Transcript of the Testimony of

The Joint United States Coast Guard/Bureau of Ocean Energy Management Investigation

Date taken: April 4, 2011
PM Session

USCG/BOEM Board of Investigation (Re: Deepwater Horizon)

*****Note*****

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USCG/BOEM BOARD OF INVESTIGATION

INTO THE MARINE CASUALTY, EXPLOSION, FIRE, POLLUTION AND SINKING OF MOBILE OFFSHORE DRILLING UNIT

DEEPWATER HORIZON, WITH LOSS OF LIFE

IN THE GULF OF MEXICO, 21-22 APRIL 2010

MONDAY, APRIL 4, 2011, 1:00 P.M.

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The Transcript of the Joint United States Coast Guard/Bureau of Ocean Energy Management Investigation of the above entitled cause before Cathy Renee' Powell, a certified court reporter authorized to administer oaths of witnesses pursuant to Section 961.1 of Title 13 of the Louisiana Revised Statutes of 1950, as amended, reported at the Holiday Inn, 2261 North Causeway Boulevard, Metairie, Louisiana 70001, on Monday, April 4, 2011, beginning at 1:00 p.m.

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MEMBERS OF THE BOARD:

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UNITED STATES COAST GUARD

REPORTED BY:

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CERTIFIED COURT REPORTER

WITNESS:

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SINE RIVALI, LLC

MARK COHEN, ESQUIRE
COHEN, GORMAN & PUTNAM
(Representing Dr. Kenney)

* * *

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JUDGE ANDERSEN:

Please be seated.

The next witness is Dr. Gary Kenney, correct?

Counsel, could you state your name for the record again?

MR. COHEN:

Yes, it is Mark Cohen, of Cohen, Gorman & Putnam, Houston, Texas, for Gary Kenney and Det Norske Veritas.

JUDGE ANDERSEN:

The testimony you will give today is pursuant to the procedures of this federally created board, and when I place you under oath, you will be bound to tell the truth under penalty of perjury.

DR. GARY KENNEY,

having been first duly sworn as a witness, was examined and testified as follows:

JUDGE ANDERSEN:

Please have a seat.

If, during the course of our questioning, you have any question that is unclear, just feel free to let us know; and, obviously, your attorney can do that as

well.

Okay, any questions from the board?

EXAMINATION BY MR. MATHEWS:

Q. Dr. Kenney, would you state your name and spell your last name, please.

A. Dr. Gary Kenney, K-E-N-N-E-Y.

Q. Thank you. By whom are you employed, sir?

A. I actually own my own company, it is called Sine Rivali, and I am on subcontract to DNV.

JUDGE ANDERSEN:

Would you spell the name, please?

THE WITNESS:

Yes. Capital S-I-N-E, capital R-I-V-A-L-I.

EXAMINATION BY MR. MATHEWS:

Q. And as subcontractor to DNV, what position do you hold?

A. The lead investigator for this project.

Q. Had you done any prior contracts with the DNV prior to this incident?

A. Yes.

Q. Can you elaborate?
A. Yes, I have done work with DNV with regard to some gas plant work in Syria, I have done work for DNV in Vancouver with the British Columbia Safety Authority, and I have done other miscellaneous projects for DNV throughout the years.
Q. All as subcontractor? Or were you ever an employee of DNV?
A. I was an employee of DNV for approximately ten years.
Q. When was that, sir?
A. About 1994 through 2005.
Q. And what is your educational background?
A. I have a bachelor's of science in physics and mathematics, and a master's and doctorate from the University of Cincinnati Institute of Environmental Health.
Q. Can you give us a brief overview of some of the forensic work you have done in the past.
A. Yes. In 1988, I was appointed by Justice Fennell to assist in Mr. Fennell's inquiries into the London underground fire

at King's Cross that claimed the lives of 32 individuals. Then again in 1988, I was appointed by Owen Cullen to assist his investigation in the Piper Alpha disaster.

In 1998, I was appointed by Sir Daryl Dawson to conduct his investigation into the Esso gas plant fire and explosion in Victoria, Australia.

Q. And how did the DNV contact you for this investigation?

A. Through Dr. Thompson.

Q. Have you had past experience with Dr. Thompson?

A. Yes, we worked together on another project in Australia.

Q. When did you begin work on the DNV project?

A. This particular project I would say probably September 10 or 11.

Q. And specifically for this project, you were responsible for the operations that took place at Michoud?

A. That's correct.

Q. And can you please elaborate on your roles and responsibilities there.

A. Yes, sir. As lead investigator, I was helping to mobilize the teams to the site to undertake the testing program. I was responsible for carrying out the various tests in accordance with the DNV test plan, and where we identified the need to do variances to the test plan, to assist with putting together those variances or changes in the test plan.

I liaised with the Technical Working Group on a daily basis, and I also liaised with NASA and the Coast Guard and the FBI members with respect to the testing program.

Q. Did you have a team at DNV to assist you with the forensic operations? Were those DNV employees or were they also subcontract employees?

A. It was a combination of DNV employees and subcontract employees.

Q. And what were their responsibilities?

A. Two of the DNV employees were directly involved in laying out the various tests that we carried out and various

examinations on the blowout preventer, the rams, the drill pipes, the functioning of the various parts of it.

We had a subcontractor assisting with a lot of, if I could use the term "wrench turning," the connections of the hydraulic systems, the hydraulic pressure unit, running and controlling that.

We also had another subcontractor, JEM Video, who was responsible for all of the video and photography that was being carried out.

Q. Prior to the beginning of the forensics investigation at Michoud, were you given any types of documents to assist you?

A. Basically, the RFP from the government at that point in time, and then I also assisted with the actual development and drafting of the DNV test plan.

Q. What documents did you have available to you? Did you have drawings of the BOP stack? Did you have manuals from Cameron on how to operate and maintain the stack?

A. All of that was produced as the

testing program continued. So yes, very early on -- I cannot remember exactly when -- but all that information was produced and provided by the JIT.

Q. Were you also responsible for the review of the ROV video footage?

A. I oversaw that, I did not undertake it directly.

Q. And who was responsible for doing that, sir?

A. That was a gentleman by the name of Scott, Colin Scott. He did a fair amount of that, and he was also assisted by Tara Podnar, who are both DNV employees based out of Dublin.

Q. Ohio?

A. Yes.

Q. Why exactly did you review the ROV footage?

A. We felt it was important to understand the state of the various rams as was identified through the ROV intervention process. Following the event on the 20th, various ROV interventions were undertaken to try to function various parts of the rams

and the annulars, and we felt that was important to our investigation to have an understanding of what they were able to achieve and what they were not able to achieve and what they identified.

Q. I think the JIT actually provided the DNV with some timelines or time frames of when certain activities occurred with ROVs. Were you able to verify that timeline was accurate through the video footage?

A. Yes. The summary of our ROV footage was the 20th of April through the 5th of May.

Q. Was any of the video footage made available to the Technical Working Group?

A. I could not answer that question.

Q. Were you an active participant in the retrieval of the Q-4000 components?

A. No, I was not.

Q. Do you know if DNV actually had a rep on the Q-4000?

A. Yes.

Q. Do you know who that was?

A. Yes, it was Ben Terrien, T-E-R-R-I-E-N.

Q. And once they were recovered, how were they transferred to DNV?

A. The -- if I might clarify, are we talking about the BOP stack?

Q. Yes, sir. Only the BOP. Sorry about that.

A. Yes. Once they were recovered, they were then loaded onto a transport barge and then barged to the NASA Michoud site.

Q. Were you involved in setting up the facility at NASA?

A. I liaised with the Coast Guard and NASA and the NASA subcontractors for the construction of the test pads and some of the initial construction, and making sure that the west docks could support the weight of the two units. That was all undertaken by NASA itself.

Q. Any other activity?

A. We had to construct some additional secondary containment in order to meet NASA requirements from an environmental standpoint. That was undertaken and completed. Again, that work was primarily carried out by Jacobs. We oversaw that

work.

Q. Dr. Thompson testified earlier about the Technical Working Group. I guess we got his big-picture overview of what was going on. You were working with them on a daily basis, correct?

A. Yes.

Q. Who were those people and what parties did they represent?

A. The people themselves sometimes rotated out. The parties they represented were BP, Cameron, Transocean, the Multi-District Litigation, Department of Justice. Is that five or six?

Q. That was five.

A. BP, Transocean -- oh. And the Chemical Safety Board. I apologize.

Q. And why was this group formed, sir?

A. The Technical Working Group was formed to assist and provide information to DNV, technical information to DNV as the testing program moved forward.

Q. And I know you said that they rotated individuals out. Do you recall if

they had parties there every day from each Technical Working Group member?

A. It would be hard to say absolutely every day, but my immediate impressions are yes, all groups were represented every day at the test site.

Q. And was their presence beneficial to you?

A. Yes.

Q. What was your initial goal or focus on the forensic testing that took place at Michoud?

A. The initial goal was to recover the drill pipe, the trapped drill pipe in the LMRP, and the lower section of the BOP. So we undertook a series of activities to recover those two pieces of pipe.

Q. Up until February, were there any other things you were focusing on?

A. We also wanted to recover the various rams that were on the lower section of the BOP, and then do function testing on the hydraulic circuits and then the electronic circuits of the BOP.

Q. Were there any delays in your

testing that you specifically encountered at Michoud?

