Deposition Testimony of:

William LeNormand

Date: June 20, 2011

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Page 11:01 to 11:17

00011:01 THE VIDEOGRAPHER:
02 This is the deposition of
03 William LeNormand in regards to the oil spill
04 by the DEEPWATER HORIZON in the Gulf of
05 Mexico on April 20, 2010.
06 Today is June 20, 2011. The
07 time is 8:33 a.m. And we are on the record.
08 WILLIAM LENORMAND,
09 having been duly sworn, testified as follows:
10 EXAMINATION
11 BY MR. WILLIAMSON:
12 Q. Please state your name for the
13 record.
14 A. William LeNormand.
15 Q. Who do you work for,
16 Mr. LeNormand?
17 A. Cameron.

Page 12:02 to 12:20

00012:02 Q. Okay. What do you do for a
03 living for Cameron?
04 A. Field service technician.
05 Q. Okay. And what's a field
06 service technician?
07 A. We go to the rigs and work on
08 customers' equipment.
09 Q. Okay. You go offshore as well
10 as onshore?
11 A. Yes, sir.
12 Q. Both?
13 A. Yes, sir.
14 Q. Okay. And I saw some document
15 when you -- you actually worked on the
16 Macondo well after the explosion, right?
17 A. Yes, sir.
18 Q. You went out -- were you on the
19 Q-4000 for a while?
20 A. Yes, sir.

Page 13:10 to 13:12

00013:10 Q. Okay. All right. How long have
11 you worked for Cameron?
12 A. '96 to present.

Page 16:05 to 16:22

00016:05 Q. Okay. What's the deck test
06 procedure?
07 A. It was a procedure we went

through to function the pods on the rig to -- before we run it back down for the top kill.
Q. Okay. So that was a procedure that was actually set up for the -- what was it, the blue pod?
A. Yes, sir.
Q. Okay. That was set up. Y'all pulled the blue pod off the DEEPWATER HORIZON stack, brought it to the surface of the Q-4000 and went through a deck test procedure before you put it back down?
A. Okay.
Q. And, of course, you made certain repairs, modifications to the blue pod before you sent it back down?

Page 16:25 to 16:25

A. Can you reask the question.

Page 17:02 to 17:10

Q. Yeah. Were there modifications and repairs made to the blue pod before it was put back down in preparation for, what did you say, the top kill?
A. We did make some changes in order to run the pod off of the Q-4000.
Q. Okay. What changes?
A. We had to add the hot line and a MUX cable onto the side of it.

Page 17:18 to 17:21

Q. Okay. You had to add a hot line.
Is that what you were going to use to use -- for the top kill?

Page 18:08 to 19:04

Q. That's okay. Why did you add the hot line?
MR. NICHOLS:
Objection, form.
A. We had to get hydraulic fluid to the pod.
EXAMINATION BY MR. WILLIAMSON:
Q. Okay.
A. "We" being all parties involved.
Q. The hydraulic fluid to the pod or to the -- some other function? To the pod?

A. First to the pod.
Q. Okay. So the hot line was for the purpose of making sure you had a hydraulic supply to the pod?
A. Yes, that is correct.
Q. Okay. And the -- and the pod didn't have hydraulic supply because what? Its hydraulic supply line had been cut?
A. Yes, sir. The ROV removed the hydraulic supply line.

Page 19:08 to 19:09

The ROV removed the hydraulic supply line.

Page 19:11 to 20:19

Q. Okay. And then you added something else too.
You added a MUX cable?
A. Yes, sir.
Q. Why did you have to add a MUX cable?
A. To be able to communicate with the SEM inside the pod.
Q. Okay. Because the blue pod, when you pulled it up, did not have a MUX cable attached any longer?
A. That's correct.
Q. Okay. So what you did was, you're having to get some sort of hot line, which is some sort of conduit to supply hydraulic power, and some sort of MUX cable in order to supply electrical power?
A. Yes, sir, that is correct.
Q. And, of course, so that's what you had to put onto the blue pod so you could deploy it back and reattach it to the LMRP?
A. Yes, sir.
Q. Okay. And then did y'all reattach it to the LMRP?
A. Yes, sir.
Q. Okay. And -- and, of course, then a top kill was tried?
A. Yeah.
Q. And it didn't work? It did not stop -- the top kill did not stop the flow of oil from the well?
A. Yes, sir.
Q. That's true, right?
A. That's correct.

Page 21:24 to 23:05

00021:24 Q. All right. The -- okay. Were
25 you there when they pulled the blue pod up?
00022:01 Post explosion, when they pulled the blue pod
02 from the DEEPWATER HORIZON to the deck of the
03 Q-4000, were you onboard?
04 A. I was onboard the Q-4000 when
05 the blue pod got pulled.
06 Q. Right. Were you there when they
07 kind of disassembled the blue pod to see if
08 there's anything wrong with it?
09 A. Yes, sir, I was.
10 Q. Okay. Do you work on pods like
11 that?
12 A. Yes, sir.
13 Q. I haven't asked you, but could
14 you briefly tell me your employment history
15 with Cameron from 1996 up until 2010?
16 A. Yes, sir. In '96 I started as a
17 disassembling blowout preventers at the
18 Liberty plant.
19 Q. You said disassembler?
20 A. Yes, sir. That was where tear
21 down and inspection.
22 Q. Okay.
23 A. Then I moved to the machine
24 shop. I'm not sure on the date. I stayed at
25 the Liberty plant roughly three years in the
00023:01 machine shop when I finished college and then
02 moved over to controls.
03 Q. You were going to college at
04 probably the same time that you were working?
05 A. Yes, sir.

Page 23:13 to 23:25

00023:13 Q. And you obtained your degree in?
14 A. It was electronics
15 instrumentation.
16 Q. Okay. All right. How long did
17 you stay in the machine shop for Cameron?
18 A. I'd say about a year and a half.
19 Q. Okay. Then what'd you do?
20 A. Specialty projects like KT rings
21 and direct hydraulic pod for BP Pompano.
22 Q. BP?
23 A. Pompano.
24 Q. What was BP Pompano?
25 A. It was a production tree.

Page 24:06 to 24:23

00024:06 Q. Okay. And then what'd you do

next?
A. Transferred to the Mangum-Dacoma office which is where controls was for Cameron.
Q. Okay. And what did you do there?
A. Assembly on the shop floor for six months.
Q. Okay. What did you do after that?
A. Was in and out of field service to wire MUX cables and help on SITs and commissioning.
Q. SITs?
A. Yes, sir.
Q. What's an SIT?
A. System integration test.

Page 25:09 to 26:21

Q. You're working in field service for Cameron Controls in connection with blowout preventers?
A. Yes, sir.
Q. Tell me about when you went there. What year approximately?
A. That I went to?
Q. Cameron Controls, doing field service work for blowout preventers?
A. I think it's around 2000. I'm not really sure on the exact date.
Q. Okay. What'd you do after that? How long did you do that work?
A. Until present, basically still working in field service.
Q. Okay. When you work in field service -- you said now you're mostly in the office?
A. Yes, sir.
Q. When did you stop going out on the rigs all the time to go to the office?
A. Roughly about five years ago.
Q. Okay. But you're still called a field service?
A. Yes, sir.
Q. What do you do? Now, the equipment comes to you and you work on it?
A. No, sir. We help with the guys in the field when they're having problems.
Q. Okay. So you act as kind of a support information center for guys who are actually out on the rigs?
A. Yes, sir.
Q. Do I have it right or is that not right?

A. It -- I work with engineering to support the guys on the rig. That is correct.

Page 28:24 to 29:11

Q. How many people are in your position? How many people like you do Cameron have?
A. There's -- usually two. Right now we're down to one.
Q. Okay. And what's your -- tell me again your title, field service?
A. Senior field service technician.
Q. Senior field service technician. How many technicians does Cameron have in the field? The ones you're supporting.
A. Roughly 40.

Page 29:15 to 29:22

Q. Okay. So you work in conjunction with the engineering staff on this issue?
A. Yes, sir.
Q. And you have about 40 -- Cameron has about 40 people. I assume they're all over the world?
A. Yes, sir.

Page 30:04 to 31:11

Q. What do those 40 people do who are field service technicians?
A. Okay. They do maintenance on blowout preventers and install on commission.
Q. What's install on commission? What is install on commission?
A. Installing is where they physically install the blowout preventers on the rig on the new builds, and then they go through a commissioning procedure to make sure the -- the blowout preventers function.
Q. Okay. What if somebody wants to change the ram blocks and go from a SBR ram block to a double-V ram block? Would that be something these field technicians would do?
A. The physical work?
Q. Yeah.
A. Yes, sir.
Q. Okay. So in addition to maintenance and installation and commission

testing, they might also do modifications if some customer wanted to pay for it?
A. Yes, sir, that is correct.
Q. Okay. And is it all blowout preventers? Cameron has another part of its business that's production facilities, right, Christmas trees and production tooling?
A. Yes, sir, it's -- drilling is different than the production side.
Q. Right. I'm trying to make sure. You're working in the drilling blowout preventer side?
A. Yes, sir, that is correct.

Page 32:19 to 33:14

Q. Okay. Tell me what you're considering the control system.
A. The pod, the MUX, and the mod section.
Q. And what's the mod section?
A. It's the hydraulic section of a pod.
Q. Okay. What about all the -- what about the panels that are in the toolpushers on station and the drillers's station and the panel that's in the CCU? Is that also part of y'all's work?
A. Yes, sir.
Q. Part of your work?
A. Yes, sir.
Q. Okay. I want you to tell me a little bit about how that's set up. Were you on the DEEPWATER HORIZON before the blowout?
A. Yes, sir.
Q. How many times?
A. Several.

Page 33:25 to 35:05

Q. -- okay? And I've got a bunch of them here, but I'm not trying to pull them out. I'm just trying to figure out when you remember -- perhaps the way to approach it is: When do you remember being on the DEEPWATER HORIZON?
A. The last time I was on there, I believe, was around five years ago.
Q. Be -- that would put us in about 2006?
A. Yes, sir.
Q. Okay. What were you on there in 2006 for?
A. I don't recall what I was on

there for at that time.
Q. Okay. But at that time you were a field service technician and you would have been on there to perform some either test, repair, maintenance, or modification to the blowout preventer?
A. That is correct.
Q. Okay. Because there was a Cameron blowout preventer on the DEEPWATER HORIZON, correct?
A. Yes, sir.
Q. Now, you would have only been working with the control system of the blowout preventer?
A. Most of the time that's all I worked with was the control portion of the blowout preventer.

Page 36:07 to 39:25

Q. After the explosion who were you working with, with Cameron? Who was out there with you?
A. Carter Erwin.
Q. Who else?
A. Rahim -- I'm not real sure of his last name.
Q. Okay. I'm talking about who else with Cameron. I should have made that clear.
A. Oh, these are all guys with Cameron?
Q. Right. Mr. Rahim, Mr. Carter Erwin. Who else was out there?
A. Eloy and Effran.
Q. Okay. Who else?
A. I think Modella Hoss. That's all I can recall.
Q. Okay. The -- all right. Do you remember the DEEPWATER HORIZON and how the controls were set up before the explosion?
A. Not in detail.
Q. Well, tell me generally. You used a MUX cable and a hydraulic power system, correct?
A. Yes, sir.
Q. Okay. Where was the hydraulic power system on the rig located?
A. If I remember correctly, it was -- through the rack back area in the moon pool, there was two doors, and it would have been -- to the left of that was where the HPU sat.
Q. And the HPU is hydraulic power

unit?
A. Yes, sir.
Q. And it was supposed to provide hydraulic power to the subsea accumulators?
A. It was to supply pressure to the pods and the BOP stack and accumulators.
Q. All right. Okay. Well, let's just start with that. And, of course, I assume from the HP unit there were hydraulic
00038:01 lines that ran down the riser through the moon pool down the riser to the stack, correct?
A. Correct.
Q. Okay. And, of course, you understood the stack had various functions on it?
A. Correct.
Q. Okay. I'm going to give you an example. One function is the BSR function, correct?
A. Yes, sir.
Q. One function would be the casing shear function, correct?
A. Yes, sir.
Q. One function would be to activate the lower annular, correct?
A. Yes, sir.
Q. One function is to activate the upper annular, correct?
A. Yes, sir.
Q. Every one of those require hydraulic power, right?
A. That's correct.
Q. Okay. If you wanted to shut in
00039:01 the upper annular, okay, where would the hydraulic power come from? Does it come from the subsea accumulator bank or does it come from the surface? I'm talking about when everything's working okay.
A. I believe it'd come from the surface.
Q. Okay. Now, if you lost hydraulic power from the surface, still on the upper annular, if you'd lost hydraulic power from the surface, okay, would you still be able to operate the upper annular from the subsea accumulator pack?
A. I'm not sure. We'd have to look at a schematic.
Q. Sometimes -- do you wire all -- them all the same way or you wire them different for different rigs?
A. It's pretty much customer specific how they -- some rigs have.
Q. All right. Did the DEEPWATER

HORIZON have one subsea accumulator bank or more than one?
A. I'm -- I'm not 100 percent certain.

Page 40:09 to 42:14

Q. Okay. You never heard of a subsea accumulator bank like the ones on the LMRP and the other ones on the stack?
A. Yes, sir, I've heard of that.
Q. Okay. I'm trying to figure out if that was the configuration on the DEEPWATER HORIZON.
A. I'm not 100 percent sure.
Q. Okay. What do you think?
A. I think that it had LMRP bottles and a stack bottle.
Q. What are the LMRP -- if it had that -- and we can look at the documents. But if that was the configuration, why would you have a distinct accumulator stack for the LMRP?
A. To have extra pressure supplied at the LMRP.
Q. Okay.
A. Or extra volume supplied at the LMRP.
Q. Right. That gives you subsea accumulators that you can use for the LMRP, right?
A. It gives you volume to use on the LMRP.
Q. Okay. And the LMRP, of course, is the -- has the upper annular and the lower annular, correct?
A. Yes, sir.
Q. Okay. And then what would the BOP stack subsea accumulator bank be used for with that configuration?
A. Your auto shear and your EDS and your high-pressure shear is all I can think of.
Q. Okay. So your auto shear and your EDS and your AMF?
A. Yes, sir, also your AMF.
Q. Okay. Oh, and you said high-pressure blind shear?
A. Yes, sir.
Q. Okay. Did I understand that right?
A. Yes, sir, it does the high-pressure blind shear, too.
Q. So if you activate your high-pressure blind shear from the rig,

everything's fine, nothing's blown up, nothing's exploded, okay?
A. Okay.
Q. You operate your high-pressure blind shear from the rig, you're going to use subsea accumulator volume in order to move those pistons?
A. That is correct.

Page 43:04 to 43:08

Q. Okay. While we're on this, I guess the EDS and the auto shear and the AMF, they are going to use the subsea accumulator bank. Am I understanding that?
A. Yes, sir.

Page 44:20 to 44:23

Q. Okay. So the accumulator stack subsea, DEEPWATER HORIZON, is going to have 5,000 psi available in the bottles?
A. Yes, sir.

Page 45:11 to 45:22

Q. Sure. If I'm going to activate the EDS, you've told me we're going to use the subsea accumulator banks, correct?
A. Yes, sir, if the high-pressure shear is in the EDS sequence, you will use the subsea accumulator bank.
Q. And to get the EDS, you press and hold one button and you press another button up on the two control panels, one of two control panels, right?
A. Yes, sir, you press two buttons to fire the EDS.

Page 46:06 to 47:07

Q. Where can you activate the EDS?
A. The -- the drillers's panel and the toolpusher's panel.
Q. Can you activate it from the CCU?
A. If I recall correctly, yes.
Q. Okay. So you can activate the EDS system from the toolpusher's panel and the driller's panel and the CCU, to the best of your memory?
A. Yes, sir.
Q. And in order to activate it, you

have to push and hold one button and then push a second button, correct?
A. I believe that to be correct.
Q. The toolpusher panel wiring, I guess, runs from the toolpusher's panel on the bridge down to the CCU?
A. No, sir.
Q. Okay. Where does it run?
A. A distribution cabinet.
Q. A distribution?
A. Cabinet.
Q. Okay. Where's the distribution cabinet?
A. I don't recall where the distribution cabinet is exactly on this rig.

Page 47:25 to 48:23

Q. You have a panel in the driller's cabinet, correct? You have a panel that operates BOP functions in the driller's cabinet, true?
A. In the driller's cabinet, yes, sir.
Q. Where does it go? Where does that wiring go?
A. To the distribution cabinet, too.
Q. All right. And you have a panel, and then you have a CCU unit that operates the EDS, to the best of your memory, you don't --
A. Yes, sir.
Q. You're not positive you get EDS from the CCU, but that's your best memory?
A. Yes, sir.
Q. Right?
Okay. Where does that go?
A. The distribution cabinet.
Q. All right. Where does it go from the distribution cabinet?
A. To the MUX cable.

Page 49:12 to 49:15

There's a yellow MUX cable and a blue MUX cable that leave the distribution cabinet and go down the riser?
A. That is correct.

Page 50:01 to 51:21

How big is the distribution

cabinet? Are we talking about a room? Are we talking about a panel? Are we talking about a junction box?
A. A junction box.
Q. Okay. How big a junction box, 2 feet by 2 feet by 2 feet, 10 feet by 10 feet by 10 feet?
A. It's probably 3 foot by 3 foot.
Q. Okay. So it's 3 feet by 3 feet. That's the distribution cabinet, right?
A. Yes, sir. There's two of them.
Q. There's two of them?
A. Yes, sir.
Q. Why?
A. It's for redundancy.
Q. Oh, okay. So there's a distribution cabinet for the yellow pod and a distribution cabinet for the blue pod?
A. Normally it's divided by A and B.
Q. Okay. Explain to me the difference between A and B.
A. In the blue pod, you'll have a A SEM and a B SEM. In the yellow pods you'll
00051:01 have a A SEM and a B SEM.
Q. Okay.
A. So normally, the distribution cabinet will have a yellow SEM wired into it like SEM A, and a blue -- and a SEM B in the yellow.
Q. Okay. So the distribution cabinet, this 3 foot by 3 foot junction box, has the yellow A and B and the blue A and B? Or no, there's two distribution cabinets.
A. There's two distribution cabinets.
Q. All right. Tell me what's in each one.
A. Power supplies and modems to send the signal subsea.
Q. Okay. Are the distribution cabinets set side by side, or are they in different parts of the rig?
A. I can't recall exactly where they had theirs located.

