 Q. Okay. And your answer is, you
21 have no intention to offer those opinions at
22 the time of trial --
23 A. Correct.
24 Q. -- about blue pod battery
25 testing by Transocean?

00548:01 A. Correct.
02 Q. I want to turn now -- I think
03 your report's been marked as 8036; is that
04 right?

Page 548:07 to 549:15

00548:07 Q. And page 2, you make the
08 statement that -- down in the bottom
09 paragraph, beginning in 1998, you worked as
10 Cameron's lead electrical design engineer; is
11 that right?
12 A. That's correct.
13 Q. Okay. And in that role, you
14 were involved in the DEEPWATER HORIZON
15 project, true?
16 A. That's correct.
17 Q. And in that project, you helped
18 supervise Cameron's design of the deepwater
19 Mark II electrical control systems; is that
20 true?
21 A. Yes. In accordance to
22 customer's specifications, yes.
23 Q. All right. And when you say in
24 accordance with customer's specifications, I
25 assume you're talking about Transocean there;
00549:01 is that right?
02 A. Yes.
03 Q. Did you also have an
04 advantage -- or did you have personal
05 knowledge of the fact that Vastar, which is
06 now BP, participated in the commissioning of
07 the DEEPWATER HORIZON BOP?
08 A. Yes. Actually, I was going to
09 say there was -- at that time, it was R&B
10 Falcon and Vastar.
11 Q. Right. But -- and -- and you
12 know that Vastar went on to become BP?
13 A. I think I've -- I've heard
14 about, that that's true, they were bought out
15 by BP or acquired by BP.

Page 550:08 to 553:05

00550:08 Q. You were involved -- well, how
09 would you describe the time period that you
10 were involved in?
11 A. Oh, that was -- that was during
12 the -- the design phases of the -- of the
13 project. We were -- we had meetings between
14 Cameron, R&B Falcon, and Vastar. And I
15 believe there was another consultant, either
16 hired by R&B Falcon -- I think it was hired
17 by R&B Falcon -- to participate and to

18 discuss the project details.
19 Q. So during the design phase, it's
20 true that Vastar was participating in
21 meetings with you related to the design of
22 the DEEPWATER HORIZON control system?
23 A. That's correct.
24 Q. What else did you witness Vastar
25 participating in during the design phase?
00551:01 A. Well, the -- you know,
02 participated in the AMF sequences and the EDS
03 sequences. I know there were, you know,
04 discussions about that.
05 Q. And is it true that Vastar
06 specified the AMF sequences and EDS
07 sequences, as you appreciated it?
08 MS. MCKENZIE: Object to form.
09 A. To my knowledge, you know, those
10 were discussed between Vastar and -- and
11 Transocean.
12 Q. And so BP, Vastar at the time,
13 certainly had the discretion to come in and
14 voice their opinion as to how the AMF should
15 be sequenced and how the EDS should be
16 sequenced?
17 A. Yes.
18 MS. MCKENZIE: Object to form.
19 Q. And based on your experience
20 during the design phase, BP had the
21 discretion to come in and specify the
22 configuration of the BOP; is that true?
23 MS. MCKENZIE: Objection, form.
24 A. As far as the EDS is and the
25 AMFs were concerned.
00552:01 Q. Your involvement was focused on
02 the control system; is that fair?
03 A. Yes, it was -- the electrical
04 control system.
05 Q. You mentioned some meetings that
06 you participated in during the design phase
07 and that Vastar, now BP, also participated
08 in.
09 What was the -- the purpose of
10 those meetings?
11 A. Well, it was discussed, you
12 know, the details of the -- of the project,
13 you know, just -- obviously, some of the
14 major things were the EDSs and the AMF
15 sequences.
16 There were some other things,
17 you know, typical -- it could be interface
18 details, the cables needed to connect all the
19 equipment together, how long were the cables,
20 how big were the panels that we were going
21 to -- to build, so they could find a big
22 enough space on the rig for them, how much

23 equipment was going to be and how big, how
24 much the HPU weighed, how big was the HPU and
25 the diverter and the mixing system,
00553:01 although -- those are just some details that
02 come to mind.
03 Q. And based on your experience, BP
04 had influence on all those decisions that
05 you've just mentioned?

Page 553:07 to 555:12

00553:07 A. They were -- I mean, they
08 were -- like Transocean, they were involved
09 in the discussions, yes.
10 Q. You also mentioned in your
11 testimony earlier today that you have
12 experience with dealing with BP related to
13 the THUNDER HORSE rig.
14 Did I understand that correctly?
15 A. Yes, yes.
16 Q. All right. You smile. Is
17 that -- are you -- is that a lot of your
18 responsibility as --
19 A. No, no. It just -- there's --
20 there's been, you know, quite a -- quite a
21 bit of work here as of late. So that's --
22 that's one of the customers that -- you know,
23 recently they have -- they have, you know,
24 purchased an upgrade for a Mark III system.
25 So --
00554:01 Q. Okay. And so you're saying that
02 BP purchased an upgrade to the Mark III for
03 the THUNDER HORSE?
04 A. Yes -- well, I'm not sure how --
05 I mean, Pride and BP are -- are -- I'm not
06 sure how that arrangement is, but they work
07 together on that -- on that rig.
08 Q. There's no question that BP
09 certainly understands what the Mark III
10 control system is and how it works?
11 A. I would agree with that
12 statement, yes.
13 Q. BP is dealing with you
14 specifically on how that system is designed
15 and how it operates, the Mark III, that is?
16 A. Yes, yes.
17 Q. Have you dealt with BP on any
18 other rigs related to the BOP control
19 systems?
20 A. Yes, the Transocean ENTERPRISE.
21 Q. Okay. And what was your
22 involvement with BP on the ENTERPRISE?
23 A. Recently, they -- they've
24 changed some AMF -- the way it arms on all
25 four SEMs, and they've also changed up the --

00555:01 the EDS sequences as well.
02 Q. And those changes came at the
03 request of BP?
04 A. For the AMF system, yes, that
05 I'm aware of. I'm not sure about the other
06 changes.
07 Q. And there's no question in your
08 mind that BP is a sophisticated customer when
09 it comes to understanding AMF systems for
10 BOPs?
11 A. I would -- yeah, there's no
12 question in my mind, yes.