A. We did have a delay in constructing the temporary enclosure from December 27 through the 28th of January. We had originally hoped to have the temporary enclosure completed by around the 10th of January, and unfortunately, it took longer than that.

Q. Did you have any other delays associated with the breaking down of the annulars?

A. Yes, we had about three or four days where we were trying to recover the annulars, and due to a locking ring on the top cap of the LMRP, we were unable to free that top cap and get to the annulars themselves.

We also then, with regards to the BOP, as we were recovering the drill pipe from that, when we opened the upper pipe rams or the upper variable bore rams, we encountered a large amount of cementitious material between the upper pipe rams and the middle pipe rams, or the middle variable

bore rams, which we had to chisel out by hand.

Q. From your experience in some of the other investigations you did, were these types of delays typical?

A. Yes. In a forensic investigation of that nature, yes.

Q. Did you record the serial numbers on the stack?

A. All components that we could identify some sort of markings on, yes, we did record that.

Q. Did you do a condition assessment of it or just record the data?

A. We just recorded the data.

Q. Were you able to catalog those serial numbers back to the original stack?

A. We have done some cataloging, but we have not had access to all the records to be able to cross-correlate between what we have identified in the as-received condition and the original stack.

Q. The as-received condition, can you please explain what you actually did once you received it and before you started doing

all the scanning, what type of cleaning, what type of testing?

A. Right. One of the first things that we undertook was a visual examination to identify where we thought there might be modifications. At this point, we had sets of design drawings or sets of drawings from Cameron, so we identified what we visually saw on various parts of both the LMRP and the BOP versus those drawings. And then we also identified the various ROV interventions that occurred following the incident.

Q. Did you identify any visual damage to any components while you were there?

A. There were a number of hoses, lines and electric lines cut as part of the ROV interventions.

Q. You had access to the Cameron drawings of the BOP stack, correct?

A. Yes.

Q. Were there any differences from the latest drawings you received to what you received at Michoud?

A. From the standpoint of

modifications, we saw no differences between the 2004 drawings that we had on file and what we received at Michoud. We did see differences, obviously, from the ROV interventions and the cut hoses and the cut lines.

Q. Going back to the Technical Working Group, did they have the ability to oversee everything that was going on at Michoud?

A. They had the ability to be -- yes. We provided to the -- a room that we set up for the Parties in Interest, we provided a closed-circuit television set and we also provided them the opportunity to attend at the site and have free access to the site. The Level 3 area of the site, as we defined it.

Q. Did you collect or analyze any fluids from the BOP stack?

A. Yes, we collected a number of fluids from various chambers and cavities within the stack, such as the ST locks, the activation of the ST locks to close and open circuits, to close and open cavities of the

rams itself and various hoses and tubing that existed on the unit. That was turned over to the EPA for analysis.

Q. Were you able to come to any conclusions when you did your analyses?

A. On a number of cases when we analyzed the fluids, such as the ST lock chambers and the blind shear ram chambers, our conclusions came from the EPA analysis that it was representative of the hydraulic fluid that the rig had used, not the fluid used by the ROV.

Q. What pieces of drill pipe did you remove from the BOP at Michoud?

A. Segment 148. If we go into the report --

Q. Page 80, Figure 38.

A. There we go. The piece recovered, Segment 148, the segment there that is red, that is one piece that was recovered. That was a piece that, when we opened up the middle pipe rams, we required the necessity of having to do the hand chiseling out of various materials. We also recovered Segment 39 from the LMRP.

Q. I want to move into the findings, and I am going to start with the ST locks. I would like for you to describe the purpose of the ST locks first and what their functions are on the BOP stack, and for each of them, if you can explain the testing you did and the conclusions you reached.

A. All right. If you go to page 30, Figure 7, there is a diagram of the ST locks.

Q. Can you describe the purpose or function of an ST lock itself, sir?

A. Right. Following the closing of the -- either the blind shear rams or the upper variable bore rams or the middle variable bore rams or the lower rams, there is a mechanism that the rams move on, a piston, on a connecting rod or a piston. And as the ram moves forward into the wellbore, this wedge or lock moves behind the connecting rod to ensure that the rams not move back out in case of a loss of hydraulic pressure. So it is a mechanical means to secure the ram in position in the wellbore itself.

Q. And do you recall the position of the blind shear rams?

A. Yes. In the blind shear rams as received, one of the rams -- and if you go to page 27 -- is the upper annular -- you asked about the rams. The starboard side of the blind shear ram was closed and the port side was open.

Q. But the ST lock for the middle variable bore ram, what position was that in, sir?

A. Both of the ST locks on the middle variable bore ram were closed.

Q. I want to move on to the choke and kill lines. Can you please define the purpose of those two lines?

A. Right. There is a diagram very early on in the report.

Go to page 15. Or pages 14 and 15. Actually, page 15, Figure 6. If you look at that picture, in the center of the diagram, you will see both a straight line, a straight run of pipe moving up to a somewhat flexible pipe which is then connected up above the flex joint. The

purpose of those is in the event of well control, or what is sometimes referred to as a kick. You can then close in your wellbore itself, and through the process of opening those valves, the choke valves and the kill valves on the choke line, you would basically start to bring your well fluids and your muds and whatever was in the well itself and that to the surface, and then send heavier materials down the kill line in order to try to regain control back over the well.

Q. Can you please explain your testing.

A. Yes, we tested those in order to see if they would open and close as intended. Through the testing, we found that they did, the choke and kill valves.

Q. No abnormalities found in your testing?

A. No, no abnormalities.

Q. Did you find the location of the line going below the test ram?

A. The line going below the test ram?

Q. Yes, sir. It is not clear in this

schematic, but the choke and kill line goes below the lowest test ram.

A. Yes.

Q. I was just wondering if you had determined if there were any issues -- I'm sorry. If you are not sure, don't answer my question, but tell me if you identified any problems with the location of the choke and kill lines.

A. We did not.

Q. Moving on to the function and removal of the ram blocks, can you please explain the testing and conclusions you performed on that, sir.

A. In regards to the ram blocks, one of our first activities as part of getting to the actual drill pipe segments was to physically remove the ram blocks from the lower section of the BOP itself. One of the reasons for that was we were concerned when we were ready to do the function testing that if we did do the function testing and those rams would move, we might cause damage to some of the drill pipe.

So in each particular case, we

went through a process of opening up what is known as the bonnets on the unit and then retracted the rams out of the wellbore, connected a 90-ton crane, or using a mobile crane connected that up; would then lower each of the individual ram blocks to grade for cleaning and further examination.

Q. Can you refer to the table on page 34, Table 3. Can you please explain to the panel what we are actually looking at, if there were any abnormalities in this, sir.

A. Right. In this particular table, what we were doing was recording the various pressures when we were trying to open the bonnets and remove the rams from the unit itself. As I indicate in there, the interim pressures that were observed during the function testing are recorded in this particular table.

I am not quite sure what the second part of your question was.

Q. I was just wondering if you had determined if there were any abnormalities in the pressures required to function these

rams.

A. In some cases, we did. In the upper variable bore ram.

These are the open pressures we are applying in order to move the ram blocks back. Or to move the bonnets back.

Q. I understood.

A. Right. And in a number of instances, yes, we did experience some issues in that. And specifically in the upper variable bore ram, we did run into an issue with having to apply a fair amount of pressure, as you can see, 1400 pounds, in order to open those ram bonnets.

Q. I am moving on to the "Automated Mode Function and Autoshear Test." Can you explain the function of the AMF and autoshear test.

A. The AMF, sometimes referred to as deadman, is a mechanism, a programmable chip that exists within the subsea electronic module that is monitoring various conditions. It is monitoring whether there is communication between the subsea electronic modules and the rig itself,

whether there is hydraulic pressure as well, and whether there is electric power to the control pods.

In the event all three of those are lost, this particular chip would activate. There is a 9-volt battery that would power up that particular chip, and then there is also a 27-volt battery that would activate a solenoid that would then open up the 8-times-80-gallon accumulators on the lower BOP, the hydraulic accumulators in the BOP, open a circuit up to the high-pressure blind shear ram close function.

Q. What is the initial power source?

A. The initial power source, the electrical power source is battery.

Q. Were you able to rule anything out on the blue pod?

A. On the blue pod, moving to page 46, as you can see the 27-volt battery, the voltage that we measured was 0.7 volts.

Later on, when we did the test of the AMF/deadman on the blue pod, there was insufficient voltage in there to power the

opening of the solenoid 103 to the high-pressure shear circuit.

Q. And with respect to the ROV panel testing, how did you test those at Michoud?

A. We did a direct connection between a hydraulic pressure unit that was external that we had brought in to do the testing, we did a direct connection from that unit through what is known as the ROV panel into a port using a tool they typically refer to as a hot-stab.

We applied different flow rates of approximately 1 gallon a minute, 2 1/2 gallons a minute, and 7 gallons a minute to function the blind shear rams, function through the ROV panel using the hydraulic pressure unit.

Q. According to the document I have in front of me, Table 4 captures those times to close the blind shear rams.

A. Right.

Q. For example, an ROV with a flow rate of 1 gallon per minute took around 72 minutes and 28 seconds; is that correct?

A. That's correct.

Q. And a 2-gallon-per-minute flow rate took 13 minutes, 34 seconds, and 7 1/2 took around 3 minutes, 15 seconds?

A. That's correct.

Q. Did you look at any of the capabilities of the ROVs that were in the field in the intervention?

A. We received one document from the JIT that indicated -- why we did the 1-gallon-a-minute test is that one of the first ROVs had a capability of approximately 2 1/2 liters a minute, which is about .7 gallons a minute.