Page 53:17 to 56:25

00053:17 Q. Okay. Okay. So some rigs had the distribution cab -- cabinets in two separate locations; some rigs had the distribution cabinets in the same location?
A. Yes, sir.
Q. Okay. The -- in any event, when you leave the distribution cabinet, you

would -- that would go -- you -- it's that MUX cable that would actually leave the distribution cabinet and go to the top of the riser?
A. No, sir. There's a junction box on the side of the MUX cable that the wires would run to.
Q. Okay. So we leave the distribution cabinet and we go to a junction box?
A. Yes, sir.
Q. How many junction boxes are there?
A. There's one on the blue and there's one on the yellow on the outer part of the MUX cable, and then there's an inner junction box to terminate the MUX cable in.
Q. We're talking about still on the rig. We're not talking about subsea, right?
A. Yes, sir.
Q. Okay. So you have a junction box that the MUX cable leaves the distribution cabinet and goes to this junction box, correct?
A. Yes, sir.
Q. And then you say it's an outer, you call it an outer?
A. Yes, sir, the -- there's an outer junction box on the outside of the frame of the MUX cable. From there it goes to a slip ring, and from the slip ring, it goes to the inner junction box.
Q. Okay. And how many inner junction boxes are there?
A. There's one in each MUX cable.
Q. Okay. For yellow -- one inner junction box for yellow; one inner junction box for blue?
A. Yes, sir.
Q. Are those going to be near the MUX reels?
A. The inners are inside the MUX reel.
Q. Okay. So the junction -- okay. And do the MUX reels -- where do they sit?
A. Normally in the moon pool area.
Q. Okay. So most of the rigs you've been on, you see the MUX reel sitting in the moon pool area?
A. Yes, sir.
Q. And then I assume the MUX cables leave the MUX reels and then go to the top of the riser and on down subsea?
A. Yes, sir.

Q. Okay. All right. So that would mean -- and how far apart -- for those of us who've never been on a rig, how far apart are the two MUX reels?
A. There again it depends on what the contractor sets them at.
Q. Okay. How far -- give me a range.
A. 100-foot, 200-foot sometimes.
Q. Sometimes 100-foot or 200-foot apart?
A. Yes, sir.
Q. And sometimes they're closer than that?
A. Yes, sir.
Q. How close have you ever seen them?
A. Probably within 50 feet of one another.
Q. Okay. But they're still both in the moon pool area?
A. Yes, sir.

Page 57:09 to 57:14

00057:09 Q. I'm trying to figure out how these MUX cables get from the MUX reel into the ocean. You tell me.
A. They go to through a set of sheaves, and they run down the side of the riser.

Page 57:18 to 57:22

00057:18 Q. Is the top of the riser in the moon pool?
A. Yes, sir.
Q. What else is in the moon pool?
A. The T joint, the riser.

Page 58:02 to 59:07

00058:02 Q. Okay. Let's talk about for the DEEPWATER HORIZON.
A. I'm not 100 percent where the engines were because we're not asked to really work on those.
Q. Okay. The -- did Cameron ever give you any training on what's a hazardous area and what's a nonhazardous area?
A. Yes, sir.
Q. Okay. Is a moon pool a hazardous area?

A. I believe the moon pool to be a hazardous area, yes, sir.
Q. That's what Cameron's taught you, right?
A. Yes, sir.
Q. Okay. Has Cameron ever taught you that you don't want these MUX cables to be in a hazardous area? Has Cameron ever taught you that?
A. I'm not aware of that.
Q. Okay. What has Cameron taught you that they don't want in the hazardous area? Has Cameron given you any teaching says, we don't want this part of our system in a hazardous area?
A. No, sir. They let the -- the rigs zone out the areas with engineering. We don't really have anything to do with them. We get there, pretty much everything's already set.

Page 60:05 to 60:17

Q. Have they -- has Cameron ever given you any training on the fact that you don't want your emergency activation systems to be in a hazardous area? Has Cameron ever given you training on that part, that you can recall?
A. Not that I can recall.
Q. Okay. Has Cameron ever told you, when you go out to these rigs, check and make sure the distribution cabinets and the inner junction boxes are not in a hazardous area? Has Cameron ever provided you training on that?

Page 60:22 to 60:22

A. Can you reask the question?

Page 60:24 to 61:03

Q. Sure. Has Cameron ever given you training saying, when you go out to the rigs, make sure that the inner junction box is not in a hazardous area? Has Cameron ever trained you on that?

Page 61:06 to 61:11

A. There again engineering sets where all the stuff goes before we get there.

It's not up to the field service tech to provide where it's going to be sitting at or designate its classification for -- I guess for explosion-proof or nonexplosion-proof.

Page 61:13 to 61:22

Q. My question is very simple. Did Cameron train you on this subject?
A. Not that I can recall.
Q. Okay. And since they didn't train you on the subject, since Cameron did not train you to look for whether the distribution cabinets, the inner junction boxes or the outer junction boxes, Cameron didn't train you on where to look for any of those locations, right?

Page 61:25 to 62:02

A. It's never been the detail of the -- the field service technician to place those objects.

Page 62:04 to 63:12

Q. Therefore, I'm sure when you went to these rigs, you never thought about whether the distribution cabinets, the outer junction boxes, the inner junction boxes, the MUX reels were in a hazardous area or not. That's not something you thought about when you were doing field service work.
Isn't that true, Mr. LeNormand?
A. Yes, sir.
Q. Okay. The -- let's go down the riser.
We now have the MUX cables at the top of the riser. And are they encased beside the riser, or are they actually -- they're not inside it, are they? I assume -- I've always assumed they're in a sheath of some sort on the side of it. Is that not right?
A. They run down the side of the riser in MUX clamps.
Q. Exposed to seawater? Are the MUX cables actually in seawater?
A. Yes, sir.
Q. Okay. When they get down to the stack, to the LMRP, where do they go?
A. To a junction box or the SEM.
Q. More than one junction box or

one junction box?
A. Normally just one junction box.
Q. Okay. So both the yellow MUX cable and the blue MUX cable go into a single junction box?
A. No, sir. A junction box for the blue and a junction box for the yellow.

Page 63:19 to 64:24

Q. Do you know if a modification was ever made on the DEEPWATER HORIZON to that -- to that configuration?
A. I believe when it came out, it went to the junction boxes already. They were there installed when they commissioned it.
Q. Okay. You -- you have to repeat that for me. I'm not sure I understood.
A. I believe that it was there when the rig was manufactured and built.
Q. Right, that there were two junction boxes: One for the yellow; one for the blue?
A. Yes, sir.
Q. I'm trying to figure out if there was a modification made after that to this subsea junction box, or do you know?
A. I believe they were removed.
Q. And combined into one junction box?
A. No, sir. In the MUX cable, plugged directly into the SEM.
Q. Okay. It didn't go through a junction box. The MUX cable plugged directly into each individual SEM?
A. Yes, sir.
Q. And how many SEMs are there?
A. There's two SEMs.
Q. One yellow, one blue?
A. Yes, sir.

Page 66:05 to 67:07

Q. Okay. What training has Cameron given you as to whether it's a good idea or a bad idea to have the MUX cables go directly into the SEM?
A. It's my opinion that it alleviates the junction box, so I mean, it's -- it's okay.
Q. Okay. So as far as Cameron's concerned, in terms of the training that they provided to you, Cameron has never told you

there's anything wrong with that?
A. Not that I can recall.
Q. Okay. All right. Let's go back up on the rig.
You have a toolpusher's control panel, a driller's control panel and a CCU control panel, or at least you did on the HORIZON, correct?
A. Yes, sir.
Q. And all three of those are going to feed into a distribution cabinet, correct?
A. Come and feeding the two distribution cabinets, yes, sir.
Q. Okay. So the toolpusher -- just to use the toolpusher's panel as an example, it's going to feed into two distribution cabinets, right?
A. Yes, sir.

Page 67:13 to 68:14

Q. Okay. By the way, what happens if the rig loses power? Is there an independent source of power for the toolpusher's panel?
A. If the rig loses power, the whole system's on the UPS backup.
Q. What's UPS?
A. Un -- uninterruptible power supply.
Q. Okay.
A. So battery backup, in a sense.
Q. Okay. So even if the rig was to lose power, you should still have power at the toolpusher panel?
A. That is correct.
Q. All right. The -- okay. Is that -- where are those batteries located? Are they located in the toolpusher panel itself?
A. No, sir. They're -- all the power that feeds the panels feed through the UPS, and the UPS is what powers up the distribution cabinets to feed power in.
Q. Okay. So the UPS is located in the area of the distribution cabinets?
A. Or in some remote location, yes, sir.

Page 69:23 to 70:10

Q. Okay. And is there one UPS?
A. No, sir, there's two.
Q. Okay. And there's two UPSs. Is

that broken down by the one for the toolpusher panel, one for the driller's panel?
A. No, sir, it's broken down by Distribution Cabinet A and Distribution Cabinet B.
Q. Okay. And A runs to both the yellow pod and the blue pod and B runs to both the yellow pod and the blue pod?
A. Yes, sir.

Page 70:23 to 71:06

The wiring from the distribution cabinet runs to the outer junction boxes, one outer junction box for the yellow pod, one outer junction box for the blue pod?
A. And it runs to all the panels to -- the distribution cabinet sort of kind of the central place to pull power and communication. So everything feeds in and out of the distribution cabinet.

Page 71:13 to 73:01

The toolpusher's panel, the driller's panel, and the CCU panel feed to the dis -- two distribution cabinets, correct?
A. That's correct.
Q. And then the two distribution cabinets feed to the outer junction boxes, correct?
A. That's correct.
Q. And each distribution panel -- each distribution cabinet feeds to each outer junction box. Do I have that right?
A. Each distribution cabinet feeds to both junction boxes.
Q. Right?
A. Right.
Q. Okay. And the outer junction boxes, one's for the yellow pod, one's for the blue pod?
A. That's correct.
Q. Okay. And are the outer junction boxes -- I haven't asked you where they're located -- are they in the vicinity of the MUX cable reel?
A. Yes, sir.
Q. And by "the vicinity" what, 4 or 5 feet?
A. Mounted on the MUX cable reel.
Q. Oh, okay. So when we leave the

distribution cabinet with wiring that goes to the MUX cable reel, that wiring goes to the outer junction box, correct?
A. That is correct.
Q. And that outer junction box feeds the inner junction box?
A. That is correct.
Q. And the inner junction box feeds the MUX cables?
A. That is correct.

Page 73:06 to 74:04

Q. Sure. The outer junction box is attached to the MUX cable reel, the inner junction box is inside the MUX cable reel, correct?
A. That is correct.
Q. And both MUX cable reels are in the moon pool?
A. That is correct.
Q. Okay. I want to ask you about EDS. Have you ever heard of something called EDS-1 and EDS-2?
A. Yes, sir.
Q. Okay. What is EDS-1?
A. It's a -- predetermined program functions that are -- when you push the button, this chain of events happens.
Q. Okay. EDS-1, then, is just a -- well, how many different EDS functions are there on rigs?
A. Depends on the drilling contractor and --
Q. Sure. What's the most you ever remember seeing?
A. Probably three.

Page 75:02 to 75:19

Q. Mr. LeNormand, I asked you -- you said you'd seen three different EDS configurations that you can recall. Please tell me what they are.
A. The EDS-1 would be a -- with the blinds shears sealing closed, and EDS-2's going to be casing shear and blind shear, and then EDS-3 is going to be a -- it basically locks out your EDS functions. So if you're running your riser, you can't accidentally hit the EDS and drop it.
Q. Okay. Would all of those functions have been on the DEEPWATER HORIZON?
A. I can't recall.

Q. Okay. What training does Cameron give you about which of those EDS functions should be in operation at any given time?

Page 75:22 to 76:02

A. Cameron doesn't set the EDSs. That's the -- basically the drilling contractor sets what they want to fire and when they want it to fire and a time sequence, and that's done through engineering.

Page 77:22 to 78:03

Q. Okay. I'm -- I know. I'm trying to figure out if you've given them the benefit of your knowledge or Cameron's knowledge on how the EDS should be programmed.
Do you share that with the customers?

Page 78:06 to 78:08

A. No, sir, I do not tell the drilling contractors how they need to use their EDSs.

Page 78:10 to 79:01

Q. Now, the EDS systems, so I make sure, it uses the subsea accumulator bank in order to power the hydraulics, correct?
A. For the high pressure shears, only thing I can recall that it uses it for.
Q. Okay. High pressure blind shears, right?
A. That's correct.
Q. By the way, do you concern yourself with what pipe is shearable, what tubulars -- you know what I mean by "tubulars"?
A. Yes, sir.
Q. Tubulars would include drill pipe, casing, coiled tubing, wireline, production casing, right?
A. Yes, sir.

Page 80:24 to 81:25

00080:24 Q. Okay. The -- what were you
25 doing out there in the testing phase?
00081:01 A. Answering DNV's question.
02 Q. Can you remember anything they
03 asked you?
04 A. They asked about how to tear the
05 annular apart.
06 Q. Okay. Did you answer that?
07 A. Yes, sir.
08 Q. Did you know?
09 A. Yes, sir.
10 Q. Did they follow your
11 instructions or follow your -- your
12 suggestion?
13 A. To the best of my recollection,
14 yes, sir.
15 Q. Okay. Anything else?
16 A. How to run the PETU.
17 Q. Okay. Which is the electronic
18 test unit?
19 A. Yes, sir.
20 Q. Portable electronic test unit?
21 A. Electronic test unit.
22 Q. Is there a PETU out on every one
23 of these rigs?
24 A. When the system is sold, it's
25 sold with the PETU.

Page 82:18 to 83:16

00082:18 Q. Okay. By the way, did you --
19 did, in fact -- which annular did DNV take
20 apart?
21 A. They took the lower and the
22 upper annular apart.
23 Q. Okay. What did -- were you
24 there when they did it?
25 A. Yes, sir.
00083:01 Q. Did you see the lower annular?
02 A. Yes, sir.
03 Q. Was it closed or open when they
04 took it apart?
05 A. I'm not exactly sure of the
06 position of the pistons. When they pulled it
07 apart, it had been functioned.
08 Q. Was it eroded?
09 A. I don't recall. I didn't get a
10 look in -- directly into the annular. I had
11 to stand back and just answer questions.
12 Q. Okay. You never got to see the
13 annular itself?
14 A. I seen the cap when they pulled
15 it out. I never looked down through the
16 annular, no, sir.

Page 86:03 to 87:12

00086:03 Q. As a field service technician,
04 did you know or have you ever heard that you
05 want to use EDS-2 when you have string across
06 the blowout preventer that may not be
07 shearable?
08 A. In EDS-2, which set of rams are
09 you referring?
10 Q. By the blind shear rams.
11 I'm sorry. EDS-2 is you fire
12 the casing shear rams, then the blinds shear
13 rams.
14 A. Yes, sir, I was aware that if
15 you're running something through there, you'd
16 want the casing shears to fire first, and the
17 blind shears are behind it.
18 Q. Okay. So if you're running a
19 string across the -- if you're running a
20 string across the blowout preventer that may
21 not be shearable, you're going to want to
22 program EDS-2. You just know that as a
23 result of working for Cameron for the last
24 several years?
25 A. That is correct. Engineering
00087:01 normally handles, you know, the programming
02 and all that other situation.
03 Q. That's fair enough. I'll ask
04 engineering. But right now I've got you
05 today. So I need to ask you, you know.
06 Your understanding is, if you're
07 running a nonshearable string across a
08 blowout preventer, you would want to be --
09 have the unit programmed for EDS-2, correct?
10 A. If I was running a nonshearable
11 across there, yes, sir, that's what I would
12 want to do.

Page 87:22 to 87:22

00087:22 (Exhibit 3600 marked.)

Page 89:05 to 89:08

00089:05 Q. Okay. So this would be the sort
06 of manual that would be in the rig book
07 located on the rig, correct?
08 A. As far as I'm aware, yes, sir.

Page 91:24 to 94:12

00091:24 Q. Yeah. Cameron, as part of its
25 control system, has an acoustic trigger

system available, correct?
A. Yes, sir, Cameron makes an acoustic system.
Q. Have they made it and had it available -- since when, do you know?
A. I don't know the exact date, but it's been around for a while.
Q. I will tell you Cameron's answered paper discovery in this case where they said that in 1999, which is when they built the DEEPWATER HORIZON, that's when that process started on the Cameron blowout preventer on the DEEPWATER HORIZON, they had an acoustic trigger available.
Do you remember that?
A. Yes, sir. We have some rigs from the same era that have acoustic system on them.
Q. Have your acoustics -- have you had problems with the reliability of your acoustic systems?
A. I wouldn't be, I mean, that aware -- we've had problems with systems, but I wouldn't say that we had a lot of problems with acoustic systems.
Q. Okay. What kind of problems have you had with acoustic systems?
A. It's -- normally it's just having answer-backs, from my experience with them.
Q. Okay. And by "answer-backs," you mean actually communicating with the BOP stack subsea?
A. Or surface is mainly where my experience lies.
Q. Okay. Tell me what you mean by that.
A. When it talks back and forth, it -- you've got to have water or something to help the signal not reflect back. So when you try to function them on surface, sometimes you don't get an answer back.
Q. Are you talking about the answer back from the BOP stack subsea?
A. From the acoustic valve module.
Q. Subsea?
A. No. This is on the surface is the only place I've ever experienced problems personally.
Q. Okay. I'm still not following you.
A. The -- you test the acoustic system on surface on our SITs, and I've seen a couple times where the answer-backs, due to reflection on surface, would cause problems.

But I've never tested one subsea.
Q. Okay. Let me ask -- okay. So what you have is -- oh, you're talking about when the answer -- you're talking about when the BOP stack is on deck during the system integration test?
A. Yes, sir.

Page 94:16 to 95:18

Q. Okay. What you're saying is, when the BOP is on deck and you have an acoustic system, you can test to see if the acoustic system's working properly?
A. That is correct.
Q. But since the medium between the remote control unit and the BOP stack is air, sometimes you have problems conducting the test?
A. That is correct.
Q. Okay. But as far as you know, when the -- when the BOP stack is deployed under the water, you don't know of any problems in terms of the operation of your acoustic trigger system?
A. I personally never tested one subsea with an acoustic system.
Q. I know. I'm asking something a little different.
I'm asking have you -- have you had customers call up and say, our acoustic trigger system's not working and it's subsea?
A. Not that I can recall.
Q. Okay. So to your knowledge, in the ten years -- last ten years, on Cameron's acoustic trigger systems, you've had pretty good reliability in terms of customer complaints?

Page 95:21 to 95:22

A. I haven't got that many customer complaints, if that's what you're asking.

Page 95:24 to 96:22

Q. Yeah, that is what I'm asking, you know; namely, have -- do you remember anybody complaining that the acoustic trigger system did not work on their rig when the BOP stack was underwater?
A. Not that I can recall.
Q. Okay. Well, don't they test it

when it's underwater?
A. That's left up to the drilling contractors.
Q. Fair enough. Wouldn't you recommend they test it to make sure it's working?
A. I would recommend them test it, yes.
Q. Sure. And is there a test available? In other words, is it possible -- with Cameron's acoustic trigger system, is it possible to test to make sure it's working?
A. Yes, sir, that is correct.
Q. Okay. So there's a test available, and you've done that test when it's on the surface, correct?
A. Yes, sir.