Page 556:20 to 558:07

00556:20 Q. Right. So anywhere you have
21 language in your report where you make the
22 comment, if rig personnel are not
23 well-trained or if rig personnel are
24 inattentive, those are generic statements by
25 you; is that true?
00557:01 A. That's -- that's correct, yes.
02 Q. And they're not focused on
03 Transocean's work on the DEEPWATER HORIZON?
04 A. That's -- that's correct, yes.
05 Q. And those statements are not
06 focused on Transocean's crew on the DEEPWATER
07 HORIZON?
08 A. That's -- that's correct.
09 Q. And just to hammer this down,
10 you didn't do any review of Transocean's
11 maintenance system related to DEEPWATER
12 HORIZON BOP, did you?
13 A. Not -- no, not to my knowledge,
14 no.
15 Q. And you don't have any opinions
16 in your report about Transocean's maintenance
17 on the DEEPWATER HORIZON BOP?
18 A. That's correct.
19 Q. Or more specifically,
20 Transocean's maintenance on the DEEPWATER
21 HORIZON BOP control system?
22 A. I'm sorry. Can you ask the
23 question again?
24 Q. You don't have any opinions in
25 your report about Transocean's maintenance of
00558:01 the DEEPWATER HORIZON BOP control system?
02 A. That's -- that's -- yes, that's
03 correct.
04 Q. And you don't intend to offer
05 any opinions about Transocean's maintenance
06 on its BOP for the DEEPWATER HORIZON?
07 A. No, no plans right now at all.

Page 560:21 to 562:11

00560:21 Trend analysis is not based on a
22 recommendation that you change your batteries
23 out on a specified -- during a specified
24 period of time or after a specified period of
25 time?

00561:01 A. I guess the way I understand
02 trend analysis as stated is just to gather
03 the data and trend it and then, you know,
04 relative data and to make sure there are no
05 anomalies with that data. It doesn't
06 necessarily mean that after you -- you trend
07 it that, you know, that you replace the
08 battery.

09 Q. You only replace -- after a
10 trend analysis, you only replace the battery
11 if you detect a pattern that causes you to
12 question the health of that battery; is that
13 true?

14 A. Yeah, I don't -- in our -- in
15 our Mark III technical description, I seem to
16 recall -- I think there's some parameters in
17 there that after you do that trend analysis,
18 if it doesn't meet or exceed those
19 parameters, then we recommend changing the
20 batteries out.

21 Q. Okay. As I understood your
22 testimony over the last day or so, is the
23 distinction between a Mark II and a Mark III
24 system is not so much a question of whether
25 one is superior over the other, it's more a
00562:01 question as to whether the control system is
02 appropriate for a rig.

03 Did I understand that correctly?

04 A. I would -- I would agree with
05 that statement, yes.

06 Q. And as of April 20th, 2010, you
07 make the statement that Transocean viewed the
08 Mark II as an appropriate control system for
09 the DEEPWATER HORIZON?

10 A. I -- I would agree with that
11 statement, yes.

Page 562:24 to 572:18

00562:24 Q. And you say customers, including
25 Transocean specifically, believe that the
00563:01 Mark II control system without rechargeable
02 batteries or realtime battery monitoring
03 capability is and has been a quality system.

04 Did I read that correctly?

05 A. That's -- that's correct.

06 Q. And it's a statement you make in
07 your report?

08 A. Yes. Yes.
09 Q. You believe that statement?
10 A. Yes.
11 Q. Do you also agree that Cameron
12 viewed the Mark II control system as a
13 quality system?
14 A. Yes.
15 Q. And in spite of the fact that
16 the Mark III was put onto the marketplace, it
17 didn't change the fact that Cameron viewed
18 the Mark II as a quality control system?
19 A. That -- that is correct. I
20 mean, we -- one of the -- you know, we had to
21 design the Mark III because of the -- some of
22 the equipment in the Mark II was no longer
23 available.
24 Q. Let me ask you this question.
25 What did Cameron view as the benefits in the
00564:01 Mark III system?
02 A. Well, from -- from my
03 perspective on the -- on the Mark III system,
04 the -- the touch panels are -- are an
05 advantage for -- for me because with adding
06 functions or with removing functions it's a
07 lot easier to -- to remove and add functions
08 on a touch screen.
09 And then of course the software
10 is a little -- little easier to use when
11 compared to -- to the -- a little easier to
12 change when compared to the -- to the
13 existing Mark I, Mark II software.
14 Q. Okay. So the touch panel is a
15 benefit and the -- the software system is a
16 benefit on the Mark III; is that true?
17 A. Right. Right.
18 Q. Any others?
19 A. The PLC system in -- in general,
20 it's -- it's -- again, it's a fairly widely
21 used PLC, so that's another advantage. We
22 can -- we can modify the software on -- on
23 that particular system.
24 Q. As you have described, the
25 decision whether to use the Mark III in place
00565:01 of the Mark II comes with tradeoffs; is that
02 right?
03 A. Yes, that is correct.
04 Q. And one specifically you have
05 discussed -- well, first let me ask you this.
06 You agree that the analysis in deciding
07 whether to use a Mark III in place of a Mark
08 II control system does not focus simply or
09 only on battery condition equipment or
10 battery monitoring equipment?
11 A. I'm sorry. Ask your question
12 again.

13 Q. Yeah. Let me put it in other
14 words. If a customer is trying to decide to
15 switch to a Mark III versus a Mark II,
16 they're not going to base their analysis
17 solely on whether the new system can monitor
18 batteries or not; is that right?

19 A. Yeah, I wouldn't think that
20 would be the only reason they chose the Mark
21 III. I would think there would be possibly
22 other reasons or they chose the Mark II or
23 Mark III. Right.

24 Q. And one of the tradeoffs you
25 have testified to today and what you provide
00566:01 opinions on in your report about are, if you
02 choose a Mark III, you're going from a
03 two-coil solenoid system to a one-coil
04 solenoid system; is that right?

05 A. Yes. The Mark -- Mark II uses a
06 dual coil solenoid versus a Mark III uses a
07 single coil solenoid.

08 Q. And on a -- on a surface level,
09 that switch is causing you to lose some
10 redundancy in your solenoid system?

11 A. Yes. Some customers may -- may
12 prefer the -- the dual coil versus the -- the
13 single coil in a Mark III.

14 Q. Absolutely. But the switch is
15 causing you to -- to lose some redundancy in
16 your solenoid system because it goes from a
17 two-coil to a one-coil system? Is that true?

18 A. Yeah, I would -- I would agree
19 with that.

20 Q. So if someone -- if a customer
21 chooses to make the switch, they have to
22 decide not only that they want different
23 battery components, but that they're willing
24 to take the other changes in equipment that
25 come along in the example we were talking
00567:01 about with the solenoids; is that right?

02 A. If you're going from a dual coil
03 to a single coil.

04 Q. Do you have an idea as to how
05 many operators in the Gulf of Mexico switched
06 to a Mark III in the first year it was put
07 into the marketplace?

08 A. I know of, you know, this latest
09 one that was -- that was put out that was on
10 the BP THUNDER HORSE, the Mark III. I know
11 the West Sirius for Seadrill has a Mark III
12 system. That's all my -- that's all my
13 knowledge.