So that is why we undertook the one test at 1 gallon a minute, to try to simulate that at that level of ROV functioning.

Q. Now, moving on to solenoid 103, if you will. I believe that is Section 6.1.10. Can you please tell the panel the role of solenoid 103 played in the BOP?

A. Solenoid 103 is a solenoid through which the high-pressure blind shear rams function. That particular solenoid provides -- would open up and send a

hydraulic pilot signal to the shuttle valves to open up the hydraulic circuits from the 8-times-80-gallon hydraulic accumulators on the lower BOP to provide hydraulic pressure to close the blind shear rams.

Q. What testing did you do on this at Michoud?

A. We undertook a series of tests, two general series of tests. One of the tests that we undertook was testing solenoid 103 from the standpoint -- well, if I may, there were two solenoid 103s -- actually, three solenoid 103s that were involved in testing. There was a replacement solenoid 103 that was placed on the yellow pod as a result of the May 5 intervention on the yellow pod. When that solenoid was replaced, the original was taken off and kept in evidence by the Coast Guard.

We tested both of those solenoids, as well as solenoid 103 on the blue pod.

We did a bench test on the original solenoid 103, the one that was removed on May 5, to try to ascertain its state because it was felt in earlier tests

and during the ROV interventions, it was identified as not activating. So we started with a series of bench tests on the original solenoid 103.

Q. And from those test results, were you able to determine if there was any type of design issue with the control pod system?

A. We saw no design issues with the control pods.

Q. And solenoid 3A, what was its role?

A. Solenoid 3A controls the upper annular regulator increase, and that -- again, on the May 5 intervention on the yellow pod -- was identified as not functioning in accordance with design.

So we also did a bench test on solenoid 3A as well.

Q. For the blue and yellow pod testing, I believe there was a 27-volt battery on the blue pod, low voltage?

A. The 27-volt battery on the blue pod, that was a low voltage, yes.

Q. Can you explain the low voltage? What is the range we are looking at?

A. In the blue pod, as identified, we only measured 0.7 volts on it. And while on the yellow pod, the one on the yellow pod, I believe, was measured at 27, 20 -- I have to look at the figure, but it was within the specifications of the battery voltage.

Q. And did DNV obtain the serial numbers for those?

A. No, we did not open up the subsea electronic modules. That is a sealed chamber, and you would have to open the seals up in order to gain access through and we did not do that.

Q. Were you ever able to obtain any type of record as to when those batteries were last serviced?

A. We reviewed various Cameron documents that were provided by the JIT. Within the documents we reviewed, we were unable to identify when the batteries may have been replaced.

Q. And can you please elaborate on the function testing that you did with the yellow and blue pods, sir, and what you were able to determine.

A. Right. In both cases, what we did with the yellow and blue pods was attempt to simulate the conditions, the three -- the loss of the three conditions, communications power, electrical power and hydraulic function, to see whether the AMF/deadman circuits would have activated, and then whether the circuits would have opened solenoid 103. Sent a signal to and opened up solenoid 103.

We carried out a series of tests on both the yellow and blue pods to determine whether it was working as intended. With the replacement solenoid 103 in place on the yellow pod, we identified there was sufficient battery and that it actually did function as intended.

Q. So regardless of which solenoid was selected, 103 would have never sent a signal?

A. No. If I -- if that is how you perceived it, I apologize. But no.

What we did was set up a function test where we established communications to the pod. We provided power to the pods and

also provided hydraulic pressure to the pods. We then stepped through a series of activities where we started to drop out each one of those particular functions, communications, electric power and hydraulics.

When we did that in regard to replacement solenoid 103, we found that the AMF/deadman on the yellow pod functioned as intended. We did a bench test on the original solenoid 103 in order to determine whether it might function or not. We did find in the bench test on the original solenoid 103 for the yellow pod, it did activate, it did operate as intended.

We then took the original solenoid 103, remounted it to the yellow pod and carried out a series of function tests on it.

Q. Did -- sorry about that.

A. Right. I understand.

We -- with the original solenoid 103 in place, we received -- and the best way we can describe it, and the way we described it at the time, is an inconsistent

series of results.

It fired at times, it activated at times as intended, and there were other times when it did not activate.

Q. In your forensics, were you able to determine if the EDS signal ever reached the BOP stack?

A. From our examinations, various functions that the EDS signals should have done, and this is through the ROV interventions and a review of the ROV interventions, we came to the conclusion that it did not; that the EDS signals were not received by the control pods and did not activate on the stack itself.

Q. Did any of the modifications that you identified have any type of role in the primary cause of the BOP failure?

A. No.

Q. Did any of the maintenance of the stack as received have any role in the primary cause of the BOP failure?

A. In the primary cause? No.

Q. During the forensic testing of the stack, did you identify any common mode

failure?

A. No common mode failure in the initial forensic testing. Common mode failure is we identified -- it is in the report --

Q. Correct.

A. -- the fact that the EDS functions, the loss of the EDS functions very early on. There is a level of redundancy in the EDS. This is a yellow and a blue control system, and from everything that we have identified from the standpoint of the first explosion, it would appear that first explosion was powerful enough to take that function out at the surface.

Q. At the completion of your forensics, were you able to determine if Transocean had a fully functional stack at the Macondo well?

A. Those activities we examined -- as the testing progressed, we focused more and more on the blind shear rams and the reason why it failed to seal the well.

Your question is a fully functional stack. Our testing did not

1 involve testing all the functions on the
2 stack itself. That is why --
3 Q. I will rephrase the question. Did
4 the blind shear rams have the operation to
5 fully function and seal?
6 A. Fully function and seal? From the
7 standpoint of --
8 Q. Of the function itself?
9 A. Of the function itself, yes. The
10 hydraulic circuits, yes. Right.
11 Q. Do you believe that your
12 examination that you did at Michoud was
13 fully sufficient to come to the conclusions
14 that you reached in this report?
15 A. Yes.
16 Q. In one section, you identify some
17 additional testing, I think it is Section
18 8.2.2, page 180 of the document. Can you
19 focus on the bullet points and why you are
20 recommending these additional tests.
21 A. 8 point -- I'm sorry.
22 Q. 8.2.2.
23 A. Sorry. A number of these arise
24 from the original DNV test plan, which is
25 Appendix A. You will see there was a series

of various tests in there we identified. As we indicated, as the testing progressed, we became more and more focused on the blind shear rams.

Through the various ROV interventions, there were various notices or identifications of supposed leaks on the stack following the incident; hence, we were suggesting the static pressure test be undertaken on the other hydraulic circuits as well.

Now, we would note in there that through the ROV interventions, there was quite a bit of work done both in regard to cutting hoses as well as tightening connections that they thought were loose. So when you do that testing, you have to bear that in mind.

When we went in and disrupted certain circuits, an issue that we were very focused on was establishing what the breakout torques were. There is a table of all the breakout torques in order to try to re-create that as much as possible.

We noted the original 103Y gave

1 inconsistent results. Two possible reasons
2 for that, or two scenarios could explain
3 that. One is that particular solenoid had
4 sat unused for approximately six, seven,
5 eight months after it was removed in May.
6 Through that period of time, it could be
7 that the deposits -- there were saltwater
8 deposits or deposits of the hydraulic fluids
9 built up which caused those inconsistent
10 results, or there could be other factors to
11 it. And we would suggest that further
12 testing be carried out on that to confirm
13 what those results might be.
14 Going back to the issue of leaks,
15 the high-pressure casing shear regulator,
16 when we first pressured up the high-pressure
17 shear circuit on the BOP stack -- and that
18 circuit goes to both the high-pressure
19 casing shear and the high-pressure blind
20 shears -- we found the regulator on the
21 casing shears leaked.
22 We removed it and we feel that it
23 would be appropriate to investigate that
24 further to ascertain its state at the time
25 of the incident.

Our initial examinations of the regulator, we came to the conclusion that most likely the leaks in that were post the incident and not pre the incident, but to confirm that, you would need to do further bench testing.

In the removal of the rams, a number of the elastomeric elements in that were looked at. We wondered whether there were temperature issues or not, and it was not always possible to come to that particular conclusion, but it was our feeling that temperature issues could have played a role in this incident. We could not determine it one way or the other, but we felt it was something that should be examined.

The test of the subsea electronic modules, again, back to the aspect of their state at the time of the incident, and as indicated, the need or the desire on that to open up the subsea electronic modules, look at the batteries, look at the state of the batteries, the serial numbers, and then try to identify what their state was, and

specifically, the blue pod battery, the 27-volt battery at the time of the incident.

There is a second test there, which is a test over the aspect of using a voltage generator we felt might assist with identifying at which voltages would that 27-volt battery not be capable of continuing to provide power to the solenoids. We did do some drop-out tests in the bench testing already, and we think it would be useful to confirm that.

As indicated, the annulars are also part of the well-control equipment on the BOP stack. The one, the upper annular in the as-received condition, that was found to be closed and locked closed. The lower annular was open.

The elastomeric elements in the upper annular were totally gone, and we felt it would be useful to remove those and do further examinations on them and look at their performance as well in the wider context of well-control activities in this particular event.

Again, to confirm the functioning

of the EDS, as noted in the ROV interventions, we did not see any evidence that the choke and kill or the colloid connectors had disconnected, which would have been part of the EDS. We suggest further testing be undertaken there to confirm that.