Page 98:02 to 99:23

Q. Okay. In the last ten years, you cannot recall one -- you've been in the field service area for the last ten years.
Did I understand that right?
A. Yes, sir, I believe.
Q. Okay. And for the last five years, you've been in the office where you're helping all your field service techs?
A. Yes, sir.
Q. Right? And you cannot recall one single time that a customer has called in and says, Cameron's acoustic trigger system did not work when I needed it?
A. I do not recall anyone calling in and telling me that it did not work.
Q. Okay. And you cannot recall one single time in the last ten years when anyone called in and says, "We're testing the Cameron acoustic system and it does not work except for some surface tests"?
A. Yes, sir, I don't recall that -- anybody calling in ex -- having problems except for some surface test.
Q. And to your knowledge, nobody's called in and says, "Your acoustic trigger system is just no good, and we can't get it to work." You don't recall a single complaint like that?
A. I don't recall, no, sir.
Q. Okay. Now, you can program the acoustic trigger to run one of the -- one or more of the BOP functions, correct?
A. That is correct.
Q. So if you want to use an acoustic trigger system to function EDS-1,

you can program it that way?
A. No, sir.
Q. Okay. Tell me why not.
A. EDS-1 is a set of preprogrammed commands that are sent through the SEM. On an acoustic system, you can do a single valve function where you pull on the solenoid value and you fire one valve at a time. You can't do a multiple-valve function --
Q. Okay.
A. -- that I'm aware of there on an acoustic system.

Page 99:25 to 100:20

Tell me: With an acoustic trigger system, can you function the blind shear ram?
A. If you --
Q. If you program it that way?
A. If you program it that way, yes, sir.
Q. Could you function where you do the casing shear ram if you program it that way?
A. If you program it that way.
Q. Could you do it where you would do the casing shear ram, then the blind shear ram?
A. It's the -- you'd have to send two different valve commands in order to do that.
Q. Okay. But it could be programmed that way, you just have to send two different commands?
A. Yes, sir.

Page 101:17 to 102:20

Q. Okay. So let me back up and make sure I understand your testimony.
Cameron does have, since 1999, an acoustic trigger system available, correct?
A. That is correct.
Q. And the acoustic trigger system is basically a remote control way to activate a BOP function, correct?
A. Yes, sir, I believe that to be correct.
Q. And if a customer wanted, they could take the acoustic trigger system and make it where it would activate the blind shear ram function on a blowout preventer,

correct?
A. I believe that to be correct.
Q. Okay. And the remote control unit could be located anywhere, right?
A. I believe that to be correct, also.
Q. Okay. So you could have the remote control unit in a nonhazardous location on the rig, correct?
A. Yes, sir.
Q. And the acoustic trigger system is not dependent upon the MUX cables being connected, true?
A. That is correct.

Page 103:11 to 103:16

If the accumulator bottles subsea are charged and you lose hydraulic power on the rig, you could use an acoustic trigger system to fire the blind shear rams if you had it programmed that way, correct?
A. I believe that to be correct.

Page 103:25 to 104:09

Q. You assist in maintaining it for Cameron's customers?
A. Yes, sir.
Q. And you've had pretty good luck with the acoustic trigger systems that y'all have out there --
A. To my --
Q. -- in terms of customer complaints about reliability and function?
A. To my knowledge.

Page 105:08 to 105:12

Q. Isn't there a box that actually has the -- the buttons where you actually activate the acoustic trigger?
A. It's about the size of a suitcase.

Page 105:23 to 106:01

Q. It would have a -- it would -- through a signal it could remotely activate a blowout preventer function, correct?
A. I believe that to be correct.

Page 107:01 to 107:20

Q. And you have a receiving antenna on the blowout preventer stack under water, correct?
A. Hydrophone, yes, sir.
Q. Okay. And that's the part you need to make it work, correct?
A. You also need a acoustic valve package module.
Q. Fair enough.
And that is where, attached to the blowout preventer stack?
A. Yes, sir.
Q. I'm trying to figure out, God forbid, something happens to the toolpusher control panel and, God forbid, something happens to the driller's rig control panel, the acoustic trigger system should still work, correct?
A. That is correct. That is correct.

Page 108:09 to 108:12

Q. Are you aware that every rig off the coast of Brazil has an acoustic trigger system?
A. It --

Page 108:15 to 108:15

A. Yes, sir, I am aware of that.

Page 109:18 to 109:25

Q. Sure. Can you see the safety features of an acoustic trigger system?
A. I can see the value of having one, yes, sir.
Q. What's the value of having one, Mr. LeNormand?
A. I think it would be a good backup.

Page 111:17 to 111:18

(Exhibit No. 3601 marked for identification.)

Page 114:03 to 115:10

00114:03 Q. By the way, the AMF system -- you know what the AMF system is on the subsea blowout preventer like the DEEPWATER HORIZON, right?
A. Yes, sir.
Q. Cameron had what they called an AMF system, which stood for automated mode -- automated mode function, correct?
A. Yes, sir.
Q. It was sometimes called the deadman system, correct?
A. That is correct.
Q. Okay. And it's supposed to work automatically if certain conditions are met, correct?
A. Yes, sir, certain conditions are met, it's supposed to work.
Q. All right. And I assume the conditions are programmed?
A. The -- some of the conditions are programmed, and some of it's human interaction. I mean, you have to arm it.
Q. Okay. So once it is armed, once
00115:01 the AMF is armed -- how do you know if it's armed, by the way?
A. You can look on the event logger.
Q. Okay. And does the event logger go to the beach?
A. Not that I'm aware of.
Q. Do we have the event logger for the DEEPWATER HORIZON?
A. Not that I'm aware of.

Page 116:18 to 117:03

00116:18 What is the event logger?
A. It's a tool used to help troubleshoot and record functions that happen on the stack.
Q. How?
A. How does it work or --
Q. Uh-huh.
A. When you make a function on a
00117:01 panel, it's sent to a -- a tech's file saying that a certain function happened at a certain time on a certain date.

Page 119:01 to 122:07

00119:01 Q. The rig's not blown up, the blowout preventer's working, the event logger is working. If they tried to close the lower annular, would that show up on the event

logger?
A. Yes, sir.
Q. Okay. If they tried to close the lower annular and with 1500 psi, would that show up on the event logger?
A. The regulator pressure will show up on the event logger, and the function will show up on the event logger.
Q. Okay. So the answer's "yes," if they were using 1500 psi to close the lower annular, that will show up on the event logger?
A. That is correct.
Q. Okay. And if they're using -- if they upped it and they were using 1900 psi to try to close the lower annular, that will show up on the event logger?
A. That is correct.
Q. Okay. Now -- and then if 20 minutes later they tried to close the variable bore rams, the middle pipe rams, that would show up on the event logger?
A. That is correct.
Q. Okay. And if I assume -- what if there's a malfunction? What if the variable bore rams would not close? Would that show up on the event logger?
A. If the command wasn't answered back or --
Q. Yeah. I mean, if the -- if they didn't seal the well, does that show up?
A. The -- the functions that are sent to the SEMs is what's going to show up on the event logger.
Q. Okay. So you have to look somewhere else to figure if you -- just for an example, if you closed the -- I'll use the lower annular.
If you closed the lower annular or activated the lower annular, that's going to show up on the event logger, correct?
A. Yes, sir.
Q. Whether the lower annular actually sealed the well won't be on the event logger?
A. The best of my knowledge, no, sir.
Q. Okay.
A. You are correct.
Q. Okay. Now, the question was: This information on the event logger, where is it stored?
A. On the event logger.
Q. I know. Where is it physically?
A. It's on the rig.

Q. Okay. Where is it physically on the rig?
A. In a predetermined location by Transocean. We don't tell them where they need to put it or --
Q. Okay. So have you seen rigs where it's in the driller's cabin, or have you seen rigs where it's in the toolpusher's cabin, or is it in the blowout preventer room, or all of the above?
A. All of the above.
Q. Okay. And is the printout hard copy or is it digital? In other words, do you read it off a computer screen, a monitor of some sort?
A. You can print it off, but it's also digital in the tech's files.
Q. Okay. Now, my question when I started this was: Does the data that comes into that event logger that shows you a record of what happened on the blowout preventer, does that data automatically go onshore to some source?

Page 122:10 to 122:10

A. Not with the Cameron system.

Page 122:12 to 122:17

Q. Okay. Can it be programmed or made where it will go onshore?
A. Cameron does not offer that feature, but yes, you can --
Q. Okay.
A. -- send it in.

Page 123:08 to 123:12

Q. Okay. So if a customer wanted, a customer could actually have the data that's on the event logger sent to the beach so that that material could be reviewed and monitored, correct?

Page 123:15 to 123:16

A. If the customer wanted to, yes, sir.

Page 126:11 to 127:03

00126:11 Q. Okay. Is there a pressure or
12 temperature sensor on the blowout preventer?
13 A. Yes, sir.
14 Q. What does it measure?
15 A. Temperature and pressure.
16 Q. Okay. Temp -- what temperature
17 and what pressure?
18 A. I can't recall specifics on
19 them.
20 Q. Was it measuring the temperature
21 of the fluids that are in the blowout
22 preventer at that time?
23 A. Measures the temperature and the
24 pressure from the wellbore, yes, sir.
25 Q. Okay. So the wellbore as it
00127:01 exists at the location of the blowout
02 preventer?
03 A. Yes, sir.

Page 129:15 to 129:22

00129:15 Q. All right. Can the temperature
16 be displayed on the control panels if -- can
17 the Cameron unit be hooked up so that the
18 temperature at the blowout preventer can be
19 displayed on the control panels?
20 A. Yes, sir.
21 Q. And you've seen that happen?
22 A. Yes, sir.

Page 130:10 to 130:18

00130:10 Q. Okay. Can the pressure that's
11 in the wellbore be displayed on the control
12 panels in addition to being displayed on the
13 event logger?
14 A. I believe that to be true, yes,
15 sir.
16 Q. Okay. And what does that tell
17 you?
18 A. The pressure inside the stack.

Page 132:23 to 139:25

00132:23 Q. Okay. The next thing is: I
24 want to go back to the AMF, automated mode
25 function deadman system. Fair?
00133:01 A. Yes, sir.
02 Q. Okay. That system on the
03 Cameron blowout preventer is operated by
04 batteries, right?
05 A. That is correct.
06 Q. On the DEEPWATER HORIZON, the

AMF had a sequence of things that had to happen in order to activate, correct?
A. Yes, sir.
Q. Okay. What had to happen?
A. I believe the system needed to be armed.
Q. Okay.
A. You had to lose loss of hydraulics.
Q. That means the loss of hydraulics from the surface?
A. Yes, sir.
Q. Okay. Okay.
A. Loss of electrical.
Q. That means loss of electrical through the MUX cables?
A. Yes, sir.
Q. Okay. What else?
A. Once you lost your electricals, you'd lose the heartbeat between the two SEMs and the deadman should fire.
Q. So the third thing is you had to lose communication between the two SEMs?
A. Yeah.
Q. Did I understand that right?
A. You had to lose communication between the SEMs.
Q. How many SEMs are we talking about, two SEMs?
A. Four SEMs.
Q. Okay. Two yellow and two blue?
A. Yes, sir.
Q. Do you have to lose communication between all four of them? In other words, to the two SEMs that are in the yellow POD, did they lose communication with each other?
A. The heartbeat would be a better terminology. You lose the heartbeat between them.
Q. Okay. And the heartbeat comes from surface power?
A. No, sir.
Q. Okay. I'm -- you're going to have to educate me on how that's going to work.
A. The -- once you lose the loss of electric and the loss of hydraulics, the deadman card boots up to see if it's the only SEM available.
Q. Okay. Deadman card boots up once you lose hydraulics and electrical, correct?
A. Yes, sir, I believe that to be correct.

Q. What happens if you just lose hydraulic? Will the deadman card not boot up?
A. If you just lose hydraulics --
Q. Uh-huh.
A. -- no, sir, the power's still on the CPUs.
Q. So the answer is the deadman card will not boot up?
A. If you just lose hydraulics.
Q. Correct.
A. No, sir.
Q. All right. Let's go the other way.
A. Well, I'll take -- not that I'm aware of. Let me rephrase that.
Q. Fair enough. And then -- but this is the system you do repair?
A. Yes, sir.
Q. This is the part of the system you do know?
A. I believe that to be true.
Q. Right. Okay. Let's take it the other way. What happens if you just lose electrical but you still have the conduit line running from the rig floor?
A. The deadman card boots up and checks for hydraulic power via batteries.
Q. And if it finds hydraulic power?
A. Then it doesn't actuate.
Q. Okay. What would it take to find hydraulic power?
A. Pressure to be on the pressure transducer.
Q. All right. If you lost your hydraulic power unit on the rig, wouldn't you still have hydraulic pressure as long as the system remained intact?
A. Depends on the circumstances.
Q. Okay. Can you explain that to me? I'm trying to figure out if something knocked out the hy -- the HPU -- hydraulic power unit, I believe y'all call it?
A. Yes, sir.
Q. HPU, right?
A. Yes, sir.
Q. Okay. I assume that has some sort of a motor engine attached to it?
A. Yes, sir, but you've got accumulators to back that up on the surface.
Q. Yeah, you're -- you're -- and that's where I'm going with this. I assume you have some sort of a motor or an engine that will power the accumulator bank on the surface, true?

A. That's true.
Q. What kind of motor or engine is it?
A. It's usually electric pumps.
Q. Okay. So you have an electric pump that charges the surface accumulator bank?
A. Yes, sir.
Q. And then the surface accumulator bank makes sure that it feeds pressure to the subsea accumulators?
A. If the valves are lined up, yes, sir.
Q. Yeah, assuming it's all operational --
A. Okay.
Q. -- and set up correctly, right?
A. Correct.
Q. Okay. Which on a drilling rig that's drilling an oil well and there hasn't been an explosion and there hasn't been a -- you know, anything to disrupt normal operations, it should be lined up so that the motor is feeding the surface accumulator bank and the surface accumulator bank is feeding the rigid conduit line. Do I have that right?
A. Yes, sir.
Q. All right. And what I'm trying to figure out is if I knock the motor out, the electric motor out on surface, but I don't destroy the integrity of the surface accumulator bank, will I still have hydraulic pressure in the rigid conduit line?
A. Yes, sir.
Q. Therefore, the AMF will not fire?
A. Under those circumstances, I believe you'd be true.
Q. Okay. Is that -- and so my next question is: If I knock out the electric motor, will the integrity of the surface accumulator system stay intact?
A. It depends on how you knock out the electric motor on that.
Q. Okay. But if all I do is turn the motor off or clip the wires to the motor, that in and of itself will not destroy the integrity of the surface accumulators, correct?
A. I believe that to be true, yes.
Q. But what you're saying is, gee, you could destroy the lines that are feeding hydraulic pressure which would cause a leak in the surface hydraulic system which would

destroy the integrity of the surface accumulator system?
A. I believe that to be true, yes, sir.

Page 140:17 to 143:12

Q. And, of course, if you have not lost hydraulic power, the AMF will not fire even if you've lost electrical power?
A. I believe that to be correct.
Q. The rigid conduit line runs alongside the riser down to the stack?
A. That's correct.
Q. Where does the rigid con -- and the rigid conduit line is the hydraulic link between the surface accumulators and the BOP stack, correct?
A. It's one of the links.
Q. All right. What are the other links? I'm talking about hydraulic links.
A. The hot line.
Q. Okay. And where does the hot line run?
A. Normally beside the MUX cable.
Q. Okay. I meant where does it originate, where does it end?
A. It's normally on the spool in the moon pool and runs to the conduit valve package.
Q. Conduit valve package?
A. Yes, sir.
Q. Okay. So you have two hydraulic lines running from the surface down subsea, correct, the hot line and the rigid conduit?
A. Yes, sir.
Q. What's the -- what is the rigid conduit supposed to be doing? When it gets subsea and it has hydraulic fluid and hydraulic pressure, where is it delivering that hydraulic fluid and hydraulic pressure to?
A. The conduit line delivers to the conduit valve package which in turn's the main supply for the pods and the BOP.
That doesn't answer your question?
Q. Sort of. We're getting there.
You have hydraulic needs for the pods, correct?
A. That is correct.
Q. And you also have hydraulic needs for the subsea accumulator pack, correct?
A. That's correct.

Q. I'm trying to figure out where that's coming from. In other words, do you have one line that runs and then it's -- Ts off and part of it goes to the pods and part of it goes to the subsea accumulators, or -- or do you just have two separate sources of hydraulic power for them?
A. The one line that if you select a conduit, you're using it to supply the pods, the accumulators, and everything. It's your one source for hydraulic supply.
Q. Okay. But you've got two different lines: You've got a hot line, you've got a rigid conduit line?
A. Yes, sir.
Q. Which one do you use? Do you select?
A. The hot line's purpose is, when you're running subsea, your conduits are not hooked up; so therefore, you can't keep pressure in your pods to keep the connectors latched. So you run on your hot line normally.

Page 148:05 to 148:18

Q. Okay. Normally the pressure that's actually delivered to the blind shear rams is designed to be 4,000 psi.
Does that sound right?
A. It depends on the rig. It's normal, though, for rated working pressure.
Q. Okay. What is -- what are you calling rated working pressure? What is that?
A. It's the pressure that the -- I guess the BOP's designed to work at.
Q. Okay. And that varies from BOP to BOP?
A. Yes, sir.

Page 150:23 to 152:02

Q. Okay. But you do know there's a regulator that will regulate the amount of pressure that will be delivered to the blind shear ram pistons? You do know that?
A. Yes, sir.
Q. Will leaks affect that pressure?
A. There again, I'm not an engineer. I'd --
Q. Okay.
A. -- rather defer back to them.
Q. Have you ever seen a situation

where leaks will affect that pressure?
A. I mean, if the leak was greater than what it was putting out, then, I'd assume that it would have --
Q. Okay.
A. -- affect the pressure.
Q. All right. Now, I want to return to the subject of the batteries that are in the SEMs that are in the pods, okay?
A. Okay.
Q. The system that was on the DEEPWATER HORIZON, there was no way to monitor the status of those 27-volt batteries, true?
A. That is correct.
Q. Did Cameron ever discuss that with you and says, we have a system here, but we really can't tell what the status of the batteries are in the SEMs?

Page 152:06 to 152:06

Q. Was that subject ever discussed?

Page 152:09 to 152:17

A. Cameron sent out a letter stating the number of cycles that you needed to fire with your deadman and the years that the batteries needed to be changed out.
EXAMINATION BY MR. WILLIAMSON:
Q. Okay. So there's -- I think it's an engineering bulletin.
Does that sound right?
A. I believe that to be correct.

Page 152:23 to 153:04

Okay. Other than that, other than the engineering bulletin Cameron put out, did Cameron ever discuss with you, the service tech, as to whether there was a good system or a bad system that we have 27-volt batteries at the bottom of the ocean and we cannot check on what status they are?

Page 153:07 to 153:11

A. We didn't discuss the condition of the battery. We discussed the amount of times it needed to be fired and the maintenance that -- which it needed to be changed out, the intervals.

Page 155:21 to 155:24

00155:21 Q. Okay. Does -- by the way, does
22 Cameron sell a system where you can charge
23 those batteries?
24 A. I believe that to be correct.