14 Q. Okay. So you have knowledge of
15 two rigs that have changed out their control
16 systems?

17 A. Right. Well, the -- the West

18 Sirius was a -- was a brand new rig.
19 Q. So you know of one rig that's
20 changed its actual operating system?
21 A. Right.
22 Q. Excuse me. Its control system?
23 A. Right.
24 Q. And that rig happened to be run
25 by BP?
00568:01 A. Yes.
02 Q. Would you -- would you state --
03 is it your opinion that in terms of the total
04 number of rigs in the Gulf of Mexico, the
05 number that have changed from the Mark II to
06 the Mark III is low?
07 A. I don't know how many rigs are
08 currently operating in the -- in the Gulf at
09 the moment. But to my knowledge, I'm only
10 aware of that one that -- that changed.
11 Q. Okay. Do you have -- explain
12 that -- when you test -- when you perform an
13 open circuit test of a battery, it has the
14 potential to give you false readings; is that
15 accurate?
16 A. I'm not sure if I would classify
17 it as false. It's just open circuit voltage.
18 You don't really -- you don't really know
19 if -- if that's going to -- going to complete
20 your AMF sequence. It may be able to start
21 it, but you don't know if it's going to be
22 able to complete it.
23 Q. And you don't know because why?
24 A. Well, you haven't -- you haven't
25 put a -- you haven't put a load on the
00569:01 system.
02 Q. Putting a load on the system --
03 system and testing the battery gives you a
04 more accurate understanding; do you agree
05 with that?
06 A. I would agree it would give you
07 more realistic -- realistically whether the
08 batteries are -- can -- can actually complete
09 the sequence.
10 Q. Is it true that whether you have
11 a non-rechargeable battery or a chargeable
12 battery, that you could still get a
13 misleading voltage measurement on the rig?
14 A. Without -- without it being
15 loaded down?
16 Q. Yes.
17 A. Sure. You -- for the case of a
18 non-rechargeable battery, obviously. But --
19 and also a case for a rechargeable battery.
20 I think I -- I stated in my report that, you
21 know, you could -- you could, you know, look
22 at the rechargeable battery and everything

23 appears to be okay and then 'cause of that
24 drop-off curve, as soon as you put a load on
25 it, it just -- it doesn't -- it doesn't
00570:01 complete the sequence.

02 Q. You make the statement on
03 page 11 of your report in exhibit 8036 that
04 some other experts in this case make no
05 attempt to weigh the advantages captured
06 against the inevitable tradeoffs arising from
07 incorporating these alternatives.

08 Do you recall making that
09 statement?

10 A. Yes.

11 Q. And that's an opinion you agree
12 with as you sit here today?

13 A. Yes.

14 Q. What -- what was your basis for
15 making that statement? Did you come to that
16 conclusion after reading the other reports in
17 this case? I want to know just exactly what
18 caused you to make that statement.

19 A. Well, it -- to make -- you know,
20 to make that statement about tradeoffs, it --
21 it was -- it was -- they were kind of just,
22 hey, that's -- that's the -- you know, the
23 solution to -- that's the silver bullet.

24 That's the solution to -- to all this, you
25 know, to why you have a reverse wired
00571:01 solenoid, to have a -- you know, put
02 rechargeable batteries and that's going to --
03 going to solve the problem.

04 Again, you know, if -- if the
05 proper maintenance and -- and if that's
06 followed, then both systems, the Mark II and
07 the Mark III, will continue to do what
08 they're supposed to do, what they're designed
09 to do.

10 Q. Did the opinion on upgrades that
11 you read in other expert reports strike you
12 as lacking sufficient analysis?

13 A. I mean, I think they looked at
14 it. And as often the case, they look at it
15 as kind of a -- I get this all the time with
16 regards to changes -- it's just, hey, you
17 know, put some -- put some hardware in there
18 and all you got to do is modify the software
19 and -- and let's -- let's go down the road.

20 They don't look at the whole
21 entire complexity of what's involved or
22 putting in a rechargeable batteries, putting
23 in new -- new hardware, putting in software,
24 to be able to -- to accommodate that.

25 Q. And that's my question. Is it
00572:01 your opinion that the other experts who
02 commented on upgrades did not look completely

03 at the analysis necessary to make that
04 tradeoff determination?
05 A. I think they went up to a
06 certain point but didn't -- didn't continue.
07 I think that's the way I would -- I would
08 characterize that.
09 Q. And specifically, did you look
10 at the expert report of a gentleman named
11 Glenn Stevick, s-t-e-v-i-c-k?
12 A. I think I may have -- recall
13 seeing his report. I don't recall
14 specifically what he -- what he stated,
15 but --
16 Q. So as you sit here, you don't
17 recall specifically what -- what an expert
18 might have said about the upgrades, but in

Page 572:23 to 573:02

00572:23 follow up on that. Is it your experience
24 that solenoid valves can stick after long
25 periods of nonuse?
00573:01 A. I really don't have no -- any
02 information or -- or knowledge of -- of that.

Page 573:06 to 573:18

00573:06 Q. And did you -- did you look at
07 any of the test results from Michoud related
08 to solenoids in this case?
09 A. I -- I read the DNV Phase I
10 testing and I saw they -- they mentioned that
11 the reason, you know, some of the solenoids
12 didn't work was due to sticking valves or
13 debris in the valves.
14 Q. Does that sound probable to you?
15 A. It's -- it's possible. But
16 again, that's not my area of expertise.
17 That's usually hydraulics and there's usually
18 a hydraulics person that deals with that.

Page 573:20 to 573:23

00573:20 On the issue of miswired
21 solenoids, is it true that Cameron has
22 changed their test procedures to identify a
23 miswired solenoid?

Page 573:25 to 575:08

00573:25 A. I've -- I've seen -- I've been
00574:01 shown a report, an FPR report during the
02 course of this deposition, and I've seen it

03 before with regards to that. I -- I don't
04 know if any procedures have been changed or
05 not.
06 Q. You don't know if Cameron has
07 change their test procedure as it relates to
08 miswired solenoids?
09 A. Yeah. I'm not aware of that.
10 Q. All right. And as I understand
11 it, you did not take place -- or you did not
12 participate in the testing that is the basis
13 for the September 2010 field performance
14 report that you discussed yesterday with some
15 of the lawyers?
16 A. That's -- that's correct, I did
17 not participate in that testing.
18 Q. That was someone else?
19 A. That was someone else.
20 Q. And you didn't help write that
21 report and you didn't help perform the
22 testing?
23 A. That's correct.
24 Q. You were simply looking at it
25 for the first time as it was shown to you
00575:01 yesterday?
02 A. Actually, I had seen it -- seen
03 it before during my -- during preparation --
04 preparation for this deposition.
05 Q. Okay. Before preparing for your
06 deposition, you had not seen that document?
07 A. I -- I would agree with that
08 statement.