Through the period of the testing, some questions were raised about the pressure temperature sensor, and with the opportunistic -- somewhat opportunistic -- if you were doing a number of these other tests, you would have the ability to go in and remove that.

Currently, the wellbores are both full of a material called StackGuard, which is an ethylene glycol-based material. You have to drain that in order to get to the pressure temperature sensor.

In order to do some of this other work, you would have to do that, so it would be an opportunity there. And we know there is interest out there in assuring the accuracy of that particular unit.

And then, finally, the undertaking

of field tests of the ability of a BOP stack of this particular nature to seal 5-1/2-inch drill pipe, which was the drill pipe in place at the time, under internal flow conditions is something that would be very useful to understand.

Most of the tests, in fact, all of the tests that we have identified, when you are doing field tests on this particular unit, if you're doing calibration or verification testing, they're not done with a full flow condition.

Q. Do you know if y'all have ever had any other -- not just a Cameron, but any other design type of BOP stack where you have the ability to shear drill pipe with a blind shear ram that was buckled, if you will?

A. No, we did not.

Q. Earlier this morning, we went through all of the conclusions that you had come to with the forensics with Dr. Thompson. I would like to move to the recommendations with you, if you will.

Can you please explain the

following recommendations and why you made those recommendations. And let's start with 8.1.1.

A. "The Study of Elastic Buckling"?

Q. Yes. We actually went through that one earlier, but if you go to 8.1.2, we can start with that one.

A. Yes. The intent there was the aspect of -- you can see in the diagrams, you probably have gone through it earlier with Dr. Thompson, there is a small V shape in regard to it. If you look at the casing shears, you will see more of a V shape.

Just the aspect of suggesting ways that if a condition existed where you did have pipe off center, how could that pipe be re-centered, or how could you assure that the pipe will be fully and cleanly cut and yet still allow the blind shear rams and that to seal on one another.

Q. And then moving on to the "Study of Well-Control Procedures and Practices."

A. Right. In this particular incident, we had the situation that in the as-received condition, the upper annulars

were closed, and also through the ROV interventions, it was identified by gamma ray scans that the ST locks were closed on the pipe rams as well, and the blind shear rams.

So in the aspect that in a full flow condition as we had in this particular situation, many of your well-control procedures would be to close in your annulars, close in your variable bore rams and start to work it out.

Our suggestions and recommendations are some of this should be recognized, and be cognizant in doing that, in this particular situation, you could have, as we found here, a state of the pipe being buckled over the side or off center, which could cause a problem with the blind shear rams not being able to fully close.

Q. And then the "Status of Backup Control Systems."

A. Right. Within the very standards, the term -- the term that's used for AMF/deadman autoshear, there's a button on the control panel that the -- these are

sometimes called -- within the industry, they are sometimes noted as being optional and sometimes noted as being backup control systems.

In the aspect of your backup control systems, we noticed that they will state that the backup control systems should have the same capability as your primary control system, but we felt that the wording in that perhaps needed to be strengthened within the industry or a review of that would be something the industry should study.

Q. And then moving on to the "Common Mode Failure of Backup Control Systems."

A. That primarily refers to the fact that the EDS system, with the redundancy built into it, was lost through the initial explosion and whether that particular issue should be examined in the future or not. We felt that the industry should study that.

Q. Did you actually look at any type of design of the DEEPWATER HORIZON and the protections that were provided to the MUX lines?

A. No, we did not.

Q. Moving on to "Study the Indication of Functions in an Emergency."

A. Right after the emergency, a fair amount of time was spent with the ROVs just trying to find out or determine the state of were the variable rams closed, were the blind shears closed, were the upper annulars closed. We felt that with the aspect of being able to determine a number of these critical functions, it would have been very useful in the first few hours after the event to set out a course of corrective action.

MR. MATHEWS:

At this time, I have no further questions, but maybe some of the other board members will.

EXAMINATION BY MR. McCARROLL:

Q. I would like to follow up with a question as to the erosion to the body of the BOP itself. Did you find erosion in any location other than the blind shear rams?

A. Other than the blind shear rams, within the bore itself. Where we did, it

was very minor. But no, no significant erosion elsewhere.

Q. And what was the degree of erosion below the blind shear rams?

A. Below the blind shear rams?

Q. Yes.

A. Minimal, if any.

Q. Was it located all on one side or --

A. It was equal, basically, where we identified it. It was basically random patterns, and it was very minor.

Q. And within the body itself of the BOP?

A. Within the wellbore?

Q. Yes.

A. Yes.

MR. McCARROLL:

Thank you.

EXAMINATION BY CAPT. HIGGINS:

Q. What role, if any, did the FBI evidence team have with regard to the Technical Working Group?

A. No role with regard to the Technical Working Group.

Q. So did they just preserve evidence and photograph, but they didn't provide any technical input; is that correct?

A. That's correct.

Q. With regard to the upper annular being closed, do you know when that was closed?

A. Not -- I have read through the evidence of Mr. Pleasant and various other individuals, and it was indicated that it was closed for the negative pressure test, and Mr. Pleasant's evidence was that he then backed the pressure off.

There is other evidence, I understand, and also even from Mr. Pleasant, that the upper annular was possibly opened again, and that when he arrives on the bridge at approximately 2150, or after the explosion, 2151 or so, he notes that everything looked to be open.

Q. Would the upper annular have been closed during some of the well-control activities? Would that have been a normal thing?

A. Between 2140, which is when water

and mud is first reported as being on the drill floor, and 2149, it is highly probable, if not definite, that the closing of the upper annular would have been something the well-control team, the drillers and that would have thought through, yes.

Q. Is it important to your analysis when the upper annular was closed?

A. Not particularly when. It needed to be closed prior to the loss of control, that's all.

Q. So whether it was closed at the negative pressure test time or at some time later in the well-control process isn't critical to your evaluation?

A. No.

Q. You have indicated both the blue and the yellow pods had problems with regard to the 103 solenoids, one the low voltage and one the inconsistent operation, but that the blind shear rams had functioned.

So the problems with the pods, is that critical to the blind shear rams operating?

A. We had two different problems. The blue pod had a low voltage; we did not identify any problem with the solenoid itself. So it would be the circuit that activates the solenoid 103 on the blue pod. The electronic circuit in that was the issue in the blue pod.

The solenoid 103 itself on the yellow pod was identified in the ROV interventions as being not active or not functioning. When we did our bench test, we found it to function. When we put it back onto the -- and remounted it, it would activate, but not in a consistent manner.

Q. So did the issues with regard to the pods have any negative impact on the ability of the blind shear rams to operate properly?

A. The aspect of the solenoid 103 in the blue pod in the state -- the inconsistent results.

The solenoid 103 did not function on the yellow pod and with the blue pod battery being low, the AMF circuit would not have fired.

CAPT. HIGGINS:

Thank you, Doctor.

EXAMINATION BY MR. DYKES:

Q. Dr. Kenney, would you please explain once again -- I am still unclear -- exactly how the blue and yellow pods interact with respect to the automatic mode function?

A. Right. Each of the control pods communicates directly to the surface through what is called a MUX line. They also receive power from the surface to that and each has a dedicated line. A blue line to the blue pod and a yellow line to the yellow pod.

In regards to hydraulic power or pressure, through something called the subsea transducer modules, that will then sense whether hydraulic pressure is still being supplied to the BOP stack or not.

All three of those inputs go to each of the pods. At any one time, one pod is active, the other pod is -- sometimes the term that is used is hot standby mode. Still active, still sensing and still

communicating with the surface, but it is in standby mode and the other pod is the active pod. Basically, all of the signals coming from the surface will go through that particular pod.

As we understand the evidence and the testimony, it was the blue pod that was active at the time of the incident.

Q. On page 5, at the very top of the page, the first paragraph reads -- and I am reading -- "Of the means available to close the BSRs, evidence indicates that the activation of the BSRs occurred when the hydraulic plunger to the autoshear valve was successfully cut on the morning of April 22, 2010."

The question I am asking is dealing with this last sentence. "However, on the evidence available, closing of the BSRs through activation of the AMF/deadman circuits cannot be ruled out."

Why does DNV make that statement?

A. Because in our tests on the 103, when we did the bench tests, and when we did all the tests on the yellow pod, we found,

other than the somewhat inconsistent results on solenoid 103 activating, that it was -- everything was as intended. The batteries were as intended, the battery voltages were as intended, the SEM system worked.

And when we did our function tests on it, with replacement, we found that that SEM, the electronic circuits and that all worked as intended.

Solenoid 103, the original solenoid 103, in the test that we did, what we found is when we activated two coils in each one of these -- and each one of these solenoids has two coils in it. When we activated one coil, the solenoid would not always retract or open. When we retracted both coils -- when we provided power to both coils, it would.

In an AMF situation, there are two right brains within the SEM that both activate. So there is 100 percent redundancy in each of the SEMs. Both of those -- on loss of communication, loss of hydraulic power, loss of electronics, both of those would activate and start to count

down, and when they both get to time zero, after a certain delay and that, they will both send a signal to solenoid 103 so both of those coils would activate.

Every time we activated both coils at solenoid 103, it activated as intended.

Q. And we are talking about the solenoid 103 --

A. The original solenoid 103.

Q. -- on the yellow pod?

A. On the yellow pod.

Q. Okay. It is based on that -- and based on the voltage in the blue pod, is it your conclusion that the blue pod played no role in the AMF function?