Page 156:11 to 156:14

00156:11 Q. Okay. Tell me what it is.
12 A. I -- I just heard engineering
13 talk about the rechargeable batteries for the
14 new style SEMs.

Page 159:08 to 161:22

00159:08 Q. Have you ever seen the
09 circumstance where the batteries were so
10 discharged they could not energize the
11 solenoid?
12 A. Not that I can recall.
13 Q. Okay. All right. Tell me about
14 the system that Cameron does sell.
15 The system that y'all sell still
16 does not monitor the batteries; there's no
17 way to monitor and see what their status is?
18 A. That -- that question probably
19 would be better direct -- I'm not real
20 familiar with that system.
21 Q. Okay. So you don't know if it
22 monitors them or not?
23 A. No, sir.
24 Q. All you know is engineering has
25 told you that it will charge the batteries?
00160:01 A. Yes, sir.
02 Q. Okay. And you don't remember
03 ever personally dealing with that system?
04 A. That is correct.
05 Q. Did Cameron ever tell you to go
06 tell the customers that they needed that
07 upgrade?
08 A. Not that I can recall.
09 Q. Okay.
10 A. It's --
11 Q. Can you see the value -- I'm
12 sorry I didn't mean to interrupt you.
13 A. Oh. But it's not -- I don't
14 deal with them on as far as trying to sell
15 them equipment and their upgrades. That's
16 done through some different folks.
17 Q. Can you see the value of having
18 a way to charge those batteries when they're

in the SEMs?
A. I meant, I believe the old way was fine if the EBs are followed. And I hadn't seen that big a problem with them.
Q. Okay. Why did Cameron come out with this system?
A. I would have to say that it was probably customer-driven.
Q. Okay. And why --
A. So --
Q. -- would customers want it?
MR. NICHOLS:
Objection, form.
A. That, I can't answer. It would be better directed towards the customers.
EXAMINATION BY MR. WILLIAMSON:
Q. Sure. Let me see if I can approach it this way: If you had a way to charge the batteries, that would be an extra level of redundancy, wouldn't it?
A. You would think.
Q. Right. I would think.
And -- and an extra level of redundancy on something as critical as the AMF is a good thing.
Can we agree on that?
MR. NICHOLS:
Objection, form.
A. I would think so.

Page 162:05 to 162:19

Q. Oh, I tell you before I do that -- I apologize -- would you turn back to Exhibit No. 3600.
I told you I had some questions about that, and I deferred them until I made sure I had copies.
Do you see Exhibit 3600, a document that's entitled "BOP Basic Operation Manual"?
A. Yes, sir.
Q. And it says "For Standard Systems Thirds Generation."
Is that what was on the DEEPWATER HORIZON, the third generation?
A. I believe that to be true.

Page 163:10 to 164:03

Q. First sentence of page 50: "A general overview drawing of the system shows you that the system is located in two different areas. One area is classified as

safe area, and the other area is classified as hazardous area."
Does that sound right to you?
A. That is correct.
Q. Okay. Okay. And it says. Then, under safe area, it says: The safe area is typically classified as a nonexplosion-proof area, correct?
A. Yes, sir.
Q. Okay. "And then the following equipment will be located. TSP, the wheelhouse panel."
Did I read that right?
A. Where are you at on the -- oh, you're right here.

Page 164:06 to 164:06

A. Yes, sir.

Page 164:08 to 164:25

Q. Okay. Why would -- what is the TSP, the wheelhouse panel?
A. It's -- the wheelhouse panel is normally mounted on the bridge on most rigs.
Q. So that's what we sometimes call the toolpusher control panel?
A. No, sir. Some rigs got them actually in the toolpusher's office.
Q. Okay. Is that the second panel in addition to the one on the rig floor that will activate the BOP functions?
A. I believe that to be true.
Q. Okay. Why do you want it in a safe area? Why does Cameron recommend that this be in a safe area?
A. Not in engineering. I don't know why they would recommend putting it in the safe area.

Page 165:08 to 165:16

Q. Okay. Then next is Distribution Cabinet A and Distribution Cabinet B, right?
A. Yes, sir.
Q. Okay. So according to this, those two distribution cabinets that you told me about, they're supposed to be in a safe area?
A. I believe that to be true per the document.

Page 166:20 to 167:19

00166:20 Q. Right. But the cables that
21 leave the distribution cabinets go to an
22 unsafe area; namely, the moon pool, correct?
23 A. In some instances.
24 Q. In all instances, all the MUX
25 cables go to the top of the riser, right?
00167:01 A. In the moon pool?
02 Q. Uh-huh.
03 A. That is correct.
04 Q. And the moon pool is a hazardous
05 area, isn't it?
06 A. I believe that to be true.
07 Q. Okay. As a matter of fact, it
08 says so down here two paragraphs below.
09 The hazardous area is connected
10 to the safe area again via the two power and
11 two signal bus lines called Power Signal A
12 and Power Signal B, right?
13 A. Yes, sir.
14 Q. So what this says is that the
15 cables that are connecting the distribution
16 cabinets to the MUX reels run to the
17 hazardous area, right?
18 A. I believe that to be true, yes,
19 sir.

Page 172:16 to 172:17

00172:16 (Exhibit No. 3602 marked for
17 identification.)

Page 172:25 to 173:07

00172:25 Q. All right. Do you recognize
00173:01 this document, 3602?
02 A. Yes, sir.
03 Q. What is it?
04 A. Just a daily report.
05 Q. Who did it?
06 A. My name's on the title. Me and
07 Carter Erwin, both, actually wrote it.

Page 174:02 to 175:10

00174:02 A. There was a report that we wrote
03 over the work that was going on, on the
04 Q-4000, so . . .
05 Q. Right. I thought that's what
06 this was.
07 You were on the Q-4000 when this
08 report was made out on May 5, 2010?

A. It was kept up with from the 3rd of May on through.
Q. Yeah, on through several days later, right?
A. Yes, sir.
Q. And I will tell you: I'm going -- we're going to get to it in a minute the fact that when we pulled the blue POD, Solenoid 103 would not fire.
You remember that part of this document?
A. Yes, sir.
Q. Okay. And you stuck -- I'm sure, stick with that?
A. Okay.
Q. That was accurate when you wrote it and it's still accurate today?
A. Best of my recollection, yes, sir.
Q. Okay. And you know what Solenoid 103 is?
A. Yes, sir.
Q. Okay. Tell me what your under -- tell me what it is. What is Solenoid 103?
A. The high pressure blind shear close.

Page 175:15 to 176:17

Q. High pressure blind shear close?
A. Yes, sir.
Q. Which means if the AMF fires, the 27-volt battery fires and it fires Solenoid 103, which activates a series of valves to activate the blind shear ram?
A. That is correct.
Q. Okay. And if Solenoid 103 fails, the blind shear ram will not activate?
A. I believe that to be true.
Q. And when the blue POD was pulled up on the deck of the Q-4000 on May 5, 2010, the SEM was opened, correct?
A. No, sir.
Q. Okay. The SEM wasn't opened?
A. That is correct.
Q. Okay. But the Solenoid 103 was tested?
A. Yes, sir.
Q. And it failed?
MR. BAAY:
Objection, form.
A. At the time it did not work.
EXAMINATION BY MR. WILLIAMSON:
Q. Okay. I call that failing.

Do you want to use a different word? If it doesn't work it fails, doesn't it?

Page 176:20 to 178:09

A. At the time the solenoid valve didn't fire.
EXAMINATION BY MR. WILLIAMSON:
Q. Well, if it didn't fire, then it doesn't work the function it's intended to work, correct?
MR. BAAY:
Objection, form.
A. I believe you're right.
EXAMINATION BY MR. WILLIAMSON:
Q. Okay. Did you figure out why Solenoid 103 did not fire?
A. No, sir. At the time we were there to get the POD up and ready to go back subsea, not do a whole lot of troubleshooting. It was just mainly fix, repair, and send back subsea.
Q. But while y'all were there, after Solenoid 103 failed to work, y'all replaced Solenoid 103, correct?
A. I believe that's correct.
Q. And when you put another solenoid in the place of Solenoid 103, a new Cameron Solenoid 103, I think, right?
A. If I recall it was one we pulled off another POD, but I . . .
Q. Okay. And after that, when you changed Solenoid 103, did Solenoid 103 then work?
A. That is correct.
Q. Okay. And I assume someone took custody of the one that did not work?
A. That is correct.
Q. Okay. The -- all right. Anything else?
Now, that's on page 3 of 19, correct --
A. Yes.
Q. -- the part we were just talking about? Am I right about that?

Page 178:16 to 178:16

A. Yes, sir.

Page 178:19 to 179:23

00178:19 Q. And you stick with that as being
20 the truth?
21 A. Yes, sir.
22 Q. You don't have anything to
23 change about that?
24 A. No, sir.
25 Q. Okay. Anything else in this
00179:01 document -- and by the way, that occurred on
02 May 6, 2010, correct?
03 A. Yes, sir.
04 Q. By the way on the batteries,
05 May 6, 2010, did y'all check the battery
06 voltage in the 27-volt battery?
07 A. I personally did not check the
08 27-volt battery.
09 Q. Okay. Well, you make a note
10 here in your records that say: "18.41 VDC on
11 the 27 VDC was recorded."
12 Do you see that?
13 A. I do see that.
14 Q. Is that -- was that accurate?
15 A. This was Carter's writing at
16 this point.
17 Q. Okay. As far as you knew, it
18 was accurate because Carter did it?
19 A. That is correct.
20 Q. Okay. You don't take issue with
21 it; you're just saying you got that from
22 Mr. Erwin?
23 A. Yes, sir.

Page 180:03 to 180:06

00180:03 Q. So the 27-volt battery on the
04 blue POD was actually discharged to
05 18.41 volts, if Mr. Erwin's note is accurate?
06 A. That would be correct.

Page 180:14 to 180:16

00180:14 Q. Did y'all change the 27-volt
15 battery and put another one on?
16 A. No, sir, we did not.

Page 180:21 to 181:04

00180:21 Is there anything -- we went
22 over a couple parts of the document dealing
23 with the blue POD battery and dealing with
24 the Solenoid Valve 103, correct? I've asked
25 you some questions about those two subjects?
00181:01 A. Yes, sir.
02 Q. Anything else about this

document that -- Exhibit No. 3602 that you believe is not correct?

Page 181:07 to 181:07

A. Not that I can recall.

Page 181:09 to 182:11

Q. Okay. Do you need a minute to read it in order to make sure that's true?
A. It's our daily report. It was stuff that was recorded as it happened.
Q. I know. And, therefore, I assume that you were going to stand behind it. If you say, gee, I don't know if I stand behind it or not, I want to know it today. See what I'm saying?
A. Yes, sir.
Q. Okay. Let's -- I'm going to -- let's go off the record. You can count it against my time. I want you to take five or ten minutes to read it.
A. Okay.
Q. Okay. And then when we come back, the first question when we come back will be, have you read 3602 and is there anything you want to correct in it?
A. Okay.
Q. Do you understand the question you're going to be asked when we come back on the record?
A. Yes, sir.
MR. WILLIAMSON:
Let's go off the record for a second. And you can count 10 minutes against my time.

Page 182:20 to 183:15

Q. Mr. LeNormand, have you now had a chance to look at Exhibit 3602?
A. Yes, sir.
Q. Okay. When we actually look at Exhibit No. 3602, it appears to refer to the yellow POD, correct?
A. The -- the hydraulic portion was yellow POD, yes, sir.
Q. Okay. So this was the yellow POD that came up off the DEEPWATER HORIZON, correct?
A. Yes, sir.
Q. Earlier I may have inadvertently

referred to the blue POD being the one that was pulled to the deck of the Q-4000, and you may have inadvertently actually even have agreed with me.
But can we both agree now that the POD that was pulled to the deck of the Q-4000 was the DEEPWATER HORIZON yellow POD?
A. That is --

Page 183:18 to 183:19

A. I believe it was the yellow POD. That is correct.

Page 183:21 to 184:03

Q. Okay. And so all of the questions I asked you about 18. -- 18.41 volts, that applies to the yellow POD battery, correct?
A. Yes, sir.
Q. And the questions I asked you about Solenoid 103 failing, that applies to the yellow POD Solenoid 103?

Page 184:06 to 184:06

A. Yes, sir.

Page 186:13 to 187:23

The -- all right. You've now had a chance to read Exhibit 3602 because we took a short break.
Is there anything in it that you think is wrong or erroneous?
A. I think, if you look at the battery readings, it was later to find out that they weren't the exact that was wrote down here. But at the time these were wrote down, that was believed to be the battery readings.
Q. Tell me where -- what page you're on.
A. Page 3 of 19.
Q. And are you talking about the battery readings where it says: "Verify battery voltage in SEM, and then it says: 8.85 VDC on the 9-volts, and 18.41 VDC on the 27-volt"?
A. That's correct.
Q. That's the part you're referring to?

A. Yes, sir.
Q. And what you now believe is the battery voltages were different?
A. Yes, sir.
Q. Okay. What were they?
A. I'm not exactly sure what we were.
Q. Okay. What makes you think they were different than what's recorded here?
A. We get different readings when we got to Michoud.
Q. Okay. Higher or lower?
A. If I recall correctly, I think they were higher.

Page 188:03 to 188:11

Q. Anything else in this Document 3602 that you want to change or modify or you don't think it's correct?
A. No, sir.
Q. Okay. And you think most of this document was -- you think all of this document was either prepared by you or by Carter Erwin?
A. That is correct.

Page 188:21 to 188:22

(Exhibit No. 3603 marked for identification.)

Page 190:02 to 191:05

Q. Okay. Do you see on the second page where it talks about backup controls?
A. Yes, sir.
Q. Well, let's start on that page, actually, with the first sentence.
"Here at Cameron we are supporting the industry by giving a clear and concise definition -- description of some of the many variables concerning emergency, backup and deepwater safety systems."
Did I read it correctly?
A. Yes, sir.
Q. Do you believe Cameron's doing that? Do you believe Cameron's giving a clear and concise description of some of the many variables concerning emergency systems?
A. I believe that Cameron lets the customer know what we have available, yes, sir.

Q. Okay. But down that below, one of the backup controls, you know, for Cameron is an acoustic system, correct?
A. Yes, sir.
Q. Okay. And the intent of an acoustic system is to shut in and disconnect -- what does that say?
A. Without main controls.
Q. Without main controls, correct?
A. Yes, sir.

Page 191:17 to 192:09

Q. Under Acoustic Systems, Cameron has a category called Limitations, right?
A. Yes, sir.
Q. And it says: "Limited to functions hard plumb from subsea valve panel."
That's the first sentence of that, right?
A. Yes, sir.
Q. And that's what you told me while ago; namely, one limitation of an acoustic system is it will only perform the functions that you program it to perform?
A. Yes, sir.
Q. Then the second thing it says is: "Perception of unreliability in turbulent water," right?
A. Yes, sir.

Page 193:21 to 194:17

Q. Okay. Okay. By the way, the next page on Acoustic Systems -- let's go back to acoustic systems one day while we're here.
Do you see on the next page Cameron talks about its acoustic systems?
A. Yes, sir.
Q. Okay. And one of the features is: No physical link to the stack is required, right?
Do you see where it says that?
A. I'm reading it.
Oh, yes, sir. Under Features, yes, sir.
Q. Okay. Okay. So Cameron touts that as a feature of their acoustic system, right?
A. Yes, sir.
Q. Because, quite frankly, that takes care of the problem of having to run

16 the MUX cables through a hazardous area,
17 correct?

Page 194:20 to 194:21

00194:20 A. That would seem correct, yes,
21 sir.

Page 195:15 to 195:16

00195:15 (Exhibit No. 3604 marked for
16 identification.)

Page 196:19 to 198:15

00196:19 Q. Okay. I want you to turn over
20 to page 3. Sorry. Probably actually the
21 fourth page in. I'm sorry. The fifth page
22 in.
23 In Cameron's catalog for
24 1999-2000, you see the -- you see the blocks
25 on the right about two-thirds of the way down
00197:01 that says "Control Systems"?
02 A. Yes, sir.
03 Q. And Cameron was advertising in
04 1999 and 2000 that they had an acoustic
05 system available, weren't they?
06 A. Yes, sir.
07 Q. And that fits with your memory,
08 doesn't it?
09 A. Yes, sir.
10 Q. Okay. By the way, on the next
11 page under "BOP stack systems," see a little
12 paragraph there called "BOP stack systems"?
13 A. Yes, sir.
14 Q. Cameron was advertising that it
15 had six-cavity body styles available,
16 correct?
17 A. That's correct.
18 Q. So you can have a six-cavity
19 stack instead of a five-cavity stack,
20 correct?
21 A. That would be correct.
22 Q. You know. By the way, the
23 control system that was on the DEEPWATER
24 HORIZON was a Mark II; is that right?
25 A. That's correct.
00198:01 Q. What's the difference between a
02 Mark II and -- Cameron now has available
03 something called a Mark III; is that right?
04 A. Yes, sir.
05 Q. What's the difference between a
06 Mark II control system like the DEEPWATER

HORIZON has and the Mark III control system?
A. The SEMs are smaller. The -- it's got DSDMs in it which basically are programmed for your solenoid valve drivers. It's a little more compact. The solenoid valves are in a oil bath.
Q. Is that the major things?
A. The valve design has changed a little bit. It's moved the oil bath --

Page 198:23 to 199:02

No. The solenoid valve's been placed in an oil bath.
A. So basically, instead of the solenoid valve sitting in the seawater, they now sit in a bath of dielectric fluid.

Page 199:08 to 199:18

Q. Okay. So the Mark III control system, when did -- when did Cameron start selling the Mark III control system?
A. I'm not sure on the exact date.
Q. Give me an approximation. 2005, 2006?
A. Probably three years ago, four years ago.
Q. Okay. Three years or four years ago from today?
A. Yes, sir.

Page 199:23 to 200:18

Q. Okay. And the advantage of the Mark III control system is -- from Cameron's perspective is, they've taken the solenoid valves and make them where they're in oil or oil-bathed, I think was the --
A. Oil bath, yes, sir.
Q. Oil-bathed, right?
A. Yes, sir.
Q. Means the solenoid valves are surrounded with oil, correct?
A. That is correct.
Q. Instead of seawater?
A. That is correct.
Q. And I'm sure the aim of that is to make the solenoid valves more reliable?
A. I'm not sure if that was the exact aim at it.
Q. Okay. I'll -- I'll make it simpler. The -- they changed the solenoids

from being in seawater to being in oil bath to make them better?

Page 200:21 to 200:21

A. I believe that to be correct.

Page 201:09 to 201:20

Q. Okay. Do coil faults have anything to do with the seawater exposure?
A. They could have something to do with the seawater exposure.
Q. Okay. Do coil faults have anything to do with solenoids?
A. The -- yes, sir.
Q. Okay. What's a coil fault?
A. It's basically when the -- a card takes a reading, an ohm reading inside the coil and passes a small current through it to see if it becomes too high --

Page 201:24 to 202:03

A. And it's basically just the detection to say that, look, you need to check on it when it comes up. I mean, it's not telling you it's a failure. It's just telling your -- your coil's getting weak.