Page 576:04 to 578:18

00576:04 Q. Yeah, that realtime battery --
05 battery -- battery monitoring is of limited
06 use in determining whether said battery can
07 complete the AMF sequence.
08 A. Yes. I -- I just found it in my
09 report.
10 Q. Okay. I believe it's in that
11 first bullet point?
12 A. Yes.
13 Q. Why do you make that statement?
14 A. Again, it's based on the -- you
15 know, on -- on the discharge curve and the
16 fact that it could give you an indication and
17 you can start the sequence, but because of
18 the discharge curve and the way it can
19 rapidly fall off, it -- it might not be able
20 to complete the sequence.
21 Q. And I think in followup to that
22 statement, you say that operators with a
23 realtime monitoring system for
24 non-rechargeable batteries would be able to

25 do little more than watch batteries whose
00577:01 voltage seemed perfectly fine before an AMF
02 sequence failed during the sequence.
03 You agree with that opinion?
04 A. That was the last -- last --
05 last sentence in that -- at the end of a
06 rechargeable battery's useful life -- which
07 one were you referring to? I'm sorry.
08 Q. I -- I think it's a statement
09 from page 15. I bounced over a couple of
10 pages. In that first paragraph, if you look
11 after the semicolon. It says, operators with
12 a realtime monitoring system for
13 non-rechargeable batteries would be able to
14 do little more than watch batteries whose
15 voltage seemed perfectly fine before an AMF
16 sequence failed during the sequence.
17 A. Right.
18 Q. Why do you say that?
19 A. Again, the -- this is -- this is
20 based on the, you know, rapid discharge
21 curve. If -- this was written in response to
22 realtime battery monitoring for the Mark II
23 non-rechargeable batteries. You have to put
24 a load on the -- on the system to get -- to
25 get some meaningful information from it. If
00578:01 -- if -- you can put a load on it and it may
02 be able to start the sequence but not be --
03 be able to finish it.
04 Q. Do you know if Cameron had any
05 kits available to allow customers to add
06 monitoring capabilities to the Mark II
07 system, battery monitoring capabilities?
08 A. I'm not -- I'm not aware of
09 that, no.
10 Q. Do you agree that one energized
11 coil is sufficient to provide the necessary
12 shifting force to move a plunger in a
13 solenoid?
14 A. On a Mark -- Mark II design,
15 dual coil?
16 Q. Yes, sir.
17 A. I -- I would agree with that
18 statement.

Page 579:05 to 579:18

00579:05 Q. In follow up on your -- on your
06 answer that there were certain pieces of
07 equipment or components that were no longer
08 available with the Mark II once the Mark III
09 was put on the market, what exactly were you
10 referencing?
11 A. The processors were not
12 available, or not available anymore from the

13 manufacturer that were -- that are installed
14 on the Mark -- on the Mark I or Mark II SEMs.
15 Q. Anything else?
16 A. These processors are also the
17 ones that are used on the -- on the control
18 panels and on the surface equipment as well.

Page 580:06 to 580:17

00580:06 EXAMINATION
07 BY MR. VON STERNBERG:
08 Q. Good afternoon, Mr. Coronado.
09 How are you doing?
10 A. Doing okay. Thank you.
11 Q. You're hanging in there after a
12 day and a half? You're on the downhill
13 slide.
14 My name is Jerry Von Sternberg.
15 This is Angelle Adams. We are two of the
16 lawyers who represent Halliburton in this
17 matter.

Page 581:04 to 581:11

00581:04 Q. All right. You have provided an
05 expert report dated November 7th, 2011; is
06 that true?
07 A. That's correct.
08 Q. And it's in response to other
09 reports that have been produced in this
10 matter; is that also a fair statement?
11 A. That is correct, yes.

Page 581:19 to 583:19

00581:19 Q. Okay. Please take a look at
20 exhibit 8036, which is your report. And
21 specifically, go to page 10. And I'll just
22 ask you a few questions about it and see if
23 you can tell me what you mean by it.
24 If you go to page 10, the
25 paragraph that starts with unfortunately, do
00582:01 you see that?
02 A. Yes.
03 Q. About five lines down, you say,
04 the reality is that a system can only
05 incorporate as many and the type permitted by
06 the design constraints specified by the
07 customer.
08 Do you see that, sir? Do you
09 see where it starts with, the reality? It's
10 the middle of the sentence. Do you --
11 A. I -- oh, yes.

12 Q. I can read the whole sentence if
 13 you want me to.
 14 A. No. I -- I -- I found it.
 15 Q. Okay. Well, let -- let me go
 16 back and read the whole -- the whole
 17 sentence, make it easier.
 18 Although on paper it seems a
 19 great idea to incorporate physical components
 20 affording in the infinite degree of fault
 21 tolerance into a design, the reality is that
 22 a system can only incorporate as many and of
 23 the type permitted by the design constraints
 24 specified by the customer.
 25 Do you see that, sir?
 00583:01 A. Yes.
 02 Q. Okay. And by that, you mean
 03 that Transocean and BP, to the extent that
 04 they had previous entities, designed, or at
 05 least told you what design parameters they
 06 wanted for this BOP; is that a fair
 07 statement?
 08 A. That's a fair statement, yes.
 09 Q. Okay. All right. Let's go to
 10 what's right there in front of you. It's
 11 tab 6 for everybody in the crowd, but it's
 12 the -- that -- the big document right there
 13 that starts with -- 676 is the last three --
 14 yeah.
 15 A. Okay. This one.
 16 Q. And it's been marked as -- do
 17 you know what exhibit number it is?
 18 THE REPORTER: Exhibit 8054.
 19 (Exhibit Number 8054 marked.)

Page 584:12 to 584:13

00584:12 before you scroll through it too far, it
 13 says, Cameron subsea systems. Look at --

Page 584:18 to 584:21

00584:18 A. Right.
 19 Q. And it's dated May 2008; is that
 20 a fair statement?
 21 A. Yes.