A. When the blue pod was raised on July 5, tests of the battery voltage were taken. And if you look at the timeline, back around page 140 or so, you will see on July 5 what the battery levels were. The battery levels -- and if I remember correctly -- on the 27-volt were about 7.4 volts.

Q. So if the automatic mode function did fire, you believe it fired off of the

yellow pod?

A. Yes.

MR. DYKES:

Thank you. I have no other questions.

JUDGE ANDERSEN:

Any other board questions?

Republic of Marshall Islands?

EXAMINATION BY MR. LINSIN:

Q. Thank you, Your Honor. Dr. Kenney, picking up on the last questions from Mr. Dykes -- by the way, my name is Greg Linsin; I represent the Republic of Marshall Islands, the flag state for the rig.

You just testified that the stack was raised on July 5; is that correct?

A. Not the entire stack, just the blue pod.

Q. I'm sorry. Just the blue pod. Are you aware of any reason why there might have been -- or any activities that might have caused that battery on the blue pod to discharge at any time between April 20 and July 5 when it was raised?

A. Yes. We understand that if the 9-volt battery is active, and yet the 27-volt battery is slightly below charge, that the 9-volt battery may continue to -- I will use the term activate or continue to fire that 27-volt battery and cause it to deteriorate over a period of time. That is something we have not tested, that is just an understanding we have, sir.

Q. So as of today, anyhow, even though the battery on the blue pod tested at 7.4 volts sometime in July, we don't really know what the voltage on that battery might have been on the night of the casualty; is that correct?

A. That's correct.

Q. You testified in response to some questions from Captain Higgins that, if I understood it correctly, the FBI did not play an active role in overseeing the analysis of the BOP; is that correct?

A. I believe Captain Higgins' question was whether they were a member of the Technical Working Group, and they were not; is that correct?

Q. Maybe I misunderstood. Let me ask the question, then.

In order to perform the work that DNV did on the BOP, the various testing and analyses that you testified about, were you required to receive permission from the Department of Justice?

A. No. The Department of Justice, though, was represented on the Technical Working Group.

Q. But am I correct in understanding then that DNV did not -- other than through the Technical Working Group, DNV did not interact with the Department of Justice in order to secure approval to perform these analyses; is that correct?

A. That's correct. We did not.

MR. LINSIN:

No further questions. Thank you.

JUDGE ANDERSEN:

We will take a brief ten-minute break. We will reconvene at 2:20.

(Recess.)

JUDGE ANDERSEN:

Please be seated.

I think Cameron is next.

EXAMINATION BY MR. JONES:

Q. Good afternoon, Dr. Kenney, David Jones on behalf of Cameron. I don't have that many questions for you.

First, I would like to ask you a question about the ST locks. You were asked about them when you received the BOP at Michoud, and I believe you said at that time they were open, correct?

A. Yes.

Q. And that is what you would have expected them to be, correct?

A. The ST locks, in the Q-4000, when the unit was first recovered, I would not have expected them to be open. But in the recovery of the Q-4000, certain functions were undertaken, and one of those functions was to open the blind shear rams.

Q. Right. That is all I wanted to establish. On the Q-4000, they cycled open the rams, which means the ST locks should have been open when they arrived at Michoud?

A. Right.

Q. On Table 3, page 34 of your

report, I just want to understand what that is telling me.

I understood -- I will give you a second to get there.

I understood what this table was showing was the pressure required to function the rams; that is, to push the piston in and out. But I thought I heard you say in your testimony that this was the pressure that was necessary to open and close the bonnets.

What is being reflected on this table?

A. Yes. That would be correct, it is the pressure here, that's when we were retracting the bonnets in order to get to the rams and then pulling the rams back so that we could remove the rams from the connecting rods.

Q. So this is not showing the pressure required to function the rams in and out of the bore?

A. That's correct.

Q. Do you have that pressure recorded anywhere in this report?

A. No.
Q. Do you have those pressures recorded somewhere?
A. The pressures required to operate the rams is recorded somewhere.
Q. You were asked about recording the various serial numbers you found while doing your various examinations of the BOP. Is that a list you still have in Ohio or at Michoud?
A. In Ohio.
Q. All right. On page 17 of your report, the very first sentence at the top of page 17 says that "The normal or standard closing of the BSR occurs at a pressure of 3,000 psi."
Do you see that?
A. Yes, I do.
Q. Where did that 3,000 psi number come from?
A. Yes. That is the hydraulic circuit for the normal BSR close, and that is a 3,000-pound circuit. It's perhaps not well-worded. We are really referring to that 3,000-pound circuit.

Q. Have you seen any indication that the actual operating pressure on a normal blind shear ram close is 1,500 psi?

A. Yes.

Q. Explain the distinction between the 1,500 psi and what you are saying here.

A. The 1,500 psi would be -- the pressures that are typically applied to the rams are the pressures necessary to close the rams, and in some verification tests, would actually shear through drill pipe.

Q. And not shear through?

A. And shear through drill pipe.

Q. It is your understanding that the testing is done to --

A. Well -- I'm sorry. Yes.

You do have a verification test. I did not have that in front of me as to what the pressures were when this unit was -- when the unit was functioning, a verification shear drill pipe.

Q. Is it your understanding that pressures in excess of 1,500 psi are applied to cut pipe?

A. Yes.

Q. On page 172 of your report, there is a statement in the third paragraph halfway through that says, "A factory acceptance test and AMF/deadman test was performed on the blue pod in June of 2009."

You see that?

A. That's correct.

Q. Since writing this report, have you seen documentation to show that it was not, in fact, the blue pod, but it was the yellow pod for which work had been done in June of 2009?

A. That's correct.

Q. Okay. So this particular sentence needs to be changed to say the yellow pod in June 2009, not the blue pod in June 2009?

A. That would be correct. If I might clarify?

Q. Absolutely.

A. The records that we have seen, which are Cameron records on this blue pod, had on the record itself "blue pod." So the factory acceptance test in June of 2009, from that particular document, would seem to indicate it was for the blue pod.

In fact, the serial number for the SEM, when we took the serial number off the yellow pod, it matched with the serial number for this blue pod test.

Q. Just so we are clear, when you actually went up and matched the serial number and the work order numbers for the work that had been done in June of 2009, you realized that that was, in fact, the subsea electronic module that was in the yellow position on the BOP stack at the time it was removed?

A. That's correct.

Q. All right. On page 167 of your report, you discussed whether there was an attempt to function the blind shear rams through the normal close function. Do you see that?

A. That's correct.

Q. Just so we are clear, one can operate the blind shear rams from the rig floor either by pressing the normal close button or you can press the high-pressure shear button, correct?

A. That's correct.

Q. And I believe that you performed no failure/cause analysis to determine whether or not the forensic evidence that you saw was consistent with someone pressing the normal close blind shear ram button, correct?

A. That's correct. We did review Mr. Pleasant's testimony, and there was no indication of trying to function through the normal blind shear ram close button.

Q. And I think what you said was there were no eyewitness accounts of anyone trying to close the blind shear ram with the normal, regular blind shear ram close, correct?

A. That's correct.

Q. But there are also no eyewitness accounts of anyone attempting to close the variable bore rams, correct?

A. That's correct.

Q. Sitting here today, we know, in fact, that someone closed a variable bore ram?

A. Correct.

Q. And we also know that someone may

have closed the middle variable bore ram and then the upper. There is some evidence of that, correct?

A. Correct.

Q. So the fact we don't have an eyewitness that says, "I saw the blind shear ram button close," doesn't mean that someone did not hit that button, correct?

A. That's correct.

Q. But there was no modeling to look at that possibility of a failure method, correct?

A. No, sir.

MR. JONES:

Dr. Kenney, that is all I have. Thank you.

JUDGE ANDERSEN:

Thank you. BP? Or Transocean, I'm sorry.

EXAMINATION BY MR. BAAY:

Q. David Baay for Transocean.

I have a few questions for you, and I promise you I will be very brief.

I want to start by looking at page 172 of the forensic report. You see

the middle paragraph where it says, "DNV did not identify any other issues or evidence that manufacturing defects of one form or another contributed to the blind shear rams not closing completely and sealing the well."

Did I read that correctly?

A. Yes.

Q. On the phrase "other issues," are maintenance issues included within that phrase?

A. No. Strictly manufacturing defects.

Q. But I understand that part of the scope of your examination was to examine whether maintenance did play a role in the failure of the blind shear rams to fully seal?

A. Correct.

Q. And you ruled out maintenance as a contributory factor to that?

A. The primary cause with the pipe being off to the side, we ruled that out, yes.

Q. You seem to condition that. Why

do you condition it?

A. Again, on the AMF/deadman, we came to -- we could not come to a conclusion one way or another on the evidence and the testing that we undertook. So with the pipe off to the side, whether through the EDS, whether through the AMF/deadman or whether through the autoshear, the same results would have occurred.

Q. So you are saying that the inconsistent results with the solenoid 103 on the yellow pod could be tied to maintenance?

A. There are maintenance issues around there, yes.

Q. And as I understood your testimony earlier, the only time you got inconsistent results on solenoid 103 on the yellow pod is when you replaced the original back on the pod; is that right?

A. That's correct.

Q. When you bench-tested it, it tested out correctly?

A. Correct.

Q. And when you tested the solenoid

with the replacement solenoid 103, it tested correctly?