Page 202:05 to 203:06

Q. Okay. So if you have a coil fault, that means the solenoid's not working perfectly, but it may still be working.
Would that be a right way to say it?
A. I believe that to be correct.
Q. Does the coil fault show up on the control panels on the surface?
A. Yes, sir.
Q. Do you have to check for it or does it show up automatically?
A. There's a display that says "System status okay" when everything's good, and then the coil fault's running over that display.
Q. Okay. Well, let me ask what's a very obvious question: If Solenoid 103 wasn't working, would that be showing up on the control panel of the DEEPWATER HORIZON?
A. Depends on the circumstances.
Q. Tell me what circumstances.

00203:01 A. The shape and the condition of
02 the coil at the time it wasn't working.
03 Q. Okay. So if Solenoid 103 wasn't
04 working on the DEEPWATER HORIZON, maybe it
05 would show up on the control panel, and maybe
06 it wouldn't?

Page 203:10 to 204:05

00203:10 Q. Is that what you're telling me?
11 A. Depends on what was broke on the
12 solenoid valve.
13 Q. All right. What could be broke
14 and it would show up on the control panel?
15 A. If it had a weak coil.
16 Q. If it had a weak coil --
17 A. Yes, sir.
18 Q. -- that would show up on the
19 control panel?
20 A. Yes, sir.
21 Q. What if it was broken in some
22 other way?
23 A. It would -- if it was broke it,
24 would show up on the event logger as a break
25 or a fault in the panels.
00204:01 Q. Okay. What could be wrong with
02 Solenoid 103 and it would not show up on the
03 control panel?
04 A. If the resistance was still
05 right in the coils.

Page 204:12 to 206:13

00204:12 Q. I'm just trying to figure out
13 from you.
14 Do you think, if there's
15 something wrong with Solenoid 103, it's going
16 to show up on the panel, or you think maybe
17 it will; maybe it won't?
18 MR. NICHOLS:
19 Objection, form.
20 A. I believe that if something was
21 wrong with 103, it should show up on the
22 panels.
23 EXAMINATION BY MR. WILLIAMSON:
24 Q. Okay. Would it show up on the
25 event logger?
00205:01 A. I believe that to be true.
02 Q. But even if it shows up as a
03 coil fault on the event logger or on the
04 control panel, you're saying that doesn't
05 necessarily mean that it won't work?
06 A. That is correct.
07 Q. How do we know? How do we

figure that out?
A. You test it.
Q. Can you test it?
I'm not being funny. Can you test Solenoid 103 from the -- from the surface?
A. Yes, sir.
Q. How do you test it?
A. You would fire the high pressure blinds shears closed.
Q. Using that particular POD?
A. Using that particular POD, yes, sir.
Q. Okay. So one of the best ways to make sure your solenoids are going to be working, if I followed your -- what you told me, is to have a testing program that will test to make sure your solenoids are working?
A. I believe that to be correct.
Q. Okay. And if you run a test where you're going to fire the yellow POD blind shear rams, that will tell you if Solenoid 103 is working?
A. If you run a test on the yellow POD and you fire the 103 solenoid valve, yes, sir, that would tell you if it was working, if they closed the shear rams.
Q. Sure. So I guess that would be one reason that you would want a good testing program in place on your rig, correct?
A. Yes, sir.

Page 206:19 to 206:20

(Exhibit Nos. 3605, 3606, and 3607 marked for identification.)

Page 206:25 to 207:11

Q. I've handed you what I have marked as Exhibit 3605, engineering bulletins 891 D by Cameron.
Do you recognize it?
A. Yes, sir.
Q. Is that the one you were referring to earlier about battery replacement?
A. Yes, sir.
Q. And this was dated September 8, 2004, right?
A. Yes, sir.

Page 207:23 to 208:15

00207:23 Q. Right. Okay. And Cameron is
24 putting another battery into its SEMs, right,
25 because the old battery manufacturers went
00208:01 out of business or has quit making them,
02 right?
03 A. Yes, sir.
04 Q. Okay. And then on the second
05 page, Cameron's making recommendations for
06 battery replacement, right?
07 A. That is correct.
08 Q. Does Cameron anywhere here
09 recommend that you put on a battery charging
10 system?
11 A. Not that I can see on this
12 document, no, sir.
13 Q. Does Cameron in here anywhere
14 put down that you can't really monitor the
15 status of these batteries?

Page 208:18 to 208:20

00208:18 A. No, sir. It tells you what you
19 need to do in order to maintain your
20 batteries.

Page 208:22 to 208:25

00208:22 Q. Does Cameron put in here what
23 happens if the batteries discharge below the
24 amount of power that will be necessary to
25 energize Solenoid 103?

Page 209:03 to 209:06

00209:03 A. No, sir. What they're telling
04 you is, if you follow these guidelines to --
05 for the upkeep and the maintenance on your
06 deadman system.

Page 209:08 to 209:10

00209:08 Q. Okay. But it doesn't really
09 tell you what will happen if you don't follow
10 these guidelines, does it?

Page 209:13 to 209:13

00209:13 A. No, sir.

Page 211:05 to 211:14

00211:05 Q. What are the consequences if you
06 don't change out these batteries quickly
07 enough?
08 A. I believe if you don't follow
09 the guidelines put forth by Cameron, that you
10 could have a situation where you don't have
11 enough power to power up the solenoid
12 valves --
13 Q. And of course --
14 A. -- or the CPU card.

Page 211:20 to 212:01

00211:20 Q. And, of course, that's for the
21 AMF system, right?
22 A. That is correct.
23 Q. And the AMF system is an
24 emergency system?
25 A. It's a tool used in emergencies,
00212:01 yes, sir.

Page 212:23 to 212:25

00212:23 Q. Okay. Tell me, then, when do
24 you need the AMF button? When do you need
25 the AMF system?

Page 213:03 to 213:05

00213:03 A. I guess when you lose hydraulic
04 and electrical power is when you would needed
05 AMF.

Page 220:11 to 220:13

00220:11 Q. I'm going to hand you what's
12 marked as Exhibit 3606. Again, there's a
13 copy in the gallery.

Page 221:14 to 221:19

00221:14 Q. Also, it talks about: Yes, we
15 do have the newer Rochester cables.
16 What's the Rochester cables?
17 A. The cable for the solenoid
18 valves and also a MUX cable. It could be
19 one of either one.

Page 222:18 to 222:19

00222:18 (Exhibit No. 3608 marked for
19 identification.)

Page 223:19 to 224:13

Q. Do you remember this incidence in approximately December 2006 when Transocean indicated some unhappiness with Cameron's repairs?
A. No, sir, I'm -- I don't remember this incident.
Q. Okay. Would this have been your department that was doing this sort of work or would it have been some other department?
A. It would have been the aftermarket.
Q. It would have been the aftermarket department. That's not your department?
A. Yes, sir, more than likely, it would have been the aftermarket by looking at the names on the e-mail.
Q. And your department is named what?
A. Field service.

Page 224:24 to 224:25

(Exhibit No. 3609 marked for identification.)

Page 225:02 to 226:10

Q. I'm going to hand you what's been marked as 3609.
Are you looking at 3609?
A. Yes, sir.
Q. Do you recognize it?
A. Yes, sir.
Q. This is an engineering bulletin in December '99, correct?
A. Yes, sir.
Q. Okay. And it talks about surface testing on the AMF system, correct?
A. Yes, sir.
Q. Okay. And it says: In order for the AMF system to work, this is -- this confirms what you and I talked about earlier, right? You need loss of communication between the pods, loss of electrical power from the surface, and loss of hydraulic conduit pressure, correct?
A. Yes, sir.
Q. Okay. And what -- this is an engineering bulletin to try to avoid

inadvertent activation of the AMF?
A. No, sir, I believe it's to help you learn how to test the AMF.
Q. Okay. To test it such a way that it will not inadvertently activate it, right? Did I get it right?
A. It -- it's the way to, I guess, test it the same way you would test it in a -- a real situation where you lose your loss of hydraulics or loss of electrics to make sure that it's functioning properly is what I believe.

Page 227:05 to 227:14

Q. Right. Why are we putting out this -- on the 1999 why are we putting out this engineering bulletin on the surface testing?
A. It's my belief that we did this to help the drilling contractors test their deadman.
Q. I know. What piece of information is given to me that will help me test it safely?

Page 227:17 to 227:18

A. It's basically the steps it's taken to do the test.

Page 229:02 to 229:03

(Exhibit No. 3610 marked for identification.)

Page 229:10 to 229:18

Q. Okay. Here's my question: When you're running -- do you see where this is a test on the Macondo on the blowout preventer on February 10, 2010?
A. Yes, sir.
Q. And apparently they're using the blue pod, correct?
A. That's what the document states, yes, sir.

Page 230:24 to 233:10

Q. Okay. Here's my question that I'm trying to get to with you: When they're

test the upper annular, are they using the pod? Is the pod part of this test?
A. If they functioned the upper annular and the stack was on bottom, the pod would have been the means of which to control the flow to close the annular if that's what you're asking.
Q. Let's go back up to the title. It's BOP Subsea Test?
A. Okay.
Q. All right. And I will tell you they splashed the BOP on February 6. I believe this is the first test they performed after they had it attached to the wellhead, okay?
A. Okay.
Q. I'm just giving you --
A. Yes, sir.
Q. -- that for context. Okay?
All right. Now, if they're doing the upper annular, are they going to be using one of the pods?
A. To open and close the annular, yes, sir, they would have to use one of the pods.
Q. Okay. But they're not using the pod batteries. Am I correct about that?
A. You'd be correct to say that they were using the power coming from the distribution cabinets, yes, sir.
Q. And, therefore, they're not testing the pod batteries?
A. In my experience you would be correct, yes, sir.
Q. Okay. Do you see on here anywhere where they tested the EDS system?
A. No, I -- no, sir, I didn't see where they tested the EDS sequencing.
Q. Is it possible to test the EDS system once the blowout preventer's on the bottom?
A. If you tested the EDS sequence while the blowout preventer is on bottom, it's my belief you're going to unlatch the LMRP from the stack.
Q. Okay. So the answer -- which you don't want to do, of course. You don't want to do that accidentally?
A. I would not want to do that accidentally, no, sir.
Q. Right. So there's no way to test the EDA system -- EDS system once you get this blowout preventer on the bottom without unlatching the LMRP?
A. The best of my knowledge, yes,

sir, you are correct.
Q. Okay. Is there any test on here for an ROV hot step where they tested the ROV hot step?
A. No, sir, not that I see.

Page 233:20 to 234:23

Q. Well, the ROV hot step for the blind shear rams, is it possible to test that when the blowout preventer's on the bottom?
A. I believe that you could test it on the bottom.
Q. All right. The ROV hot step for the VBRs, is it possible to test that when the BOP's on the bottom?
A. Yes, sir, I believe you could test it on bottom.
Q. Is there an ROV hot step for the annulars?
A. Not that I'm aware of.
Q. Right. Okay. So the two ROV hot steps you would have available would be for the VBRs and for the blind shear rams -- oh, I'm sorry, and for the casing shear rams, right?
A. Yes, sir.
Q. Could you test the casing shear ram ROV hot step on the bottom?
A. Normally after testing the casing shear rams, it's required to open them back up.
Q. I'm sorry. I'm not following you. Can you test the casing shear rams while the blowout preventer's on the bottom?
A. If you wanted to, yes, sir, you could test it on the bottom.

Page 236:08 to 237:02

Now, here's my point: Can you close the -- okay. You can definitely close the casing shear rams when the BOP is on the bottom, correct?
A. Yes, sir.
Q. Okay. Can you open them back up?
A. As long as there's no obstructions behind the casing shear rams, yes, sir.
Q. All right. What obstructions would there be?
A. You -- in my experience you could have mud or something like that behind

them.
Q. Ah. You're saying as long as you don't have any debris or something else that would prevent their fully closing and opening?
A. Fully opening is the main thing.

Page 239:09 to 242:23

Is there a test where we can prove the AMF works that does not require us to pull the BOP stack to the surface?
A. We -- you could have fired the AMF subsea without having to pull the BOP back to surface, yes.
Q. How?
A. By activating the fire in the AMF.
Q. Okay. And are you -- I'm -- to make sure I'm following you. Is that going to cause permanent damage to the -- anything or is that going to be a test like, okay, it works, now we can go back to the business of drilling an oil well?
A. The energize and extend -- extend and energize the seals is one of the risks you would run in messing up the seal ports where you'd have to pull it back to the surface.
So I meant during the test you would or could have some complications where you'd have to pull the stack back to the surface.
Q. Okay. Isn't that going to be true any time you activate or test the blind shear rams?
A. I guess you're correct, yes, sir.
Q. Okay. All right. And are you telling me that if you activate and close the blind shear rams one time, that -- that there's a risk you're going to mess up the seal so that -- so that you're going to have to pull the BOP stack?
A. No, sir, it's not the blind shear rams. You can close the blind shears and open them as much as you want to.
Q. Okay. Then tell me why I can't test the AMF system since the AMF system closes the blind shear rams. See, I'm not following you on this distinction.
A. The stinger ports where your fluid flows from your pod back to your stack, you take pressure off of those stinger ports and you have to reenergize them, so you run

the risk of blowing one of those seals. It's not --
Q. And tell me again what a stinger port is.
A. The stinger sets -- is how the pod gets the hydraulic fluid from the LMRP down to the stack.
Q. Okay. So you have a stinger port or a valve or -- or connection that gets the hydraulic fluid from the surface to the piston in order to close the blind shear ram?
A. That's correct.
Q. Okay. And this stinger port is different from the -- the way you move the piston when you activate the blind shear rams?
A. It's the same as you do when you activate the blind shear rams, but in order to get the deadman deactive, you have to vent all the pressure off the pod, therefore, not leaving it a hydraulic power to make the seal. So during the deadman it reenergizes the stingers that extends and energizes to put hydraulic pressure back on it before it starts to flow.
Q. Okay. And why would you run the risk that reenergizing the stingers would blow the seals?
A. Any time you deenergize or energize -- well, not any time. It -- it's my experience when you have pressure on something and you deenergize the seals with the loss of power or something like that nature, that you run the risk of the seals popping.
Q. Okay. So Cameron recommends you should test the AMF system, therefor, or Cameron recommends you shouldn't test it?
A. I don't believe Cameron states one way or another about the testing as far as I'm aware.
Q. Okay. What's your opinion? Should we test the AMF system or should we not test it?

Page 243:01 to 244:09

A. My opinion is I guess we should test the AMF system.
EXAMINATION BY MR. WILLIAMSON:
Q. Seems to me if you have an emergency system, you should be -- you should -- of course, this BOP could be deployed for a number of months subsea, correct?

A. In my experiences, yes, sir.
Q. Just in this particular case, it was deployed February, March, and April, right? A little shy of three months, right?
A. I'm not exact date of when it was deployed, no, sir.
Q. It was splashed on February 6th and it -- the -- the accident happened on April 20th --
A. Yes.
Q. -- okay?
Okay. So it seems to me you need a system where you can test the AMF and the emergency systems. And I'm trying to figure out if -- if you can test it.
MR. NICHOLS:
Objection, form.
A. It's my belief you could test it, but you run some risk.
EXAMINATION BY MR. WILLIAMSON:
Q. Okay. And the risk is that the way the system is designed, if you test the AMF when it's on the bottom, you run the risk of damaging the sting -- port stinger seals?
A. Stinger seals, that's my belief, yes, sir.

Page 245:03 to 245:04

(Exhibit No. 3611 marked for identification.)

Page 245:17 to 246:19

Q. On September 11, 2001, you say: "We did a safety meeting on how the EDS should work and give TSF and BP the times on the EDS and also had high lift and on how it should work and they would do this EDS at 5-degree angle."
Did I read it correctly?
A. Yes, sir.
Q. Okay. Who's TSF?
A. Transocean.
Q. Okay. And BP is BP?
A. Yes, sir.
Q. And then you actually did an EDS-2Q, right?
A. Yes, sir.
Q. What's an EDS-2Q?
A. It was just an EDS-2. I think that was a typo.
Q. Okay. "All was good. It took four hours to latch back up."

And that's because I guess when you did the EDS, it disconnected the LMRP?
A. Yes, sir, we fired the EDS subsea.
Q. Okay. "We had the ROV look at the stack stingers, and it looked good. BP was happy," right?
A. Yes, sir.

Page 246:23 to 247:09

Q. Okay. Do you remember being out there when the DEEPWATER HORIZON was actually being commissioned?
A. I remember some things about it, yes, sir.
Q. Okay. And why was BP there?
A. It was my belief that BP was going to be the drilling contractor for the rig.
Q. BP was the one out there making sure the rig met the specifications they wanted?

Page 247:12 to 247:14

A. I guess BP had surveyors there to make sure that it met their specifications.

Page 247:25 to 248:13

Q. Well, I mean, BP didn't just -- it wasn't just Transocean that was there. That's what I'm trying to make sure of. It wasn't just Transocean that was seeing these tests done and seeing it was approval. BP was there, too, and it sounds like you were making sure BP was satisfied?
A. Our client was Transocean, and Transocean's client was BP.
Q. Okay. And you're -- what did you mean when you said BP was happy?
A. That -- I guess what I was meaning was Transocean and BP were both happy with the disconnect at the 5-degree angle.

Page 249:07 to 249:08

(Exhibit No. 3612 marked for identification.)

Page 249:16 to 250:17

00249:16 Q. I want you to go down to the
17 entry on September 19, 2001. It said:
18 "Safety stand down. BP shut the whole rig
19 down so that they could go over some safety
20 thing and team building. This was a 12-hour
21 class," right?
22 A. Yes, sir.
23 Q. So BP was the one who shut the
24 whole rig down on September 17, 2001, when
25 they were trying to figure out if it met
00250:01 their criteria?
02 A. No, sir, it was a -- what BP
03 called, if I can recall, a safety stand down,
04 and it was just wanting to make sure that
05 everybody was thinking the same way BP was
06 when it come time for safety.
07 Q. Okay. My point is, it was BP
08 who did it?
09 A. Yes, sir, it was a BP shutdown
10 for the safety reasons, yes, sir.
11 Q. Yeah. According to your note,
12 BP's in charge and BP shut the whole rig
13 down?
14 A. Yes, sir.
15 Q. That's the way you remember it,
16 and that's the way you wrote your report?
17 A. Yes, sir.

Page 250:21 to 250:22

00250:21 (Exhibit No. 3613 marked for
22 identification.)

Page 251:11 to 251:19

00251:11 Q. It says: "We'll be making a rig
12 move somewhere between June 1st and 10th.
13 We've been getting alarms and lights on the
14 panel flashing when a booster valve is
15 closed. Also, have a few pod mismatch
16 alarms."
17 What does that mean?
18 A. What it would mean to me would
19 indicate a -- a coil fault.