Page 585:10 to 592:18

00585:10 Q. That's fine. Well, my questions
 11 are going to be probably limited to the
 12 control issues, anyway, so --
 13 A. Okay.
 14 Q. Those are the things that you're

15 knowledgeable about, correct?
16 A. That's correct.
17 Q. Okay. Also, if you look at the
18 first page, the cover page is what I called
19 it, which is Bates, last three digits, 676,
20 it says, raising performance together.
21 Do you see that?
22 A. Yes.
23 Q. Is that a mantra that Cameron
24 has been putting on their marketing material?
25 A. I've -- I've seen that before in
00586:01 other marketing material.
02 Q. Okay. So to the extent that you
03 say in your report at page 10 that you're
04 limited by the design constraints specified
05 by the customer, at least in your marketing
06 material, Cameron does say that you're
07 working together to put together these BOPs;
08 is that a fair statement?
09 A. Working together with the
10 customer?
11 Q. Yes.
12 A. Yes. We -- we design it per
13 customer -- design it per API 16D, and we
14 also design it per customer specifications.
15 Q. Okay. That's -- that's fine.
16 All right. Let's go to Bates
17 number 2728, if you would, please. It's a
18 significant way into the document.
19 A. Okay.
20 Q. It said, installed base 1996 to
21 2004.
22 Do you see that at the top?
23 A. Yes.
24 Q. Okay. And then you list four
25 R&B Falcon vessels that were at least
00587:01 initiated in 1997; is that a fair statement?
02 A. Yes.
03 Q. I mean, we know from the records
04 in this case that the DEEPWATER HORIZON
05 wasn't actually certified and -- and sent out
06 into the market until 2001.
07 A. Right.
08 Q. Okay. So you must have started
09 building the BOP, or at least designing it,
10 in 1997; is that true?
11 A. Could -- could have been on
12 the -- you know, could have been on the books
13 as far as an order, potential order.
14 Q. Okay. And if you'll go another
15 couple pages down to what's Bates 2730, do
16 you see that?
17 A. Yes.
18 Q. And here we have the Legacy
19 system versus Mark III system.

20 Now, when you say Legacy system,
21 are we talking about the Mark II?
22 A. I -- I would agree it is
23 Mark II -- Mark -- Mark I or Mark II.
24 Q. Okay. And so thumb through the
25 next few pages. I'm going to ask you a
00588:01 couple questions about it, but am I right in
02 assuming that this is a discussion from
03 Cameron to Transocean in reference to the
04 available Mark III system and its pluses and
05 minuses in reference to what was already out
06 there as the Legacy system, which is the
07 Mark II?
08 A. I think it was in -- in regards
09 to, you know, some of the -- the differences
10 between the Legacy system and the Mark III
11 system.
12 Q. All right. Well, go to -- to
13 what's Bates as 2731, which is just the next
14 page.
15 A. Okay.
16 Q. You see that?
17 A. Yes.
18 Q. All right. It says, surface
19 changes and surface communications.
20 Do you see those?
21 A. Yes.
22 Q. Okay. And then it says, Legacy
23 used Profibus via fiber optics with OLMs.
24 I don't know what any of that
25 means and I don't really care. What I care
00589:01 about is the next dot that says, Mark III
02 utilizes Ethernet technology via fiber optics
03 with field proven Siemens fiber
04 converters/switches.
05 Do you see that?
06 A. Uh-huh.
07 Q. Now, isn't Ethernet technology
08 something more efficient than just the plain
09 fiber optics that you marked in the first
10 button or the bullet point?
11 A. Ethernet is more -- I'm sorry?
12 Q. Is it newer technology?
13 A. It's -- not sure how -- how old
14 it is with regards to -- to Profibus, but it
15 is more available technology at the moment.
16 Q. All right. Well, luckily, you
17 put a paren underneath the second dot, paren,
18 robust network management for increased
19 uptime and enhanced diagnostics, close paren.
20 Do you see that?
21 A. Uh-huh.
22 Q. Isn't that an improvement over
23 the first bullet point?
24 A. You know, we're switching

25 over -- we're switching over to Ethernet with
00590:01 the technology. That -- that could have been
02 an improvement, yes.

03 Q. Okay. So your testimony here
04 today is, increased uptime and enhanced
05 diagnostics could have been an improvement?
06 Is that what you're telling me?

07 A. Yes.

08 Q. Okay. And then it says,
09 touchscreen panels have been developed, and
10 then there's a little block there that covers
11 up what probably is additional writing.

12 Don't you agree with me there?
13 Because it says, touchscreen panels have been
14 developed, and then it says push-button
15 panels.

16 It can't be both, can it?

17 A. Yeah.

18 Q. It should be, instead of
19 push-button panels, or something of that
20 nature; is that right?

21 A. Yeah. I couldn't really say,
22 though, because you can't see it.

23 Q. Okay. That's fine.

24 And then the next dot says,
25 Wonderware HMI software utilized for enhanced
00591:01 graphics and ease of use.

02 Do you see that?

03 A. Yes.

04 Q. Okay. Now, that appears to be
05 an improvement over the Legacy system, would
06 it not?

07 A. Sure. I mean, that's one of the
08 things that I stated earlier, was that that
09 was one of the things that, you know -- what
10 the advent of technology was, you know,
11 was -- was the nice thing to have on touch
12 panels.

13 Q. Okay. Well, the fact is, the
14 reason why some of the materials that were
15 utilized for the Mark II system became
16 unavailable is because they were becoming
17 outdated.

18 Is that not a fair statement?

19 A. I'm -- I'm not sure why they
20 became -- specifically why they became
21 outdated. I mean, the customer basically
22 said, hey, we can't make these anymore. So
23 we had -- we had no -- we had to find another
24 option.

25 Q. Okay. And the other option was
00592:01 the Mark III system, which gave you increased
02 uptime, enhanced diagnostics, and enhanced
03 graphics and ease of use, which is what
04 you're marketing program said; is that fair?

05 A. There -- there were some things
06 that with the -- with the changeover to touch
07 panels and -- and the Wonderware HMI software
08 that -- you know, that from a software side,
09 I -- I view as an improvement.

10 Q. Now, I read your report and I'm
11 going to paraphrase a little bit, and you can
12 tell me if I'm off base, but it seems that
13 one of your issues is that some of the
14 upgrades proposed by the other experts don't
15 take into consideration whether or not the
16 Transocean employees could actually learn and
17 quickly utilize the new software and the new
18 panels; is that a fair statement?

Page 592:21 to 597:17

00592:21 A. I don't -- I don't -- not --
22 not -- I don't think I -- I made that
23 statement specifically. I think I was
24 speaking generally about that, with regards
25 to -- to being able to -- to view the data,
00593:01 to trend the data. You know, they have to be
02 able to -- to be able to do that on a
03 rechargeable battery.

04 Q. Okay. Well, let's go to the
05 next page, then. That's Bates 2732.
06 Do you see that, sir?

07 A. Yes.

08 Q. Now, that's the Legacy hardware
09 and push-button panels that's the Mark II
10 system, is it not?

11 A. Yes, it -- yes, it appears so.

12 Q. Okay. And then if you go
13 forward to 2733, your marketing brochure
14 shows the touchscreen panels; is that true?

15 A. That -- that's correct, yes.

16 Q. So you're not saying that a
17 Transocean employee would have more
18 difficulty operating what's on 733 as opposed
19 to what's on 732, are you?