A. Yes.

Q. It functioned correctly?

A. Yes.

Q. The other things that you have ruled out and you discussed briefly earlier are leaks; is that right?

A. Yes.

Q. And modifications?

A. Yes.

Q. Part of your basis for ruling out leaks is the fact that you did see a leak on the casing regulator; is that right?

A. That's correct.

Q. But you determined that that leak, or the DNV determined that leak was a leak that occurred after the incident?

A. Based on our initial evaluations, yes, we came to that conclusion.

Q. And the other basis that allowed you to rule out leaks was the fact that when you had your ROV interventions on the 27th and the 29th, you were able to pressure up rapidly, and that would not have occurred

had there been a leak; is that true?

A. That's correct.

Q. One more issue on examining your scope. I think you used the phrase, "deferral of necessary repairs."

Did you rule out deferral of necessary repairs as a contributory factor for the blind shear rams not fully sealing?

A. With the primary cause, yes.

Q. Next issue is the opinion you provided in the report and you testified earlier about, autoshear versus the AMF functioning the blind shears. I believe your testimony and the report states that the autoshear is the most likely sequence; is that true?

A. That is true.

Q. Why do you favor the autoshear over the AMF?

A. We looked at a number of different factors in that particular regard. When we added all those factors up, the aspect of timing, the aspect of where the pipes ended up after the event, et cetera, we came to the conclusion -- and the fact that the

plunger, the aspect of the plunger moving, the ROV interventions, et cetera, we came to the conclusion that it was more likely the autoshear function than it was AMF/deadman.

Q. Do I understand correctly that when you activate the autoshear, you are essentially cutting the plunger that is the connection between the stack and the LMRP?

A. Yes, in a sense. There is a plunger, as you describe, between the LMRP in the BOP and the lower section of the BOP. In this particular instance, that was physically cut using a saw, using a circular saw by ROV intervention.

Its normal practice would be when the LMRP disconnects and lifts off, that plunger would then lift.

Q. Okay. And does that serve as a mechanical trigger to then actuate the accumulators on the stack?

A. Yes.

Q. Does the sequencing of the autoshear require solenoid 103 on either blue or yellow?

A. No.

Q. And it doesn't require the use of the batteries?
A. No.
Q. I believe I heard you earlier state that you did liaise with the Technical Working Group members at Michoud?
A. Yes.
Q. And that they were beneficial to you?
A. Yes.
Q. And I want to ask you specifically about Geoff Boughton, who was Transocean's member of the Technical Working Group.
Was he helpful to your testing?
A. Yes.
Q. And Geoff is not shy, is he, about expressing opinions?
A. No, sir.
Q. So he both gave you his opinions and you sought his opinion, correct?
A. Yes.
Q. Would you say that he was cooperative with the JIT's investigation?
A. Yes. He was cooperative with us.
Q. Same questions for Owen McWhorter.

I know Owen was there for a short time assisting in the forensic investigation. Did you find his involvement to be helpful?

A. Yes.

Q. He had a specific knowledge with the DEEPWATER HORIZON BOP, didn't he?

A. Yes.

Q. And he brought that to bear through your testing?

A. Yes.

Q. And you understand that he was asked to leave at some point before the testing was finished?

A. Yes.

Q. Do you know why he was asked to leave?

A. I did not know all the reasons why. I believe there was a concern over the perceptions of impartiality.

Q. Did you share those concerns?

A. Personally?

Q. Yes.

A. No.

Q. Were you upset when he was asked to leave?

MR. COHEN:

I object.

JUDGE ANDERSEN:

I am going to sustain that objection on the theory that we don't need to go into the witness' feelings about things. His opinions are fine and you have got his personal opinion. How he feels about something, I think, is beyond the scope of what the board is requiring him to testify to.

EXAMINATION BY MR. BAAY:

Q. Suffice to say, you agree that you lost a valuable hand when you lost Owen's help in the forensic testing?

JUDGE ANDERSEN:

If you have an opinion, you can give it.

THE WITNESS:

Yes.

EXAMINATION BY MR. BAAY:

Q. Thank you. An issue that has been a part of these proceedings is whether Transocean should have changed the ram bonnets. Are you familiar with that issue?

A. No.
Q. Did DNV identify anything associated with the ram bonnets that might have contributed to the blind shear rams not functioning as intended?
A. No.
Q. There has also been an issue raised with the fact that Transocean did not fully disassemble the DEEPWATER HORIZON BOP. Are you aware of that?
A. Yes.
Q. Did anything in your testing reveal that the failure to fully disassemble the BOP contributed to the blind shear rams not fully sealing?
A. Can you expand on the term "fully"?
Q. Did you find any evidence, is there anything in the report that describes Transocean's decision not to take the BOP to shore and fully disassemble it as contributing to the blind shear rams not fully sealing?
A. No. There is nothing in the report to that effect.

Q. Which leads me to the conclusion that you did not find evidence of that or else you would have included it in this report; is that true?

A. It would have been included in this report; that's correct.

Q. It would have been included in this report?

A. Yes.

Q. Capt. Higgins asked you a question about solenoid 103, and I think the phrase he used was whether it contributed to the failure of the blind shear rams to operate as intended.

I understood your answer to say that solenoid 103 was not critical because you do know that the blind shear rams functioned and closed?

A. We do know it closed, yes.

Q. And so does that lead to your conclusion or did I understand your answer correctly that solenoid 103 was not critical?

A. As we indicate in the report, we could not rule out the AMF/deadman which

would have fired through solenoid 103 as being the mechanism that would have triggered the hydraulic circuit.

Q. So you also could not conclusively establish whether solenoid 103 did function on April 20, the day of the incident?

A. That's correct.

MR. BAAY:

Those are all my questions. Thank you.

JUDGE ANDERSEN:

Now BP.

Counsel, would you state your name for the record?

MR. COLLIER:

Paul Collier, Kirkland & Ellis, for BP.

EXAMINATION BY MR. COLLIER:

Q. Dr. Kenney, I would like to talk about some of the things you did not have an opportunity to complete as part of your investigation at Port Michoud.

As I understand it, you did not have the opportunity to remove the upper annular from the LMRP; is that correct?

A. That's correct.
Q. As a consequence of not being able to remove fully the upper annular from the LMRP, you have not had the full opportunity to evaluate the upper annular, correct?
A. Correct.
Q. You have not had the opportunity to remove the lower annular from the LMRP, correct?
A. Correct.
Q. And you have not had the full opportunity yet to evaluate the lower annular; is that correct?
A. That's correct.
Q. I also understand that you had the opportunity to function test solenoid 103 from the yellow control pod?
A. Yes.
Q. But you have not yet had the opportunity to disassemble solenoid 103 from the yellow control pod; is that correct?
A. Correct.
Q. I also understand that you have not had the opportunity yet to vent and crack open the subsea electronic modules; is

that correct?
A. That's correct.
Q. And because you have not had the opportunity to vent and crack open the subsea electronic modules, you have not had the opportunity to evaluate and inspect the batteries inside, correct?
A. Correct.
Q. I also understand you have not had the opportunity to evaluate or conduct a material analysis of the elastomeric seals; is that right?
A. That is correct, yes.
Q. I think you talked about earlier today the high-pressure casing shear regulator. Do you remember that?
A. Yes.
Q. It is my understanding that the high-pressure casing shear regulator leaked; is that right?
A. Yes.
Q. And I understand you have not yet had the opportunity to inspect and disassemble the high-pressure casing shear regulator; is that correct?

A. Yes.
Q. The ram bonnets that are on the BOP, have you had the opportunity to disassemble and inspect the ram bonnets?
A. We did an initial visual inspection when we had the ram bonnets open, but we did not inspect them in the sense of doing any NDT work or anything of that nature, no.
Q. Thank you. Now, one thing I wanted to make clear is that DNV was not asked to investigate the well-control efforts conducted on April 20; is that correct?
A. That's correct.
Q. And you are not a well-control expert, correct?
A. Correct.
Q. Were there any members of the DNV team that are considered to be well-control experts?
A. We have individuals that are experienced in that area, yes.
Q. Was DNV asked to investigate whether or not the DEEPWATER HORIZON rig

crew used the BOP correctly during the well-control incident on April 20?

A. No.

Q. So you have no opinion as to whether or not the well-control efforts that were conducted were conducted in accordance with well-control procedures and policies?

A. Yes. We have no opinion.

Q. Now, Dr. Kenney, I would like to draw your attention to page 2 of your report. Specifically 1.2, "The Accident."

You see that?

A. Yes.

Q. I would like to draw your attention to the first sentence.

It reads, "On the evening of April 20, 2010, control of the well was lost, allowing hydrocarbons to enter the drilling riser and reach the DEEPWATER HORIZON resulting in explosions and subsequent fires."

Do you see that?

A. Yes.

Q. One of my questions is can you explain where is the drilling riser located

with respect to the BOP?

A. The drilling riser is above the BOP, and connects -- basically connects between the flex joint and the rig itself.

Q. And so to enter the drilling riser, the hydrocarbons would need to pass through the BOP. Is that your understanding?

A. That's correct.

Q. So the hydrocarbons would have passed through the variable bore rams?

A. Perhaps the turn of phrase we used there would not have been the best term. It is more probable than not that the hydrocarbons were coming through the drill pipe itself, and possibly not through the -- outside the drill pipe and through the riser itself.

By using the term "drilling riser," we really meant to mean that it did get above the BOP stack into the rig.