Page 251:23 to 252:07

00251:23 Q. All right. Is that common -- is
24 this a common complaint or is this really
25 unusual?
00252:01 A. No -- no, sir, you do get coils

that -- the coils have been getting weakened and you get mismatches and lights went flashing.
Q. Okay. So having a coil fault is kind of a common problem that sometimes you have on these blowout preventers?

Page 252:10 to 252:11

A. I wouldn't call it a common problem, like an everyday problem, no, sir.

Page 256:10 to 257:15

Q. Okay. Let's go back to my assumption. Let's assume the EDS-1 was designed for the high-pressure blind shear ram function, okay?
A. Yes, sir.
Q. Okay. Does that use the subsea accumulator bank?
A. Yes, sir, if it fires the 103, then it would use the subsea accumulator bank.
Q. Okay. And am I correct that that's also true for the AMF? If the AMF is activated and if it's working property -- properly, then the AMF fires the 103 solenoid and uses the subsea accumulator bank?
A. Yes, sir, that is correct.
Q. What about the auto shear? Where does the auto shear get hydraulic pressure?
A. The auto shear also gets its hydraulic pressure from the subsea accumulators, the best of my recollection.
Q. Okay. So if the auto shear fires, it will also get its pressure from the subsea accumulators?
A. I believe that to be true.
Q. Okay. What about the ROVs? The ROVs, I'm assuming, don't use the surface accumulators and they don't use the subsea accumulators?
A. I believe that to be correct.

Page 258:13 to 258:19

Q. Okay. Okay. All right. One more thing about testing. If we're going to test, you said it's possible to test the blind shear rams. You can open and close the blind shear rams using the BSR function,

18 correct?
19 A. That is correct.

Page 258:24 to 259:03

00258:24 Q. Okay. The -- and you can test
25 the 103 solenoid subsea if you're activating
00259:01 the blind shear rams?
02 A. If you activate the
03 high-pressure blind shears, yes, sir.

Page 259:07 to 259:10

00259:07 How do you test solenoid 103
08 when the blowout preventer is subsea?
09 A. You would activate the
10 high-pressure blind shear close.

Page 259:15 to 259:18

00259:15 Q. All right. Okay. Is that the
16 only way to test solenoid 103 when the unit
17 is subsea?
18 A. It's the only way I can recall.

Page 260:06 to 260:09

00260:06 Do you now know -- and it's
07 dated February 22, 2010. DEEPWATER HORIZON,
08 do you now know what upgrade they're talking
09 about?

Page 260:15 to 260:17

00260:15 (Exhibit No. 3614 marked for
16 identification.)
17 A. It's going to be 3614.

Page 260:19 to 260:22

00260:19 Q. Okay.
20 A. To my recollection, they wanted
21 to change out the CCU to a different
22 industrial computer.

Page 261:02 to 261:24

00261:02 Q. Okay. What does your -- well,
03 what does that unit do?
04 A. If I recall correctly, this unit
05 was a stand-alone unit for the subsea

engineer to function the stack when it was on the surface, so . . .
Q. See if I can understand that. This is a unit that will allow you to test the stack when it's on -- when the stack is on deck?
A. It was used to test when -- when it was on surface. You could use it to fire the stack subsea, but it was mainly used for surface testing.
Q. Okay. So the upgrade that was going to be contemplated in February 2010 was an upgrade that would allow you to test the stack on the surface more conveniently?
A. I think it was -- if I recall correctly, it was just another computer that replaced the one that was there that was updated instead of a computer that was ten years old.

Page 262:05 to 262:07

Q. Okay. So this is the central control unit computer, correct?
A. Yes, sir.

Page 262:14 to 263:03

Q. Okay. Well, what's the advantage of getting the new one?
A. If they were having problems with it or if -- I think you go to a flat screen instead of the old monitor screen like they had. And I think it could go on a shelf where it slid in and out, make it a little more convenient.
Q. By the way, do you ever work -- did you ever go out to the THUNDER HORSE?
A. Yes, sir, I've been to the THUNDER HORSE.
Q. Does THUNDER HORSE have Mark II control systems?
A. Yes, sir.

Page 266:06 to 266:09

Q. Okay. And have you -- have you performed tests on -- on an actual rig to ensure that the AMF function is operable?
A. Yes, sir.

Page 266:17 to 268:08

00266:17 What are the -- what are the
18 requirements for the AMF deadman to actually
19 function?
20 A. I believe it's the loss of
21 electrical, the loss of hydraulics, and then
22 the loss of communication or the heartbeat
23 between the SEMs.
24 Q. Okay. And then does the AMF
25 actually have to be armed for it to function?
00267:01 A. That is correct.
02 Q. Okay. So if it's not armed and
03 those other three factors that you just
04 mentioned are present, it wouldn't make it --
05 it still wouldn't function, correct?
06 A. That is correct, it wouldn't
07 fire.
08 Q. All right. Now, how -- where --
09 where on the rig can you actually arm the
10 deadman?
11 A. It's my belief you can arm it
12 from the panels.
13 Q. Okay. And can you describe how
14 that works? What do you have to do to
15 actually arm it?
16 A. You would go to the panel and
17 hold an enable button down and then deadman
18 arm button.
19 Q. So there's a specific button
20 that -- that's labeled "enable"?
21 A. Enable, yes, sir.
22 Q. Okay. Is there another button
23 than that says "disable" or do you just push
24 that button again?
25 A. You hold that button down while
00268:01 you're making functions. If you release that
02 button and you push a button on the panel,
03 nothing will happen.
04 Q. Okay. Is there a way that you
05 can tell from the panel that the -- the AMF
06 has actually been enabled?
07 A. Yes, sir, the light changes
08 state from disabled to enabled.

Page 269:17 to 269:21

00269:17 Q. Okay. Now, can you give me an
18 example of a time when it would be
19 appropriate to disable the AMF function?
20 A. I would disable the AMF when I
21 was pulling or running -- running riser.

Page 270:05 to 270:14

00270:05 Q. Is there any other time?

A. Not that I would be aware of.
Q. And, to your knowledge, does Cameron have any recommendations as to when the deadman should be enabled versus disabled?
A. No, sir, not that I can recollect as to when -- I mean, they doesn't -- they don't tell the contractors when they need to able or disable something.

Page 271:14 to 272:08

Q. And if I understood your testimony, in order for the AMF to fire, the system has to be armed, correct?
A. Yes, sir.
Q. And then the batteries on the pods have to be sufficiently charged?
A. That is correct.
Q. Okay. And the relevant solenoid valves have to be operable; is that correct?
A. That is correct.
Q. And if all three of those are true, then the AMF should function; is that correct?
A. Only if the conditions are met.
Q. Okay. Assuming the conditions are met, and the system is armed, the batteries are charged, and there's nothing wrong with the solenoid valves, the AMF should function, correct?
A. The best of my belief, yes, sir.

Page 272:21 to 273:08

Q. And whether to -- pardon me -- whether to enable or disable the AMF is the decision of Transocean?
A. The subsea engineer, yes, sir.
Q. Now, with respect to the AMF function as it was set on the DEEPWATER HORIZON as of April 20, 2010, in the course of your testing, were you able to determine whether the conditions necessary to -- to activate the AMF were met?
A. I couldn't say either way if the -- the conditions were there to actually activate the AMF.

Page 274:09 to 274:24

Q. As of the time that you participated in the relief efforts, are you

aware whether any of those conditions necessary for the AMF to fire had not yet occurred?
A. Not that I'm aware of.
Q. Do you have any reason to believe that those conditions had not been met?
A. I don't know the condition, if it was armed or disarmed at the time. Without that condition and the -- the rest of the conditions, it doesn't matter.
Q. Okay. Assuming it was armed, do you have any reason to believe that the other three conditions were not met?

Page 275:02 to 275:04

A. No, sir, I wouldn't have any concerns that the rest of the conditions hadn't been met if it had have been armed.

Page 276:19 to 278:19

Q. Did you participate in any work with respect to the -- the DEEPWATER HORIZON relief efforts between April 20, 2010, and May 3rd?
A. Yes, sir.
Q. Okay. Can you describe what your -- your role was at that time?
A. I was in the crisis center for -- I don't know the -- the exact dates I went to the crisis center.
Q. What was your -- what were you working on during that period?
A. The -- getting everything ready to retrieve the pods.
Q. What did that entail?
A. We were pulling drawings and resources together to make sure that we had the proper equipment to pull the pods for the top kill.
Q. Okay. Was there anything else that you -- that you were involved with?
A. I helped with the PT sensor.
Q. What's -- what is the PT sensor?
A. It's the pressure and temperature probe that's on the stack.
Q. And when you say you helped with it, what -- what specifically did you do?
A. We built the cable for the ROVs to use to plug into the PT sensor.
Q. Okay.
A. But I don't -- I know it got

deployed, but I don't know if it ever actually worked.
Q. Okay. Are you familiar with the -- the manner in which the solenoid valves on the BOP work?
A. Yes, sir.
Q. Do you have a basic understanding of how that happens?
Okay. Let's take a look at Tab 7, which is the document that was marked as Exhibit 7013 previously in a prior deposition. If you'd turn to page 2, actually.
On page 2 there, there's a -- on the left-hand side, there's a -- a drawing that signifies that it's a solenoid coils top view.
Does that represent to you what a solenoid coil would look like from the top?
A. Yes, sir.

Page 279:12 to 283:19

Q. Okay. Are you -- you specifically worked with Solenoid Valve 103 while you were working on the yellow pod; is that correct?
A. Yes, sir.
Q. And that valve had two coils?
A. The valve should have had two coils. We never opened it up and actually examined it.
Q. Okay. Do you -- do you have an understanding of how each coil functions to operate the valve?
A. Yes, sir.
Q. Can you explain it to me?
A. When you energize the coils, it creates a magnetic field which picks up a plunger and it supplies hydraulic pressure across the set of shear seal valves.
Q. Okay. So it lifts up the valve and the valve will operate?
A. It lifts up the seal carrier which contains two shear seals, and then the valve operates. It's got a spring in the top, so when the magnetic field's lost, it pushes the seal carrier back toward the bottom.
Q. Okay. Can the valve operate if only one of the two coils is energized?
A. It's my understanding that, yes, sir, if one of them's energized, it still can operate.
Q. Okay. And if both coils are

energized, it -- can it operate?
A. Yes, sir.
Q. Okay. And so each coil is energized by its own set of wires; is that correct?
A. Yes, sir.
Q. Okay. Do you know what would happen if -- if the wires on one of the coils were reversed?
MR. BAAY:
Object to form.
A. I'm not an electrical engineer, but you would basically be creating opposing forces.
EXAMINATION BY MR. PFEFFER:
Q. Okay. And in creating opposing forces, would the valve operate in that instance if both coils were energized?
MR. BAAY:
Object to form.
A. Depends on a lot of circumstances.
EXAMINATION BY MR. PFEFFER:
Q. Okay. What -- what would it depend on?
A. How the -- the solenoid was being pulsed.
Q. If it -- I'm sorry. I mis --
THE REPORTER:
Being pulsed.
A. Being pulsed.
MR. NICHOLS:
P-u-l-s-e-d.
EXAMINATION BY MR. PFEFFER:
Q. And what do you mean by that?
A. The A SEM pulses the coil at one rate, and the B SEM pulses at another. If they're pulsing at the exact same time, you could cancel out the magnetic field, but that's what I think.
Q. Okay. So with that understanding, do you have a -- do you have a position on whether the coil should be wired such that they have the same -- that they're wired the same for each coil?
A. It's my belief that they both should be wired the same for each coil. That way you have both opposing forces working together.
Q. Okay. All right. And if the opposing forces are operating against each other with the same -- with the same pulse rate, what does that mean with respect to the valve function?
MR. BAAY:

Objection, form.
A. I'm not the electrical engineer, but it would be my belief that it would oscillate, meaning it would try to open and close.
EXAMINATION BY MR. PFEFFER:
Q. Would -- would the -- if we were talking about Solenoid Valve 103 and the -- the coils that are miswired in that manner, would the blind shear ram activate?
MR. BAAY:
Objection, form.
A. Depends on the conditions again.
EXAMINATION BY MR. PFEFFER:
Q. Okay. Assuming that the pulse rate is the same.
MR. BAAY:
Form.
A. I'd say there could be problems, but there's a possibility that you might get it to work, too.

Page 283:21 to 283:24

Q. Okay. So if you have a two-coil solenoid that -- that's not working, one possibility might be that the -- the coils are miswired, correct?

Page 284:02 to 284:03

A. I believe that to be correct, yes, sir.

Page 284:05 to 284:12

Q. Another possibility might be that neither coil fired at all, correct?
A. Yes, sir, I believe that to also be a possibility.
Q. Are there any other explanations that you can think of why a solenoid valve would not work aside from the failure to supply energy to the coils themselves?

Page 284:15 to 284:16

A. I also believe you could have a mechanical problem, too.

Page 284:18 to 285:22

00284:18 Q. Can you give a -- can you
19 explain what you mean by that?
20 A. If the valve wasn't properly
21 maintained, you could make it where you
22 couldn't pull the -- or the forces couldn't
23 actually pull the shear seals up, and they'd
24 be stuck in whatever position.
25 Q. What would -- what would
00285:01 specifically cause it to be stuck?
02 A. There's several different
03 things: A bad spring, or just a drag on the
04 shear seal. That's . . .
05 Q. Okay. So in the course of your
06 testing Solenoid Valve 103 on the Q-4000, did
07 you inspect the wiring of that valve?
08 A. Not the internal wiring of the
09 valve, no, sir.
10 Q. Did you consider the possibility
11 that there may be a problem with the wiring?
12 A. At the point we were sent out to
13 the Q-4000 to work on the yellow pod, it
14 was -- the efforts were supposed to be
15 focused on getting the pod up ready to run
16 and not so much on troubleshooting or trying
17 to figure out what happened.
18 Q. Okay. So you did not consider
19 the mis -- potential for a miswired solenoid
20 valve at that time?
21 A. Not at that time. We replaced
22 the solenoid valve and kept moving.

Page 287:08 to 288:22

00287:08 Q. 30 -- Exhibit 3602. That should
09 match up with what I have.
10 Okay. If you'll turn to page 4.
11 And I'm looking at May 8th at 10:48 and
12 11:22.
13 Are you with me on where we are?
14 A. Yes, sir.
15 Q. Okay. At 10:48 it says:
16 "Completed pages 11 to 22 on SEM A. Upper
17 annular regulator increase solenoid valve
18 would not fire on SEM A, so we moved on in
19 the procedure."
20 And then at 11:22, it states:
21 "Completed pages 11 to 22 on SEM B. Upper
22 annular regulator increase solenoid valve
23 would not fire on SEM B, so we moved on in
24 the procedure."
25 Did I read that correctly?
00288:01 A. Yes, sir.
02 Q. Okay. Does that refer to
03 Solenoid 3A or do you know?
04 A. I'm not exactly sure -- there

was two solenoid valves changed. I'm not exactly sure if it was 3A or not.
Q. And when you discovered that there was a problem with the valve, did you -- again, did you inspect the -- did you consider the possibility of the wiring as a -- as the problem on that particular solenoid valve?
A. No, sir. If I remember correctly, we changed it out and moved on. And I believe the Coast Guard took custody of the valve.
Q. Okay. And if you turn to page 8. And looking at the entries on May 13th, at the very bottom, the last entry on that page is at 12:00 o'clock.
You see where I'm --
A. Hold on, page 8.

Page 289:21 to 290:07

Q. Okay. And I have at 12:00 o'clock, it states: "Performed predeployment test on both SEMs per page 19 to 22 of the deck test procedure in order to verify stinger seals and bleed pilot lines down. During this test it was noticed that function 96 lower outer choke close on the B SEM would not fire and had a fault displayed on the PETU. This function, though, would fire on SEM A."
Is that another solenoid valve malfunction?

Page 290:10 to 290:20

A. I believe so.
EXAMINATION BY MR. PFEFFER:
Q. And is that separate from Valve 103?
A. Yes, sir.
Q. And is it separate from the -- the other one that we just discussed that may or may not have been 3A?
A. Yes, sir.
Q. Okay. So there were three total valves that were problematic?

Page 290:23 to 290:23

A. Yes. Yes, sir.

Page 290:25 to 291:07

00290:25 Q. Okay. And this one specifically
00291:01 states that it fired on SEM B -- or excuse
02 me -- it fired on SEM A but not SEM B,
03 correct?
04 A. Yes, sir.
05 Q. Okay. Is that an unusual
06 occurrence for it to fire on one but not the
07 other?

Page 291:10 to 291:10

00291:10 A. It depends on the circumstances.

Page 291:12 to 291:15

00291:12 Q. Okay. What -- what would the
13 circumstances be that it would depend on?
14 A. If the coil on SEM B was broke
15 or had too high of a resistance --

Page 291:20 to 291:24

00291:20 A. -- then you wouldn't -- they
21 wouldn't fire on B. You'd actually get a
22 coil fault or coil break on the PETU. And it
23 would only fire on SEM A if SEM A was
24 selected.

Page 292:22 to 293:11

00292:22 Q. Okay. And when we talk about it
23 firing on SEM A or SEM B, does that refer to
24 one coil versus the other coil?
25 A. Yes, sir. SEM A fires one coil,
00293:01 and SEM B fires the other coil.
02 Q. Okay. Are you aware that
03 sometimes your customers will rebuild their
04 own solenoid valves?
05 A. Yes, sir, I'm aware that
06 sometimes our customers will rebuild their
07 own solenoid valves.
08 Q. Okay. Is that common?
09 A. Yes, sir, it's pretty common.
10 The rigs sometimes do maintenance on their
11 own, so . . .

Page 293:17 to 294:05

00293:17 Q. Is there a procedure that --
18 that Cameron employs to ensure that solenoid
19 valves that it provides are properly wired?

A. The solenoid valves that, as I'm aware that Cameron provides, go through an FAT.
Q. Okay. So there's a test conducted to ensure that they fire properly?
A. Yes, sir, the ones that come from . . .
Q. Is there documentation for individual solenoids that are provided that -- that relay the results of the FAT?
A. As far as I'm aware, yes, sir.

Page 295:01 to 295:18

Q. Okay. Now, if you jump down just a little bit, it's -- there's: "2043, deadman system was armed via the PETU," correct?
A. Yes, sir.
Q. Okay. Could you just explain in your own words what the PETU is?
A. It's a -- it stands for portable electronics test unit, and it's basically used to communicate with the SEM, to power it up and talk to it.
Q. And it's my understanding it's usually paired with a laptop; is that correct?
A. That is correct.
Q. And the PETU can be used to arm and function the deadman?
A. Yes, sir.

Page 295:25 to 297:21

Q. Okay. I have -- there should be -- in the front cover of your binder there, there should be two photographs. Those were the handouts that I provided.
And we'll go ahead and mark -- let's see. Let's mark this one -- the one that's in your right hand, let's mark that with the next exhibit number.
A. 3615.
(Exhibit No. 3615 and 3616 marked for identification.)
EXAMINATION BY MR. PFEFFER:
Q. And then let's mark the other one 3616.
A. Yes, sir.
MR. BAAY:
How are you distinguishing between the two?
MR. PFEFFER:

3615 has a yellow switch -- there's like a yellow rectangle in the center of the system right underneath the insulation monitorings.