20 A. No.

21 Q. Okay.

22 A. I'm not saying that.

23 Q. And if you'll go forward to
24 what's Bates labeled as 737, do you see that,
25 subsea changes?

00594:01 A. Uh-huh.

02 Q. Now, what's the effect of the
03 new system, the Mark III system, have power
04 and signal go directly to the S-E-M, or the
05 SEM?

06 A. During -- during the course
07 of -- of the Mark III design, we -- we -- I
08 mean, it's still going through the same MUX

09 cable. That hasn't changed. But we've opted
10 to -- we've opted to go directly from -- from
11 the termination on the end of the MUX cable
12 directly into the SEM.
13 Q. Okay. What's missing from this
14 system that used to be on the Mark II system
15 in reference to the power going directly to
16 the SEM? If you can describe that for me,
17 because I don't really understand.
18 A. With -- with -- in comparison to
19 the -- to the Mark I, Mark II system?
20 Q. Yes. Well, the Mark II to the
21 Mark III.
22 A. I think some systems, if I
23 remember correctly, the -- the -- rather than
24 going directly to the SEM, they went through
25 a riser mounting junction box.
00595:01 Q. Okay. So you basically, with
02 the Mark III system, have eliminated a
03 junction box.
04 A. On some systems, yes.
05 Q. Okay. Then the last dot on
06 there is, all interconnection cabling is
07 version two PBOF with testable connections
08 and field repairability.
09 What does that mean just in
10 brief terms?
11 A. Those were the interconnect
12 cables that connect the SEM or RCB to the SEM
13 or -- or SEM to some other devices or -- or
14 components, like PT sensors. The version two
15 was -- was -- was actually designed before
16 the Mark III was designed. So it was -- that
17 was available, you know, during the Mark II
18 days. But we thought, you know, to mention
19 it here in this -- or somebody thought to
20 mention it in this -- in this description.
21 Q. Okay. Let's jump ahead to
22 what's 769.
23 Do you see the MUX system
24 architecture?
25 A. Yes.
00596:01 Q. What is C-A-N. Why CAN? What
02 does C-A-N mean?
03 A. CAN stands for controller area
04 network.
05 Q. Okay. And is that something
06 that wasn't in the Mark II system that's now
07 in the Mark III system?
08 A. Yes. It's -- it's now on the
09 Mark III system.
10 Q. Okay. And it shows --
11 A. It was not on the Mark II.
12 Q. And it shows that it's used in
13 the auto industry; is that correct?

14 A. Yes. Some automobiles use this
 15 type of communication protocol.
 16 Q. Okay. Go on to this other
 17 document which we've already brought out for
 18 you. Let's see. It's this one. Right
 19 there. And go to what's marked as -- it's
 20 exhibit 5153, already marked in this matter.
 21 And go to CAM_CIV, and the last
 22 three digits are 653.
 23 Do you see that?
 24 A. Yes.
 25 Q. It says about midway down the
 00597:01 paragraph, one concern of some of our
 02 customers -- and then -- is to be able to
 03 determine the condition in the battery pack
 04 without having to open the SEM enclosure.
 05 Do you see that?
 06 A. Yes.
 07 Q. And this is dated 2004?
 08 A. That is correct.
 09 Q. Do you know which customers
 10 might have caused you to -- or Cameron to
 11 have drafted this document?
 12 A. No, I can't remember
 13 specifically.
 14 Q. But obviously, some people were
 15 already concerned about not being able to
 16 monitor the batteries while it was subsea; is
 17 that true?

Page 597:19 to 600:25

00597:19 A. Possibly. I don't -- I don't
 20 recall.
 21 Q. Okay. Go to what's been marked
 22 as exhibit 4115, which is this graph in front
 23 of you.
 24 Is it possible, in your mind, to
 25 program the AMF or the DMF system such that
 00598:01 would shear with the casing shear rams first
 02 before the blind shear rams are activated?
 03 A. Sure. It's -- it's possible.
 04 Q. Okay. And this document, 4115,
 05 actually goes through a calculation, or at
 06 least an evaluation, of which should be done
 07 and which shouldn't; is that true?
 08 A. It appears there's some pros and
 09 cons listed here of -- of doing the casing
 10 shear ram and then the BSR and then the BSR
 11 only.
 12 Q. And certainly, you, as the
 13 software and control -- I'm going to say
 14 manager because I'm running out of time and
 15 don't have any more things to say -- you
 16 understand that the AMF card could certainly

17 be programmed to shear the casing shear rams
18 first before it shears the blind shear rams,
19 true?
20 A. It's actually not the -- not the
21 AMF card that the sequence resides. It's
22 actually in the process. But, yes, it could
23 be set up to -- to close the casing shears,
24 but, of course, that's from an electrical
25 point of view. We also have to look at, you
00599:01 know, the hydraulics and -- and is there
02 enough accumulators, all that good detail.
03 Q. Certainly. But you-all --
04 apparently someone did an analysis as to
05 which way it should be, and the pros and cons
06 are here on exhibit 4115; is that true?
07 A. Yes.
08 Q. And then you, Cameron, didn't
09 make the decision one way or the other; it
10 was somebody else? Is that fair?
11 A. That was -- yes. That would be
12 decided by the customer.
13 Q. Okay. The batteries that were
14 in this BOP SEM were Lithium sulphur dioxide;
15 is that true?
16 A. In the SEM?
17 Q. Yeah.
18 A. In the Mark II SEM?
19 Q. The 27-volt battery.
20 A. That were -- they were Lithium
21 magnesium dioxide.
22 Q. Close enough.
23 A. Close.
24 Q. Look -- look at this -- what
25 we've -- look at what we've marked as 8055,
00600:01 will you please.
02 (Exhibit Number 8055 marked.)
03 Is that a quote from SAFT in
04 reference to how much it costs for the
05 nine-volt batteries for the -- the SEMs?
06 A. It's kind of hard to read.
07 Q. Yeah. Well, try.
08 A. Attached, please find SAFT's
09 quote for battery pack LM 3600. This says be
10 assigned part number --
11 Q. Well, let me ask you this so you
12 don't have to read the whole document. How
13 much do you think it costs for the 27-volt
14 battery in the SEM of the Mark II system?
15 A. I mean, according -- according
16 to this, it's, you know, \$365.
17 Q. Okay. And how -- do you know
18 how often the BOP was raised from the bottom?
19 In other words, how long did it take to drill
20 any particular well?
21 A. I'm not sure.

22 Q. Okay. Any reason why, for \$365,
23 they couldn't have changed the batteries
24 every time they took the BOP off the -- off
25 the bottom of the ocean?

Page 601:02 to 601:02

00601:02 A. I'm -- I'm not sure.