Q. You would change the sentence; is that right?

A. It could be clearer, yes.

Q. So it is DNV's position that the

well flow was coming through the drill pipe on April 20, correct?

A. Yes.

Q. Are you aware of any well-control efforts taken on April 20 to close the drill pipe?

A. I have read through Mr. Pleasant's testimony in some detail, and Mr. Harrell's. Other than that, no.

Q. Do you know what efforts were taken on April 20 to close the drill pipe?

A. No.

Q. Again, that's not an issue you were asked to investigate?

A. No.

Q. Is it DNV's position that one of the annulars was closed prior to the well-control incident?

A. Or in the early stages of the well-control incident.

Q. And does DNV have an opinion as to when the upper annular was closed on April 20?

A. No, other than prior to.

Q. That is not an issue that DNV has

spent effort on in evaluating?

A. Exactly.

Q. If you could turn to page 135 of your report, Dr. Kenney. Page 135 provides a timeline of the events pertaining to the blind shear rams, correct?

A. Correct.

Q. And the first event that is listed on this timeline is "EDS announced at 2156."

A. Yes, that's correct.

Q. Is it DNV's view that prior to 2156, there were no attempts to activate the EDS?

A. Yes, and that is taken primarily from Mr. Pleasant's testimony.

Q. The next page, 136, there is a timeline that shows the events pertaining to the variable bore rams, correct?

A. Yes.

Q. And the first entry in this timeline is at 2143. You see that?

A. Yes, sir.

Q. And it says --

A. "Standpipe pressure."

Q. "Standpipe pressure rapidly

increased."

Do you see that?

A. Yes.

Q. And that is, again, at 2143?

A. Yes.

Q. At that point in time, does DNV or do you have any knowledge as to how long the well had been flowing at that point?

A. At 2140, I believe it was reported that water and mud were noted on the drill floor. Other than that, we have no other evidence.

Q. So at the point of 2143, when you have in your timeline that the VBR might have been shut, mud had already passed the BOP, correct?

A. Yes. There was reported mud on the floor.

Q. Now, you have talked earlier, Dr. Kenney, about solenoid 103 in the yellow pod. Do you recall that?

A. Yes.

Q. And in your report, you discuss the fact that the solenoid 103 of the yellow control pod showed inconsistent behavior

during the testing, correct?
A. Yes.
Q. And you identified in one of your explanations for the inconsistent behavior is a buildup of deposits that could have formed after the solenoid was recovered from the BOP, correct?
A. Yes.
Q. And the solenoid 103 was recovered in, I believe, May of 2010; is that right?
A. That's correct.
Q. And the source -- or at least based on your explanation -- of those deposits building up in solenoid 103 was either seawater or hydraulic fluid; is that right?
A. Yes.
Q. You are aware there was testing conducted on solenoid 103 of the yellow control pod when it was first recovered in May of 2010, correct?
A. That's correct.
Q. And during that testing, it was shown that the solenoid 103 would not activate, correct?

A. That's correct.
Q. And so the development of deposits after the solenoid's recovery would not necessarily explain the failure of the solenoid 103 in May 2010, correct?
A. That's correct.
Q. The issues with solenoid 103 could be possibly explained by maintenance issues?
A. As we identified, it could be manufacturing defects or the buildup of deposits, as stated in the report.
Q. And that would potentially be a maintenance issue?
A. The buildup of deposits could occur as a result of it having been removed and actually being retained in evidence for a period of time.
Q. Now, the solenoid 103 on the yellow control pod that was on the DEEPWATER HORIZON at the time of the incident, did you inspect that particular solenoid 103?
A. Other than visually and doing the bench test as described in the report, that is as far as we went.
Q. Was the solenoid 103, based on

your visual inspection, was that an original Cameron solenoid 103?

A. The serial numbers and part numbers, and it was stamped as being made in Germany. I can't confirm it was a Cameron or not.

Q. Do you know if that was a refurbished solenoid?

A. No, we do not have any records of that.

Q. Did you do any analysis to compare the solenoid 103 from the DEEPWATER HORIZON to an original Cameron solenoid 103?

A. The only testing we did is within the report itself, and that was the bench test and the proving test.

We did do the test against 3A, and we got the exact same results on 3A as we did on 103.

Q. Now, with respect to the battery testing that you did of the control pod batteries, I think you testified earlier that the 27-volt battery at the blue pod had a low state of charge, correct?

A. Yes, sir.

Q. And that was testing that you conducted in March of this year that showed that the charge was at less than 1 volt; is that correct?

A. That's correct.

Q. And at that voltage, the blue control pod would not have been able to activate the deadman?

A. In the bench test of the solenoids, we did something called a drop-out and a pull-in voltage. The pull-in voltage is -- I'm sorry if I am going a bit long on my answer -- but the pull-in voltage is when we start at 0 volts and slowly increase until we get to a voltage that would cause the solenoid to activate.

It did not activate until approximately 15 volts. So below 15 volts, the solenoids would not have activated in regard to the two tests we carried out.

Q. Are you aware of what maintenance requirements were provided with respect to the control pod batteries?

A. No.

Q. Did you review any Cameron

1 documents associated with that?
2 A. The documents we received were
3 various factory acceptance tests, but
4 nothing specific on the batteries
5 themselves.
6 Q. Is it possible that the issues
7 with the blue control pod battery were
8 maintenance-related issues?
9 A. I couldn't answer that.
10 MR. COLLIER:
11 Thank you, Dr. Kenney, I have no
12 further questions.
13 JUDGE ANDERSEN:
14 Thank you. Thanks very much.
15 Halliburton?
16 EXAMINATION BY MR. BOWMAN:
17 Q. Dr. Kenney, I am Bruce Bowman; I
18 represent Halliburton. I have a few
19 questions.
20 I want to understand some of this
21 a little bit better. Other people seem to
22 understand it better than me. First of all,
23 the flow through the drill pipe, remember?
24 A. Yes.
25 Q. As I understand it from maybe your

testimony earlier, that was based on what, the actual flow you observed through the drill pipe?

A. When we are talking about the flow through the drill pipe, it was the aspect of we have a loss of control very early on, 2140 or so, and with the aspect of that and the BOP stack, yes, we assumed that it was through the drilling pipe itself.

Q. Did you do anything to ascertain whether it was also flowing in any other place besides the drill pipe?

A. No.

Q. Would that be possible if you were to look at the upper annular, take the annular off and actually see the flow pattern there?

A. If we could identify erosion, it would be difficult.

Q. Now, one thing I also think I now know the answer to is cement. Do you remember seeing some cement?

A. Yes.

Q. Do you know where that cement came from, what the source was?

A. No.
Q. That wasn't part of your job?
A. No.
Q. Now I want to direct you to a couple of parts of, let's say, minutia. Do you have your report there?
In the very back, there is a list of items that you found when you were doing this. Let's see.
A. This is the "List of Evidence," sir?
Q. Yes, sir. The "List of Evidence." Number 186, it looks like it is -- can I approach the witness?
JUDGE ANDERSEN:
Sure.
EXAMINATION BY MR. BOWMAN:
Q. I think you are more familiar with this than I am.
A. Yes.
Q. I want to ask you about two items here.
First of all, there is -- item 186 -- go to the preceding page, 145. "Debris, sponge-like substances."

Would that be, like, wiper balls?
A. Yes, sir.
Q. Did you do anything to ascertain where those wiper balls came from or why they were there?
A. No, sir, we did not.
Q. Do you know where they are today?
A. Yes, they are in the custody of the Coast Guard, I believe.
I apologize. I believe they are in the custody of the EPA.
Q. EPA?
A. Yes.
Q. Go to the next page, item 186.
A. Yes.
Q. The location of the retrieval was the riser near the kink?
A. Yes, sir.
Q. What is the kink? What are you talking about?
A. I believe there is a diagram earlier in the report.
JUDGE ANDERSEN:
If you would like to tell us what the kink is, you can let people know at a

break what diagram number it is.

THE WITNESS:

On the sinking of the rig, the riser, as attached to the top of the flex joint, bent over, and the term we used was it kinked 90 degrees.

EXAMINATION BY MR. BOWMAN:

Q. And around there, you found a metallic ball? That's what it says?

A. Yes.

Q. Any idea what kind of metallic ball?

A. I believe a preliminary analysis was done on it, but I don't remember that.

Q. Do you happen to know if it was the type of metallic ball that you use in converting a float collar?

A. There was some speculation about that, but I am not sure we were able to confirm or take that any further.

Q. Where is the ball?

A. I believe it is in Dublin.

Q. Dublin where?

A. Ohio. Not Ireland.

Q. That's why I was asking.

Under whose possession?

A. DNV's.

Q. Under DNV's possession? Thank you.

Now, I want to ask you some questions to make sure I understand some of these things. The automated mode function/deadman. You have a nice explanation on pages 168 and 169, right?

A. Yes, sir.

Q. Did it work or did it not work here?

A. In our tests, in the tests that we did of the automated mode function/deadman, it worked but gave inconsistent results. The blue pod as we received it did not work because of the low voltage. The solenoid would not fire.

In regards to the yellow pod, yes, it did work, but there were inconsistent results in the test.

Q. Based upon the tests you did, did you form any opinion as to whether the deadman worked or did not work on April 20, 2010?

A. As we state in the report, we believe that the closing of blind shear rams was as a result of functioning the autoshear, but we could not rule out AMF/deadman.

Q. Okay. You talk about in the very first sentence the deadman, as sequenced, it was designed to initiate from the control pod if electrical power, fiber optic communication and hydraulic pressure were lost, right?