Do you see that?

MR. BAAY:

Got it.

MR. PFEFFER:

The other one lacks that.

EXAMINATION BY MR. PFEFFER:

Q. Can you -- can you explain the difference between these two photographs?

A. Yes, sir. This -- the 3616 is an older PETU that was used during the -- the top kill procedure.

Q. And -- and again, 3615 -- I'm sorry, you're -- you're --

A. 3616. I'm sorry.

Q. And -- and that's the photograph that does not have the extra switch in the center, correct?

A. That is correct.

Q. Okay. And when you say it was used during the top kill procedure, are you referring to the period between May 3rd on the Q-4000 -- May 3rd and through July on the Q-4000?

A. Yes, sir.

Page 297:25 to 298:06

Q. So the tests that you were conducting on the yellow pod involved a PETU that looked like 3616?

A. To the best of my recollection, yes, sir.

Q. And so it did not have the extra switch?

Page 298:09 to 298:12

A. No, sir, I needed two more PETUs, so I had to have them built in the shop. And this was one of the newer ones that came out of the shop.

Page 299:25 to 300:14

Q. And what does that switch do?

A. If I'm recalling correctly, this was a PETU for the shop, but the switch really has no bearing on if you're functioning the single or the A plus B, it

still only fires on the A or B, whatever you have selected at the top, if I recall on that.
Q. Does -- does the switch have any function?
A. As I recall for -- for the application we were using it in, no, sir.
Q. And you mentioned that you had to have two more PETUs built?
A. Yes, sir.

Page 301:11 to 301:14

Q. Okay. Do you know which of those configurations was used to test Solenoid 103?
A. It would have been --

Page 301:17 to 302:18

A. -- the 3616, if I --
EXAMINATION BY MR. PFEFFER:
Q. The 3616 with the additional switch?
A. No, the 3616 does not have the additional switch.
Q. My apologies.
3616 that only has the A and B knob?
A. Yes, sir, if I'm remembering correctly.
Q. Okay. Do you know what happened to that particular PETU after you were finished on the Q-4000?
A. If I can recall correctly, all the PETUs were sent back to Berwick and kept together.
Q. Okay. What -- where is Berwick? I'm --
A. Louisiana. I'm sorry. The Cameron plant.
Q. Okay. Do you know if there's any documentation of the serial number or anything to identify the specific PETU that was used in the testing on Q-4000?
A. If my memory calls me correctly, there's some pictures.

Page 303:01 to 303:08

Q. Do you know if any of -- if -- if the PETU that was used in testing 103 ended up at Michoud, by any chance?

A. Yes, sir, the PETU that was used to test 103 did end up in Michoud.
Q. And it's your recollection that it -- it looks like Exhibit 3616?
A. In my recollection, yes, sir.

Page 304:25 to 305:03

Q. Okay. Looking at 3616, to your knowledge, is there any way to fire on both A and B at the same time?
A. Not to my knowledge, no, sir.

Page 306:10 to 306:12

Q. Okay. So there's no way to be sure if it's operating on one coil or both coils?

Page 306:15 to 306:19

A. You could pull the solenoid valve out of the pie connector and check to see if you're only powering it with one coil or the other coil if that's what you're asking.

Page 306:21 to 307:18

Q. Okay. But I'm guessing that you never did that on the Q-4000, correctly -- correct?
A. Not that I recall, no, sir.
Q. Okay. I think you mentioned earlier that you've been out to Michoud at some point for -- during the -- while the BOP's been held out there?
A. Yes, sir.
Q. Okay. Did you see the -- the PETU that was on the Q-4000 out there?
A. I seen all four PETUs.
Q. Okay. And were those the -- the same ones that you had on the Q-4000, as far as you know?
A. As far as I know, yes, sir.
Q. And just because that -- there may -- I may have had some confusion. Of the four total PETUs, three of them looked like 3616 and one -- and only one of them looked like 3615?
A. To the best of my recollection, yes, sir.

Page 310:05 to 310:16

00310:05 Q. Okay. When you -- you mentioned
06 that you had tested the AMF function onboard
07 rigs while you were a field service
08 technician?
09 A. Yes, sir.
10 Q. When you perform that function,
11 do you use a PETU to do that?
12 A. Yes, sir.
13 Q. Okay. And is the procedure
14 essentially the same as what you did on the
15 Q-4000?
16 A. Yes, sir.

Page 311:05 to 312:16

00311:05 Q. Let's turn to page 4 of
06 exhibit -- Exhibit 3602. We're back in Tab 1
07 in my folder. But you can use the 3602
08 that's already been marked. And page 4.
09 Okay. Just before you get to
10 the May 8th entry, there's a -- a bullet
11 point that says: Note: Function 103 would
12 not fire using the PETU on SEM A or SEM B; is
13 that correct?
14 A. That is correct.
15 Q. Were you personally involved in
16 that test?
17 A. Yes, sir.
18 Q. Okay. Were you able to
19 determine why that was -- was not functioning
20 on either SEM A or SEM B?
21 A. No, sir, we didn't determine.
22 We wasn't there for the fault finding. We
23 was trying to get the POD up and running to
24 use it for the top kill.
25 Q. Okay. If you head towards the
00312:01 bottom of the -- the May 8th entry, again,
02 just under 1330, there's another bullet point
03 that says "note." Do you see where I'm
04 looking there?
05 A. Yes, sir.
06 Q. And it says: "Solenoid Valve
07 No. 103 was noted not to have a Cameron
08 supplied E connector installed. This
09 E connector is different than the Cameron
10 issued. The plated pins are approximately
11 1/16 inches shorter than the ground pin.
12 Seacon identifications numbers were 35996 and
13 19164112."
14 Do you see where it -- did I
15 read that correctly?
16 A. Yes, sir.

Page 312:25 to 313:05

00312:25 Can you explain what you mean
00313:01 by -- why you noted that the E connector was
02 not a Cameron-installed E connector?
03 A. Why we noted it wasn't a
04 Cameron-installed E connector, because it
05 didn't have a Cameron part number.

Page 314:19 to 316:01

00314:19 Q. Okay. Then if we just go right
20 below that to 1335, it states: "Solenoid
21 valve for upper annular increase and high
22 pressure blind shear No. 103 were replaced
23 with spare solenoid valves from the
24 Transocean Nautilus POD that was sent over as
25 a spare."
00315:01 Did I read that correctly?
02 A. Yes, sir.
03 Q. Okay. So if I understand, the
04 10 -- the original solenoid valve 103 was
05 malfunctioning correctly -- correct?
06 A. Yes, sir.
07 Q. And you or your team put a
08 separate -- a new 103 on the yellow POD,
09 correct?
10 A. Yes, sir.
11 Q. Okay. And then you tested it
12 again with the -- with the replacement?
13 A. It was a replacement, not new.
14 Let me back up. I'm sorry.
15 Q. But there's just a different 103
16 that you use as a replacement on the yellow
17 POD?
18 A. Yes, sir.
19 Q. Okay. Okay. So all of your
20 tests on the original 103 indicated that it
21 was a bad solenoid valve, correct?
22 A. To the best of my recollection,
23 yes, sir.
24 Q. Okay. And the test -- the
25 testing that you performed consistently
00316:01 indicated that 103 was not working?

Page 316:04 to 316:05

00316:04 A. The test would have indicated if
05 there was a problem with 103, yes, sir.

Page 316:15 to 316:17

00316:15 Q. You didn't see anything to
16 indicate that 103 was going to activate
17 the -- the blind shear rams?

Page 316:20 to 317:04

00316:20 A. On the Q-4000, no, sir, we did
21 not see any of --
22 EXAMINATION BY MR. PFEFFER:
23 Q. Okay.
24 A. -- anything that would indicate
25 that.
00317:01 Q. Once you replaced 103 with a
02 different solenoid valve, it did work,
03 correct?
04 A. That is correct.

Page 317:08 to 317:09

00317:08 Q. So you had consistent, good
09 results with the replacement 103, correct?

Page 317:12 to 317:12

00317:12 A. If I recall correctly, yes, sir.

Page 317:14 to 317:15

00317:14 Q. And you had consistent bad
15 results with the original 103?

Page 317:18 to 317:18

00317:18 A. If I recall correctly, yes, sir.

Page 318:06 to 318:14

00318:06 Q. No. We're on the first page, if
07 you go down to the May 6th entry --
08 A. Okay. The second column?
09 Q. -- and you jump down four bullet
10 points.
11 A. Yes, sir.
12 Q. It says: Received approval from
13 Houston on deck test procedure, correct?
14 A. That is correct.

Page 318:22 to 318:23

00318:22 (Exhibit No. 3617 marked for
23 identification.)

Page 319:06 to 319:18

00319:06 Q. And is that what -- what's
07 referred to in -- on that May 6th entry that
08 we just read?
09 A. Yes, sir, I believe that to be
10 true.
11 Q. Okay. Can you just in general
12 terms explain the process of the deck test
13 procedure, if you recall?
14 A. In my general words, it would be
15 a function test for the complete pod to make
16 sure that we had good valves and good results
17 to be able to run it back subsea to try to
18 get control of the well.

Page 319:23 to 321:04

00319:23 Q. Okay. If you -- in the May 9th
24 entry, if you go down towards the bottom, you
25 see where it says: End of day?
00320:01 A. Yes, sir.
02 Q. Okay. Go up three bullet points
03 from there where it says 1335.
04 A. Yes, sir.
05 Q. Okay. The last sentence in that
06 bullet point says: Waiting for procedure
07 from Houston for deadman test.
08 Do you -- do you know what
09 procedure you were waiting on at that point?
10 A. Yes, sir. There's a separate
11 procedure from this that was the deadman test
12 procedure.
13 Q. Do you know why you needed a
14 different procedure from the deck test that
15 you had been using at that point?
16 A. The deck test procedure didn't
17 cover the deadman. Basically there was some
18 discussions about running the pod back subsea
19 and trying to make the deadman active in case
20 we needed to shut in the fail-safe valves
21 during the top kill, if we had a drive-away
22 or something.
23 Q. Okay. Would you take a look at
24 Tab No. 3, which has previously been marked
25 as part of Exhibit 7014.
00321:01 Do you know what that document
02 is?
03 A. Factory acceptance test
04 procedure.

Page 321:10 to 321:20

00321:10 Q. Do you -- was this the procedure
11 that you were waiting on?
12 A. I believe this was a procedure
13 we were waiting on.
14 Q. So that -- that entry that we
15 just referred to on May 9th, where it says,
16 waiting for procedure from Houston for
17 deadman tests, you believe that was the
18 factory acceptance test procedure dated
19 May 11, 2010?
20 A. Yes, sir, the AMF deadman.

Page 322:01 to 322:08

00322:01 Q. How does how does the -- the FAT
02 at Exhibit 7014 differ from the deck test
03 procedure?
04 A. If my recollection's correct,
05 the deck test procedure doesn't test the
06 deadman anywhere in it. It was basically
07 just a function test for the valves and the
08 solenoid valves.

Page 322:16 to 322:17

00322:16 (Exhibit No. 3618 marked for
17 identification.)

Page 322:19 to 323:19

00322:19 Q. Can you tell me what this
20 document is?
21 A. The top kill procedure.
22 Q. And it also indicates that it
23 involves a rerun and function tests the
24 yellow pod; is that correct?
25 A. I believe you are correct.
00323:01 Q. Okay. And what does that
02 entail?
03 A. The -- basically, we done a
04 complete function test on the pod -- on the
05 deck before we run it back subsea, and then
06 we rerun the subsea with the Lars system over
07 the side of the Q-4000 and landed it back on
08 the HORIZON BOP.
09 Q. And the purpose of that was
10 to -- in part was to function the deadman?
11 A. No, sir. It was the -- to
12 mainly be able to open the choke and kill
13 valve so we could pump mud through the BOP
14 for the top kill.
15 Q. Okay. After the yellow pod was
16 run back to the DEEPWATER HORIZON BOP, was

the deadman tested?
A. No, sir, we never armed the deadman at that point.

Page 326:22 to 329:16

Q. Can either of these PETUs, 3615 or 3616, be set to simultaneously operate both SEM A and SEM B?
A. Not on the HORIZON pods, no, sir, not that I'm aware of.
Q. Now, we talked a lot about your work testing on the yellow POD.
Did you also do any work on the blue POD?
A. Yes, sir.
Q. Okay. Can you describe your role in testing the blue POD?
A. It's pretty much the same as the yellow POD. We traveled to the DEEPWATER ENTERPRISE, pulled the POD, landed it in the moon pool and did the deck test procedure and got it ready to rerun, with the exception that we had a quick disconnect for the hot line hose and a disconnect jumper for the MUX cable.
Q. Okay. Was any of the equipment that you used to test the blue POD different from what you used on the yellow POD?
A. The PETUs were different, yes, sir.
Q. Did you -- did you use any different procedures than the ones that were set out for use on the yellow POD?
A. Not that I recall.
Q. Okay. And one of the tests that were run on the blue POD was a -- a voltage test on the batteries; is that correct?
A. That is correct.
Q. Okay. Can you just briefly explain how battery voltages are determined on these pods?
A. There's a pie connector which has the batteries wired into it so you could check the voltage in the batteries. By checking the voltage in the batteries, it doesn't give you the state if the battery is good or bad, it's just a troubleshooting point. I mean, it doesn't have a load on it; so therefore, you can't tell the drain on the battery.
Q. Can you get a reading on how much voltage is left on the battery?
A. You could see how much voltage is in the battery. That is a correct

statement.
Q. Do you regard that as a complicated procedure?
A. Now I do.
Q. Why do you say that?
A. We've had two different people try to take the same readings, and both times I'm assuming they misplaced their meters in the wrong holes in the pie connectors.
Q. So you were getting different readings every time you did the test?
A. No, sir. The -- we done a test on the blue SEM on the Q-4000 and it was different test results when we got back to Michoud. And we did one on the -- sorry.
We done one on the yellow POD on the Q-4000, and we got different test results when we got back to Michoud. And we did one on the blue POD on the ENTERPRISE, and we had different test results when we got back to Michoud.

Page 329:20 to 330:10

Q. Okay. How long does it take to test battery voltage?
A. Maybe 30 minutes.
Q. Can you just walk me through the basics of the process?
A. Basically, if I remember correctly, it's Pie -- it's in Pie 18F, and you've got four pins. One of the pins is going to be your ground, and the rest of the pins is going to be your voltage, one for your 9-volt for A, one for your 9-volt for B and the other one's for your 27-volt.
Q. And you just --
A. You hold your meter in the one lead and touch it across, and you get your battery voltage readings.

Page 331:04 to 331:19

Q. Did you -- at any time in any of the readings you were present for, did you determine that there was -- there was sufficient charge on the blue POD to operate the AMF procedure?
A. We tried to do the test procedure for the AMF, and we had in -- inclusive [sic] report. Basically we didn't get a finish because we couldn't get it to fire off the batteries. When you turned the PETU back on, we couldn't get the deadman to

fire.
Q. So the conclusion was that the batteries weren't sufficiently charged to operate the deadman?
A. I believe that to be true.

Page 334:18 to 334:23

Q. Okay. Is there any way that you're aware of that the blue POD battery could have been discharged after April 20, 2010?
A. I'm not the electrical engineer, but I don't see it possible.

Page 337:10 to 337:13

Q. Is there any reason you can think of why the charge on the blue POD would have changed from April 20th until the time that you tested it in July?

Page 337:16 to 337:17

A. Not that I could recall, no, sir.

Page 338:18 to 339:08

Q. Okay. So at the close of your testing on the blue and the yellow pods you had, in its original condition, the yellow POD had a Solenoid 103 that wouldn't function the blind shear ram, correct?
A. Depending on the conditions.
Q. Based on your testing, it did not function -- it would not function the blind shear ram?
A. That is correct.
Q. Okay. And the blue POD had a battery that was insufficiently charged to operate the deadman?
A. I'll --
Q. Is that correct?
A. That is correct.

Page 339:19 to 339:23

Q. Okay. If you have bad Solenoid 103 on one POD and a battery that -- that's insufficiently charged on the other POD, is there any way that the dead --

23 deadman can fire?

Page 340:01 to 340:01

00340:01 A. Not that I could see.

Page 346:23 to 347:13

00346:23 Q. Okay. What -- let's just
24 briefly, what was your involvement at Michoud
25 once BOP arrived?
00347:01 A. If I recall when the BOP got to
02 Michoud, we pulled the pods off and
03 functioned them to remove the saltwater out
04 of the blue and the yellow POD.
05 Q. Okay. What else?
06 A. The next time I was called down
07 was to show DNV how to operate a PETU.
08 Q. Okay.
09 A. And answer questions.
10 Q. Were you able to explain to them
11 in a -- so that they could -- that you felt
12 comfortable that they could operate the PETU
13 successfully?

Page 347:16 to 348:01

00347:16 A. While they were operating the
17 PETU, we were standing over their shoulder in
18 case they was pushing the wrong button or had
19 an issue where they could damage the
20 equipment.
21 EXAMINATION BY MR. PFEFFER:
22 Q. Okay.
23 A. It was the guy's first time as
24 far as I'm aware of functioning the PETU.
25 Q. Did he tell you that?
00348:01 A. Yes, sir.

Page 355:22 to 356:09

00355:22 (Exhibit No. 3619 marked for
23 identification.)
24 EXAMINATION BY MR. COULSON:
25 Q. After you've had a chance to
00356:01 look at it, would you tell us what 3619 is,
02 please.
03 A. It's a daily log of going out to
04 the ENTERPRISE.
05 Q. It's prepared by yourself?
06 A. I think this one here was
07 actually prepared by me with the -- help with
08 some notes for some other guys who were

09 writing it down when we were working.

Page 357:01 to 357:23

00357:01 Q. You prepared a daily report
02 sheet such as 3619 as part of your normal job
03 at Cameron working with others on the job; is
04 that right?
05 A. When the job entails it, yes,
06 sir.
07 Q. And you prepared and worked with
08 others to prepare Exhibit 3619, right?
09 A. That is correct.
10 Q. And you strove for -- to make
11 Exhibit 3619 as -- as accurate as you could?
12 A. To the best of my understanding,
13 yes, sir.
14 Q. And do you believe that 3619 is
15 an accurate reflection of the -- the blue pod
16 intervention events you recorded?
17 A. I'd have to read it again all
18 the way through, but . . .
19 Q. Well, is there any -- any reason
20 that -- that you know of that it -- that it
21 would not be accurate? You -- you tried to
22 make it accurate, right?
23 A. Yes, sir.