Page 601:24 to 602:14

00601:24 Q. And I just want to refresh your
25 memory. Yesterday you testified that the
00602:01 load on the nine-volt battery during the AMF
02 deadman sequence was 5.5 amps, correct?
03 A. On the nine-volt battery, yes,
04 during a -- yeah, that -- yes.
05 Q. And you testified that during
06 the AMF deadman sequence, the load on the
07 nine-volt battery was much heavier than the
08 load on the 27-volt battery, correct?
09 A. Yes.
10 Q. In fact, you refer to the
11 nine-volt battery as the limiting factor; is
12 that correct?
13 A. That's correct.
14 (Exhibit Number 8056 marked.)

Page 602:23 to 603:03

00602:23 Are you finished reading it? So
24 Mr. Childs -- according to exhibit 8055,
25 Mr. Childs testified that during the AMF
00603:01 sequence the load on the nine-volt battery
02 would have been less than the load on the
03 27-volt battery, correct?

Page 603:05 to 603:07

00603:05 A. That's -- that's -- I don't know
06 how Mr. Childs arrived at that conclusion,
07 but that's -- that's not correct.

Page 604:16 to 604:20

00604:16 Q. And according to your testimony
17 yesterday and today, the load on the
18 nine-volt battery is much heavier than the
19 load on a 27-volt battery, correct?
20 A. Yes.

Page 605:07 to 605:14

00605:07 Q. Well, what I'm asking is, based
08 on your understanding, the load on the
09 nine-volt battery would not be less than the
10 load on the 27-volt battery during the AMF
11 sequence; isn't that correct?
12 A. During AMF sequence, the -- the
13 load on the nine-volt would be -- would be
14 more than the load on the 27-volt battery.

Page 607:03 to 609:10

00607:03 Q. So the pulse with -- so with the
04 pulse with modulation, if you have a reverse
05 wired solenoid, that reverse wired solenoid
06 won't function; isn't that correct?
07 A. If -- if one of the -- one of
08 the coils is reverse wired, yes, it will not
09 function.
10 Q. Yesterday you testified -- we
11 were talking about redundancy and fault
12 tolerance and you testified that redundancy
13 is just one way to make a system fault
14 tolerant; is that correct?
15 A. That's correct. That's also in
16 my -- in my report.
17 Q. Right. So can you turn to
18 tab 95, which has been marked as
19 exhibit 8045?
20 A. 95?
21 Q. Yes, 95. And could you turn to
22 page 29? And could you read sections
23 5.2.12.1.1? Do you see that? It's under --
24 it's under general and it's just one -- it's
25 just one sentence.
00608:01 A. Oh, a minimum of two control
02 pods shall be used, affording redundant
03 control of all subsea functions. The surface
04 control manifold directs pilot command
05 signals to operate the pressure regulators,
06 control valves and the straight-through
07 functions in both pods.
08 Q. So it's correct that API 16D
09 requires redundant control pods, right?
10 A. It says in there, a minimum of
11 two pods shall be used, affording redundant
12 control of all subsea functions.
13 Q. So do you understand that to
14 mean that API 16D requires redundant control
15 pods?
16 A. I would agree with that
17 statement, yes.
18 Q. So, therefore, API 16D describes
19 a fault tolerant control system that must

20 have redundant control pods, right?
21 A. API 16D does not use the word
22 fault tolerant.
23 Q. Well -- well, you've testified
24 that redundancy is one way to make a system
25 fault tolerant, right?
00609:01 A. Yes.
02 Q. So then if API 16D says --
03 requires redundant control pods, doesn't API
04 16D describe fault -- a fault tolerant
05 control system?
06 A. That may be one way of achieving
07 fault tolerance as redundant control pods.
08 Q. So API 16D required -- so API
09 16D described one way of making a system
10 fault tolerant, correct?

Page 609:12 to 609:13

00609:12 A. With redundant control pods,
13 yes.

Page 609:22 to 610:19

00609:22 Q. And could you tell me what
23 every -- you know, to the best of your
24 knowledge, what -- what Cameron did to make
25 this 27-volt battery fault tolerant, using
00610:01 any definition you want to use?
02 A. To make it fault tolerant?
03 Q. To make the system, control
04 system fault tolerant with respect to the
05 27-volt battery.
06 A. Well, again, fault tolerance is
07 not used in API 16D and we build our system
08 to API 16D. As far as -- there's a --
09 there's a redundant control pod as per API
10 16D and in that redundant control pod there
11 is a 27-volt battery. There is another
12 27-volt battery pack in the other pod.
13 So there is two redundant
14 battery packs, one in each pod.
15 Q. So if one of the -- one of the
16 pods die or wasn't able to activate, you
17 would just be left with one 27-volt battery?
18 A. And we -- we meet that
19 redundancy per API 16D.

Page 611:06 to 613:09

00611:06 Q. Mr. Coronado, over the last
07 couple of days, you have said on various
08 occasions that Cameron designs and

09 manufactures BOP control systems pursuant to
10 API 16D; is that correct?
11 A. That's correct.
12 Q. API 16D has previously been
13 marked as exhibit 8045. It is tab 95 in the
14 binder in front of you.
15 On page 1 of exhibit 8045, there
16 is a discussion of the scope of this
17 particular API specification.
18 Do you see that?
19 A. Yes.
20 Q. And the very first sentence
21 reads, these specifications establish design
22 standards for systems that are used to
23 control blowout preventers, BOPs and
24 associated valves that control well pressure
25 during drilling operations. Do you see that?
00612:01 A. Yes.
02 Q. And is -- is that your
03 understanding of what API 16D does?
04 A. Yes.
05 Q. Does API 16D incorporate proven
06 engineering practices?
07 A. Yes, it does.
08 Q. Does API 16D incorporate sound
09 engineering practices?
10 A. Yes, it does.
11 Q. Given that API 16D incorporates
12 sound engineering practices and proven
13 engineering practices, do you believe that
14 when Cameron designs its BOPs to API 16D,
15 that it's designing safe equipment?
16 A. Yes.
17 Q. You were asked several questions
18 by counsel for the United States using the
19 phrase best and safest technology.
20 Do you recall those questions?
21 A. Yes.
22 Q. When you were answering those
23 questions, were you answering them with any
24 regulatory sense, or were you answering them
25 with respect to your understanding of those
00613:01 words?
02 A. Understanding of those words.
03 Q. When you were answering those
04 questions, were you -- you were asked
05 generally about BOPs. Were you answering
06 relating to controls, BOP stacks, or both?
07 A. My knowledge is in drilling
08 controls, so I was responding with respect to
09 drilling controls.