Page 358:03 to 358:21

00358:03 Q. The blue pod intervention
04 reflected in Exhibit 3619 was attended by
05 representatives from the MMS, US Coast Guard,
06 Cameron, and Transocean, and BP, among
07 others; is that right?
08 A. I believe so.
09 Q. From that -- from your
10 experience that's -- is what you recall?
11 A. Yes, sir.
12 Q. And the -- the group of
13 representatives I just mentioned attended
14 meetings to discuss the -- the work that's
15 being done?
16 A. Yes, sir.
17 Q. And as the work progressed, is
18 it correct to say that no one raised any
19 objections or -- to the -- the work that was
20 done?
21 A. Not that I'm aware of, no, sir.

Page 359:15 to 359:16

00359:15 (Exhibit No. 3620 marked for

16 identification.)

Page 360:03 to 360:04

00360:03 (Exhibit No. 3621 marked for
04 identification.)

Page 360:06 to 360:11

00360:06 Q. We won't go through these in
07 detail, but from just looking basically at
08 the signature pages for these, are these --
09 are Exhibits 3620 and 3621 written procedures
10 followed for the blue pod intervention?
11 A. Yes.

Page 360:18 to 361:22

00360:18 Q. Sure. Let's look at
19 Exhibit 3620. Is Exhibit 3620 the factory
20 acceptance test procedure that was performed
21 for the blue pod intervention?
22 A. This was the deadman test
23 procedure for the blue pod intervention, yes,
24 sir.
25 Q. And the procedure was -- looking
00361:01 at the back, it looks like it was signed by
02 personnel for Transocean, US Coast Guard, and
03 MMS, and I think also yourself; is that
04 right?
05 A. And BP, too, yes, sir.
06 Q. And BP, also?
07 A. Yes, sir.
08 Q. Did any of the representatives
09 signing here have any objection to this
10 procedure?
11 A. Not that I recall.
12 Q. Okay. 3620?
13 All right. Same question for
14 3621, the next exhibit, the deck test
15 procedure. Is this the deck test procedure
16 for the blue pod intervention?
17 A. Yes, sir.
18 Q. Okay. And any of the
19 representatives present for the blue pod
20 intervention raise objections regarding this
21 procedure?
22 A. None that I could recall.

Page 362:07 to 363:18

00362:07 Q. I think so. You -- you tell me
08 if you noticed anything -- any new connectors

on the -- the blue pod.
A. Yes, sir, we noticed that the blue pod had new -- it looked to be pie connectors and E connectors.
Q. And what if -- you also look at the -- the stamping on there such as stamping for DD1 or DD2? Is that -- do you recall that?
A. Yes, sir, I recall seeing the stamp that said D&D.
Q. D&D?
A. Yes, sir.
Q. Did you look into this stamping with others from Cameron during or after the blue pod intervention?
A. If I recall, I sent an e-mail back to Cameron, but I don't know how far they made it into looking into it.
Q. What, if anything, did you conclude as a result of seeing the -- the D&D stamping and the new connectors?
A. It's my belief that a company called D&D probably rebuilt the solenoid valves.
Q. And who's D&D?
A. It's my belief that D&D is a set of brothers that used to work at Cameron and started their own company.
Q. So, in other words, the -- the solenoids -- you say solenoids?
A. Yes, sir.
Q. In other words, the solenoids were rebuilt by someone other than Cameron?
A. That's what I believe to be, yes, sir.

Page 364:16 to 364:17

(Exhibit No. 3622 marked for identification.)

Page 366:18 to 366:24

All right. So this Exhibit 3622 is Cameron meeting minutes of August 4, 1999. It's from the middle of the first page.
A. Okay.
Q. Do you recognize the RBS8D as the DEEPWATER HORIZON?
A. Yes, sir.

Page 368:16 to 368:17

00368:16 (Exhibit No. 3623 marked for
17 identification.)

Page 369:25 to 370:12

00369:25 Q. Looks to be dated in July 2007
00370:01 regarding the -- the HORIZON -- the DEEPWATER
02 HORIZON -- work on the DEEPWATER HORIZON.
03 Does that look right to you?
04 A. Yes, sir.
05 Q. And looking at the second
06 document, the thick document, it's the work
07 related to some factory acceptance test work
08 on the control pod for the DEEPWATER HORIZON?
09 Does that look right?
10 A. Yes, sir, looked like the
11 factory set acceptance test procedure, yes,
12 sir.

Page 372:04 to 376:21

00372:04 Q. All right. Starting -- looking
05 from the bottom and going up about four
06 items, there's a word, "bad coil."
07 What did -- what would -- what
08 does "bad coil" mean to you?
09 A. It could indicate improper
10 wiring, wires got smashed, flooded. I mean,
11 there's numerous things that cause a bad
12 coil.
13 Q. Okay. And that was -- that's --
14 those are causes of bad coil.
15 And a bad coil is a coil that's
16 not working or a coil that's failed? How
17 would you characterize what a bad coil is?
18 A. Bad -- to me a bad coil would be
19 one that didn't pass the FAT.
20 Q. And looking down a little bit
21 from "bad coil", there's a couple "sticky
22 coils".
23 What's a sticky coil?
24 A. That's re -- we in field service
25 refer to it as, if the BOP fluid is not the
00373:01 right mix or you get hardened water,
02 sometimes it causes a coil to get sticky
03 where it won't slide up and down, the shear
04 seals start dragging.
05 Q. So the -- a sticky coil is one
06 that won't activate when -- when called upon
07 to do so? Can you describe -- is it one that
08 will not function?
09 MR. BAAY:
10 Object to form.
11 A. No, sir. A sticky coil will

function, but it just seems to take a little longer to function. It's not always stuck. You still can get it to move, in my mind.
EXAMINATION BY MR. COULSON:
Q. Okay. Let's look at -- at Coil 75 and 76, which are about six or seven up from the bottom. There's a comment written here: "Did not flow on A until B was energized."
What does that statement mean to you?
A. I'm not sure if they had two PETUs and they were firing the A side off one and the B side out the other or how actually
00374:01 they were testing those. I mean, if they were testing it with a panel, they would have fired A and B at the same time. I mean, I just -- by looking at this document, I can't really tell how they actually tested it.
Q. Sure. I --
A. Or if they were using the SEM to test it, I meant.
Q. I just want to -- we don't know how -- you don't know how the testing was done, but I'd like to interpret this statement.
If it says on -- for 75: "Did not flow on A, take the first part." Does that mean that energizing A SEM for the solenoid, it didn't -- the solenoid didn't work?
A. Me trying to interpret what was wrote here, I'd agree with you it did not flow on A until B was energized when you got both coils pulled in and energized.
Q. The one coil, A, on 75 didn't work, and then when you turned B on also, the coil -- the Solenoid 75 did work?
A. That is correct.
00375:01 Q. Looking up to the Solenoid 65 statement: "Flow stops when both A and B are energized, dash, COIL," in capital letters.
What does that mean to you?
A. If it was me, I'd indicated that a coil -- the flow stops when both A and B are energized.
I'm not an electrical engineer, but my belief would be you'd have the A coil wired different from the B coil.
Q. Let's look up to No. 31, Solenoid 31, that's close to the top.
A. Yes, sir.
Q. There's a comment: "Pie CONN period backwards."
What does that mean to you?

A. I'm not real sure what that would mean, pie backwards.
Q. Okay. There's one more question, then, on the -- at the No. 52 at the very top.
Among the writing there's a comment at the very top: "No flow until both solenoid on."
Did you see that?
A. Okay.
Q. What does that mean to you?
A. It could mean a couple different things. In my mind would mean maybe the A coil was broke and they fired the B coil, and then they thought since both of them were fired, then it pulled it in. Or the drag on the shear seals was great due to contaminated fluid.
Q. Indicates some kind of problem on 52 solenoid?
A. Yes, sir.
Q. In fact, all of the items we've mentioned, all of the -- that we've discussed, the solenoids had -- each had a problem, just maybe a different kind of problem for each one; is that right?
A. It -- after reading over this, it looks like some of it was due to, you know, bad fluid on the hydraulic end causing it to stick or some kind of buildup.

Page 378:21 to 378:24

Q. Sure. Is having a problem with 10 percent of the solenoids when running a Cameron factory acceptance test procedure a significant problem?

Page 379:02 to 379:05

A. I would agree with -- if indeed had 10 percent of the total number of solenoids, that would be a problem to me, yes, sir.

Page 379:07 to 379:11

Q. I'd like to turn to what's been previously marked now as Exhibit 3603, which I'll hand you. I have the exhibits here.
A. Okay. Can I set these down? Are we done with these?

Page 379:14 to 379:25

00379:14 Q. Would you please turn to the
15 third page, middle section, Acoustic Systems.
16 It says in the second sentence:
17 "The signal receivers are mounted on extended
18 arms on the stack." Is that right?
19 A. Yes, sir.
20 Q. And is it your understanding
21 that the receivers on the stack for an
22 acoustic -- a Cameron acoustic system are --
23 are, in fact, mounted on the stack?
24 A. The receivers are on arms on the
25 stack, yes, sir.

Page 381:05 to 381:06

00381:05 (Exhibit No. 3624 marked for
06 identification.)

Page 382:01 to 382:23

00382:01 Q. Executive Summary, the first
02 sentence: "Secondary intervention can be
03 defined as an alternate means to operate BOP
04 functions in the event of total loss of the
05 primary control system or to assist personnel
06 during incidents of imminent equipment
07 failure or a well control -- control
08 problems. These systems can be completely
09 independent and separate or utilize
10 components of the primary BOP control
11 system."
12 Did I read that right?
13 A. Yes, sir.
14 Q. And there's some examples listed
15 below, such as deadman, acoustic system, ROV
16 intervention, automatic mode function. I'd
17 just like to use just generally that type of
18 definition for the secondary systems in the
19 report. Okay? I'm going to ask you about
20 secondary intervention systems, such as
21 deadman, acoustic, automatic mode function
22 as . . .
23 A. Okay.

Page 384:02 to 384:17

00384:02 Q. Let's turn to the very last page
03 of Exhibit 3624, the West report. If you'll
04 look at the very last item on Section 7.3
05 titled All Rigs, it reads: Acoustic systems
06 are not recommended because they tend to be

very costly and there is insufficient data available on system reliability in the presence of mud or gas plume.
You mentioned that -- that you're not aware of any Cameron data on testing of the BOP during turbulent conditions; is that -- is that right?
A. That is correct.
Q. So you would agree with the statement I've read on -- under Section 7.3 of Exhibit 3624?

Page 384:20 to 384:23

A. I would not agree on the grounds that I've never tried to test it with mud and gas either, so I wouldn't have a conclusion one way or the other.

Page 384:25 to 385:13

Q. Okay. So you don't have any data on -- under mud or gas conditions?
A. That is correct.
Q. So you -- you don't have anything to add to the West report statement that there's insufficient data available on acoustic system reliability in the presence of mud or gas plume?
MR. NICHOLS:
Objection, form.
A. That's not the kind of my scope of work. I mean, it would be more along the line of someone in engineering, not field service.

Page 386:01 to 386:16

Q. You don't have any -- you don't have any data on BOP acoustic system reliability in the presence of mud or gas plume, right?
A. I personally do not, yes, sir, that is correct.
Q. And you're not aware of any Cameron data or testing of BOP in the presence of a mud or gas plume, right?
A. As far as I'm aware, no, sir, I don't know of any data one way or the other.
Q. So you couldn't bring forth any data to dispute West's conclusion that there's insufficient data available?
A. I personally could not, you are

16 correct.

Page 386:23 to 387:06

00386:23 Q. I'd like to look -- under the
24 discussion header, I'd like to look at the
25 last sentence of the first paragraph reading:
00387:01 Acoustic systems are useful in situations
02 where the primary control system has failed
03 but may not function if the well has
04 significant flow.
05 Do you disagree with that
06 statement?

Page 387:09 to 387:11

00387:09 A. I can't neither agree or
10 disagree with it because I have no grounds
11 of --

Page 387:13 to 387:19

00387:13 Q. You don't have any Cameron data
14 to bring forth to disagree with the West
15 statement that acoustic systems may not
16 function if the well has significant flow,
17 right?
18 A. That -- I personally do not have
19 any, that is correct.

Page 388:07 to 389:03

00388:07 Q. Have you -- you've mentioned --
08 I think you've -- you've -- you've had some
09 work -- you've worked on acoustic systems?
10 A. Yes, sir.
11 Q. Okay. You just haven't
12 conducted subsea testing under flow
13 conditions is what you're saying?
14 A. I personally have not, that is
15 correct.
16 Q. Okay. There's a mention here of
17 experimentation with remote hydrophones or
18 relay beacons on the seafloor 100 meters from
19 the BOP stack to improve communication during
20 a blowout.
21 The Cameron system is -- is
22 attached to the BOP stack, right?
23 A. Yes, sir.
24 Q. There's no option from Cameron
25 to have 100 meter -- a remote sensor 100
00389:01 meters away that -- that sends a signal on
02 the seafloor by cable to the BOP?

A. Not that I'm aware of.

Page 391:02 to 391:22

Q. Okay. I'll start again. It states: Significant doubts remain in regard to the ability of an acoustic control system to provide a reliable emergency backup to the primary control system during an actual well flowing incident.
Did I read that right?
A. That is correct per the -- what's written here.
Q. Environmental factors that would be expected to exist during an emergency such as high noise and/or a mud cloud may prevent reliable actuation of stack function with acoustics.
Did I read that right?
A. That's what it says here, yes, sir.
Q. And, again, as we've mentioned before, you can't -- you're not aware of any Cameron data or testing that Cameron could bring forth to dispute this, right?

Page 391:25 to 392:05

A. I'm personally not aware.
EXAMINATION BY MR. COULSON:
Q. Yeah, you personally --
A. Yes, sir.
Q. -- not aware of it, right?
A. Yes, sir.

Page 392:13 to 393:09

Q. And discussing the secondary systems, the report states in the second sentence of the first paragraph: There are many systems available that will increase the security of a BOP system similar to the way a belt adds security to suspenders. This approach has the potential to create more problems than it solves if not thoroughly thought out in advance. And the added complexity has proven problematic in some cases?
Did I read that right?
A. That's what it says, yes, sir.
Q. Would you agree that adding additional secondary systems -- one example is an acoustic system, another example is

a -- any other upgrades that have been mentioned earlier today -- adds to the complexity of the BOP system?
A. I would agree it adds to the complexity of the BOP system. That is correct.

Page 393:20 to 394:04

Q. And it is true that secondary systems, of which acoustic system is one, add to the complexity of a system.
We covered that, right?
A. Yes, sir.
Q. And systems -- when -- that are added to the BOP have to interact with other systems in -- in some cases, right?
A. Yes, sir, it has to interact sometimes.

Page 401:09 to 401:10

(Exhibit No. 3626 marked for identification.)

Page 401:13 to 401:21

Exhibit 3626 is a Cameron safety alert?
A. That is correct.
Q. Safety alert for the Mark III SEM, regarding the Mark III SEM, right?
A. That's correct.
Q. The DEEPWATER HORIZON had a Mark II SEM; is that right?
A. That is correct.

Page 402:12 to 404:03

Q. And the very last sentence of the -- the paragraph starts in Warning, capital letters, states: This could result in failure of the BOP to perform its intended function.
Did I read that right?
A. Yes, sir, that sentence, you read it correctly.
Q. This -- so this safety alert is informing customers of Cameron that there's an issue under which the Mark III could fail to perform its intended function, right?
A. Until we get the new I/O boards installed, yes, sir, you are correct.

00403:01 Q. And this safety alert does not
02 regard the Mark II version of the Cameron SEM
03 that was on the DEEPWATER HORIZON, right?
04 A. This document does not refer to
05 the Mark II SEMs. You are correct.
06 Q. So the Mark III SEM is not
07 completely problem three -- problem-free,
08 right?
09 A. It wasn't at this time. I feel
10 that it is now.
11 Q. You would -- you would say that
12 to people working on the rig, that Cameron
13 can -- working on rigs out in the Gulf, that
14 Cameron can say that the Mark III is
15 problem-free and that they don't -- won't
16 have any problems with it? Is that the
17 Cam -- guarantee from Cameron?
18 MR. DOFFERMYRE:
19 Objection to form.
20 MR. NICHOLS:
21 Objection to form.
22 A. No, sir. What I can say is that
23 I -- I feel the Mark II (sic) has some
24 upgrades and some advantages over the -- the
25 Mark II. BP must feel the same way since
00404:01 we're putting the same type pods on the BP
02 THUNDER HORSE or removing your IIs and
03 putting IIIs.

Page 404:05 to 404:12

00404:05 Q. And the -- what you mentioned
06 earlier was that the Mark III problem in this
07 safety alert has been -- since been
08 corrected?
09 A. Yes, sir. That was a brief
10 problem we had and we corrected it. I mean,
11 there was some procedures put in place where
12 you could go around us and still work.

Page 404:24 to 405:02

00404:24 Q. Until the problem could be
25 fixed?
00405:01 A. Until the problem could be
02 fixed. That is correct.

Page 405:10 to 405:11

00405:10 (Exhibit No. 3627 marked for
11 identification.)

Page 405:21 to 406:14

00405:21 Q. It's regarding anode material
22 getting in the pie connectors of the
23 DEEPWATER HORIZON pods; is that right?
24 A. That is correct.
25 Q. And you make the statement that:
00406:01 This is the new SEM that left here six months
02 ago, right?
03 A. That is.
04 Q. Can you explain the statement or
05 can you explain the issue that was happening?
06 A. Yes, sir. Somewhere along the
07 line, the way -- I don't know if Cameron or
08 Transocean -- somebody installed an anode
09 right in front of where the pie connectors
10 plug in. So when the anode gets eaten away
11 because it's made of a sacrificial metal and
12 when you're subsea, you get two dissimilar
13 metals put together, it's called the Seebeck
14 effect. It starts creating a voltage --

Page 406:18 to 406:24

00406:18 Q. Maybe a summary of the issue.
19 A. It's a Seebeck effect. It
20 basically creates a voltage, and it eats away
21 at the sacrificial metal. And as it gets
22 eaten away, it breaks free, and I guess it
23 could have floated in the current; but it got
24 embedded into the pie connectors.

Page 407:01 to 407:23

00407:01 Q. So the anode was installed in
02 the wrong place?
03 A. My personal opinion is, yes,
04 sir, the anode was stuck in the wrong spot.
05 Q. And it got material into the pod
06 pie connectors that shouldn't have been
07 there?
08 A. Yes, sir.
09 Q. And that happened within the
10 space of six months after the pod went back
11 into service?
12 A. That is correct. If you've got
13 a voltage leak on your rig or something that
14 will speed up the process of the breaking
15 down of the anodes, they deteriorate faster.
16 Q. And you'd characterize that
17 material in the pie connectors as a problem
18 with the pod?
19 A. It could make the rubber
20 conductive.
21 Q. So that's a -- that's bad --

it's a bad thing?
A. Yes, sir.

Page 408:04 to 408:05

(Exhibit No. 3628 marked for identification.)

Page 409:18 to 409:23

Q. Okay. They're -- Transocean's asking to be able to monitor the battery?
A. That is correct.
Q. And they're showing you the data that says they currently can't monitor it?
A. Yes, sir.