Page 614:05 to 617:18

00614:05 Q. Does Cameron give trend analysis

06 guidance to customers using the Mark II pods
07 with non-rechargeable batteries?
08 A. That would be EB -- the EB that
09 describes when to replace the batteries.
10 Q. And -- and I think you're
11 referring to EB 891D?
12 A. Yes.
13 Q. EB 891D, though, doesn't talk
14 about trend analysis, correct?
15 A. No, it does not. It talks about
16 replacement of the non-rechargeable
17 batteries.
18 Q. Right. And when you're dealing
19 with a non-rechargeable battery, the guidance
20 from Cameron is, replace those batteries on
21 various periodic schedules, correct?
22 A. Correct. As per the -- the EB.
23 Q. You were asked various questions
24 about monitoring open-circuit voltage.
25 Do you recall that?
00615:01 A. Yes.
02 Q. Can one monitor open-circuit
03 voltage on a Cameron Mark II deadman system
04 when the BOP is on the deck?
05 A. Yes, you can -- can monitor it.
06 Q. Can one test the deadman system
07 on a Cameron Mark II control system while the
08 BOP is on the deck?
09 A. Yes.
10 Q. And -- and someone does that
11 like it was done at Michoud or like it was
12 done on the Q4000?
13 A. Yes, that's correct.
14 Q. If you tested the deadman system
15 on the deck, and the 27-volt battery did not
16 have sufficient charge to drive the
17 solenoids, would you know it?
18 A. Yes, you would.
19 Q. How would you know it?
20 A. The -- it wouldn't -- the
21 sequence wouldn't -- wouldn't work, the --
22 the blind shears wouldn't close.
23 Q. Can you test -- well, let me ask
24 it this way: If you tested the deadman
25 sequence subsea and the 27-volt battery did
00616:01 not have sufficient charge to drive the
02 solenoids, would you know it?
03 A. Sure. Again, the blind shear
04 wouldn't close.
05 Q. You were asked various questions
06 by the counsel for the Plaintiffs' Steering
07 Committee about whether or not Cameron ever
08 had discussions with BP or Transocean during
09 the build-out of the DEEPWATER HORIZON BOP
10 regarding the advantages or disadvantages of

11 closing both the casing shear ram and the
 12 blind shear ram during a deadman sequence or
 13 just closing the blind shear ram.
 14 Do you recall those questions?
 15 A. Yes. Yes.
 16 Q. Now, you were involved in
 17 discussions with BP and -- and Transocean, or
 18 I guess at the time, Vastar and R&B Falcon,
 19 during the build-out, correct?
 20 A. That is correct, yes.
 21 Q. If I could get you to put that
 22 exhibit 4155 in front of you.
 23 This is a document that you were
 24 asked about earlier today, correct?
 25 A. Yes.
 00617:01 Q. This is a -- a -- a page of
 02 handwritten notes.
 03 It appears to be written on
 04 Vastar notepad?
 05 A. Yes. That -- Vastar's at the
 06 top of the page, yes.
 07 Q. And looking at the Bates number
 08 down at the bottom, it appears that this
 09 document was produced in this litigation by
 10 BP?
 11 A. Yes. Yes.
 12 Q. This document has a discussion
 13 of the pros and cons of closing the casing
 14 shear rams and then the blind shear rams or
 15 closing the blind shear rams only during the
 16 deadman sequence.
 17 Do you see that?
 18 A. Yes.

Page 618:06 to 618:14

00618:06 So from this document,
 07 regardless of whether or not Cameron ever had
 08 discussions with anybody during the
 09 build-out, from this document, it certainly
 10 appears that at least BP was aware of the
 11 pros and cons of closing the casing shear
 12 rams and then the blind shear rams or just
 13 the blind shear rams?
 14 A. Yes.

Page 618:16 to 621:02

00618:16 Q. When the BOP was first delivered
 17 in 2001, did it have retrievable pods?
 18 A. Yes, it did. It was originally
 19 designed with -- with retrievable pods.
 20 Q. And what does it mean to have
 21 retrievable pods?

22 A. It means that those pods can
23 be -- can be retrieved while they're deployed
24 subsea on stack.

25 Q. At that time, where did the
00619:01 wiring for the AMF heartbeat run from one pod
02 to the other?

03 A. At that particular time, it was
04 designed to -- to run through the -- through
05 the connector, through the wet mate connector
06 down -- down through the PBOF cable to the
07 riser mounted junction box, then from the
08 riser mounted junction box through the --
09 through the riser control box and down to
10 the -- through the other riser mounted
11 junction box and down to the other pod.

12 Q. Can you look at tab -- can you
13 look at tab 83, please?

14 What is exhibit 8037?

15 A. That's the general arrangement
16 interconnection diagram.

17 Q. And does that general
18 arrangement diagram reflect the retrievable
19 pod arrangement?

20 A. Yes, it appears so.

21 Q. Now --

22 A. Yes.

23 Q. -- after delivery of the
24 DEEPWATER HORIZON BOP, were the pods made
25 non-retrievable?

00620:01 A. Yes, they were.

02 Q. And as part of that process,
03 were the junction boxes removed?

04 A. Yes, that is correct, the
05 junction boxes were removed, and then the --
06 the heartbeat signal was in -- and there was
07 some wiring changes done to the SEM, and the
08 heartbeat signal was then redirected through
09 X11, which then goes through the riser
10 control box -- box back to the other pod.

11 Q. If you would, turn to tab 25 in
12 BP's binder.

13 And if I could, can I get you to
14 mark that as exhibit 8057.

15 (Exhibit Number 8057 marked.)

16 Q. Is exhibit 8057 the general
17 arrangement following that change from making
18 the pods non-retrievable?

19 A. Yes. It looks like the riser
20 mounted junction box have been removed from
21 this -- from this drawing.

22 Q. And it's after that point in
23 time, did you say, the AMF heartbeat signal
24 would run from the SEM through the riser
25 control box?

00621:01 A. Right, down through the other --

02 to the other pod -- to the other SEM.

Page 622:05 to 622:15

00622:05 Q. If you lose hydraulics power and
06 communication from the rig, are the three
07 conditions that are necessary for the deadman
08 to operate necessarily satisfied?
09 A. Yes, they are satisfied.
10 Q. So if you lose hydraulics,
11 power, and communication from the rig, you
12 will have lost detection of power at the SEM,
13 hydraulics detected at the transducer, and
14 the heartbeat between the pods?
15 A. That is correct.

Page 622:24 to 623:15

00622:24 Q. If you -- if you lose the MUX
25 cables, the rigid conduit, and the hotline,
00623:01 will the deadman system fire?
02 A. Yes.
03 Q. And is that true regardless of
04 whether or not the check valve in the
05 hydraulic power unit, or the HPU, is
06 destroyed?
07 A. That is correct, yes.
08 Q. If you lose the MUX cables but
09 not hydraulics, can you function the BOP with
10 an ROV?
11 A. Yes, you can.
12 Q. If you loss MUX cables but not
13 hydraulics, can you function the BOP with the
14 deadman system by removing the hydraulics?
15 A. Yes, you can.