A. Yes, sir.

Q. All those things happened, didn't they?

A. Yes.

Q. So in theory, it should have worked?

A. In theory, sir, it should have worked.

Q. Okay. Now, had it worked at 9:40 on the 20th, what would have been the likely result?

A. As we state in the report, regardless of whether it had functioned by EDS, by AMF/deadman or by autoshear, with

the pipe to the side, that the blind shear rams could not have completely sealed.

Q. I thought I heard you say that, and that is the reason I am going there.

The pipe to the side. You are saying that the fact of the pipe to the side would have prevented this blowout preventer from preventing a blowout?

A. In this particular situation with the pipe to the side, the blind shear rams could not completely close and seal.

Q. Now, it would seem to me that a pipe is not always going to be perfectly centered in the event of a blowout. Does that make sense?

A. Again, you are asking me to speculate on something.

Q. Well, if I am, it is because you are supposed to be an expert in this area. Let's find out.

Have you tested before to see if pipes always stay perfectly straight in the event of a blowout?

A. In the event of a blowout, we have researched and looked at the literature.

One of the responses was no, we have not looked at every blowout to identify pipes being off center in its aspect and how it affected the blowout preventer.

Q. Have you looked in other situations and found that pipes were off center?

A. We have done research and understand there is work out there of that nature, but we have not researched it in detail, no.

Q. Any particular reason?

A. It was just the time in order to basically do the report and everything, we did not have the time to do all of the work that we wanted to do, including all of the literature research and review we wanted to do.

Q. Okay. Let's go to page 164. I think this has to do with the pipe being off center and pressures. I want to make sure I understand that, okay?

You talk about -- your company talks about the maximum shear force for the off-centered pipe analysis was calculated to

be 4,273 psi for the BSR design.

"Based on this analysis, the BSR would likely stall at this point, if not prior to this."

Stall during what?

A. The rams not being able to completely close, sir.

Q. And the rams wouldn't be able to completely close, because if it stalls at the 4,273, and you go on to say, "If not prior to this, as the required pressure exceeded the available hydraulic system pressure (regulated to 4,000 psi)."

What is the required pressure?

A. It is that calculated pressure, in this instance, of 4,273.

Q. That is more than the 4,000 by 273?

A. That's right.

Q. Are we saying it is going to take more than 273 psi to do something here?

A. That's correct.

Q. And what is the something?

A. As the model predicts, to completely shear through the pipe.

Q. And that was not done because you could not get the pressure up high enough to do it or because of the position of the pipe?

A. I'm unclear about your question, sir.

Q. Okay. You said it was not able to fully shear, right?

A. Yes.

Q. I'm asking was it not able to fully shear because you could not get the pressure high enough to fully shear, or was it merely the position of the pipe itself kept it from being fully sheared?

A. The position of the pipe to the side, with the way the model was running in this particular situation, says that in order to shear through it cleanly, you need the 4,273.

Q. Which, of course, you did not have in this situation?

A. The high-pressure shear circuit to the ram -- no, we did not have it because the high-pressure shear circuit to the rams was regulated to 4,000.

Q. To 4,000?
A. Right.
Q. Do you know who decided to regulate it to 4,000 as opposed to 4,500 or 5,000?
A. No, sir.
MR. BOWMAN:
No more questions.
JUDGE ANDERSEN:
Thank you very much.
Anadarko and MOEX?
Mike Williams?
Douglas Brown?
Patrick O'Bryan?
Robert Kaluza?
Jimmy Harrell?
MR. FANNING:
Can I have a couple, Judge?
EXAMINATION BY MR. FANNING:
Q. Good afternoon. My name is Pat Fanning. I represent Jimmy Harrell. Do you know who that is?
A. Yes.
Q. Do you know Jimmy?
A. No, sir. I read his testimony,

sir.

Q. Good. This morning when Dr. Thompson testified, I heard him say that the Technical Working Group was comprised of DOJ, MDL, BP, Transocean, Cameron and CSB. Does that sound right?

A. Yes.

Q. And he said something about at times, an FBI evidence response team and the EPA would be out there. Do you agree with that also?

A. The FBI evidence response team was out there almost continuously.

Q. Who from the DOJ besides the FBI was there?

A. The Department of Justice had a representative in the External Working Group and Technical Working Group, one named Red Corbett and the other was Rory Davis.

Q. I don't know those folks and their names don't help me. I know the FBI is part of the DOJ, but I don't know what part of the DOJ these guys come from. Are they FBI or some other part?

A. I can't answer that.

Q. Do you know if they were criminal investigators or from the FBI civil division?

A. No, I do not.

Q. Can you tell me, what was the FBI's role on the scene when you guys were doing your thing?

A. They -- documentation. They were -- sometimes the term was used, "bagging and tagging" evidence and documenting it.

Q. I heard you say that the EPA has possession of some evidence and the Coast Guard has possession of some evidence, and it seems like now you are saying the FBI took possession of some evidence also; is that correct?

A. No. The FBI never took possession. They merely identified the evidence, photographed it, tagged it and turned it over to the Coast Guard in all cases, because the Coast Guard was the primary evidence controller. And then in some cases, such as the fluid sampling, that was then transferred to the EPA for

analysis.

Q. So the FBI evidence response team, as I am familiar with them in other cases, that is a group of people that specializes in coming in, identifying, taking control of and maintaining evidence. Would you agree with that?

A. In other cases, sir? I have no knowledge of that.

Q. I am saying that is what I know them to do from other cases I have seen them in. Is that what they did in this case?

A. No, sir. They identified and tagged, but did not take control of.

Q. We don't need to split hairs here. In any event, they did a search warrant, didn't they?

A. I am not aware of anything of that nature.

Q. That might have been before you got involved when there was a search warrant to keep control of the blowout preventer?

A. I have no knowledge of that.

Q. So all you know is as you described, bagged, tagged and passed off to

other agencies?

A. Yes.

Q. They did not have any technical people there to assist you in your examination?

A. No, sir.

Q. And the DOJ, did they have anybody there, wherever they were from, from DOJ, to do any technical analysis or to assist you in your investigation?

A. They were represented on the Technical Working Group and always had a representative there.

Q. But what did those other two DOJ folks do?

A. They had experts in BOP design and operation and, as other members of the Technical Working Group, provided input and advice to us as the testing program went forward.

Q. DOJ has BOP experts?

A. They were contractors to DOJ.

Q. Okay. So they worked for somebody else and DOJ hired them for this job?

A. That's correct, sir.

Q. All right. That helps.
MR. FANNING:
Thank you. That is all the questions I have.
JUDGE ANDERSEN:
Curt Kuchta?
MR. SCHONEKAS:
No questions.
JUDGE ANDERSEN:
Mr. Bertone?
Dril-Quip?
Weatherford?
M-I SWACO?
Counsel, are there any questions you would like to ask of your client?
MR. COHEN:
No, Your Honor.
JUDGE ANDERSEN:
Any additional questions from the board?
EXAMINATION BY CAPT. HIGGINS:
Q. Dr. Kenney, do you know when in the sequence of events the pipe deflected or buckled?
A. No. In looking at the sequence of

events, we came to the conclusion that it was very early on when the well control was lost.

Q. At some point during the well control, it deflected, but you are not confident as to when?

A. That's correct.

Q. As I understand it, there were three things that could have activated it. First by Mr. Pleasant, second being auto function, and third being autoshear?

A. Right.

Q. With regard to the EDS activated by Chris Pleasant, do you know why that didn't work?

A. In his evidence, Mr. Pleasant indicates that he arrives at the bridge, goes to the control panel, and then pushes the emergency disconnect sequence button. I believe he indicates, as does Mr. Harrell, that when they looked around at the various gauges on the control panel, he did not see any movement and he assumed that the explosion disrupted the EDS, the hydraulics and the power to the pods.

Q. It is my understanding you know there were indications that it did not work, but you don't know why it didn't work?

A. We don't know why, but our assumptions are that the first explosions and the fires were intense enough to disrupt the MUX cables and the hydraulic systems as well.

Q. And that disruption by the explosions should have functioned the second way that the blind shear rams would have worked, and that would have been the automatic or deadman function, correct?

A. That's correct. With the loss of all three, the AMF/deadman sequence is designed to then activate and activate the blind shear rams.

Q. My understanding is you cannot conclusively say whether or not that did or did not function, correct?

A. That's correct.

Q. And if that did not function, would that have or could that have been a function of maintenance?

A. There could be maintenance issues

1 involved, sir.
2 Q. And the third way, my
3 understanding is the autoshear, and that is
4 what you believe did work based on the
5 plunger and observations, correct?
6 A. Yes.
7 Q. Were you tasked with evaluating
8 the maintenance of the blowout preventer?
9 A. Not the extent of the overall
10 maintenance, no, sir.
11 Q. Did Cameron provide their
12 specifications or maintenance procedures?
13 And did you evaluate based upon those?
14 A. The Cameron documents we had, and
15 there were a variety of Cameron documents,
16 we did not go through and examine the
17 maintenance. We did not have any records of
18 actual maintenance other than the Cameron
19 maintenance, and that was carried out over a
20 period of time on the two units.
21 Q. Did you form an opinion as to
22 whether the BOP was properly maintained?
23 A. No.
24 Q. Maintenance was not a function of
25 your tasking; you were looking at the

functions; is that correct?

A. We looked at the functions and certain issues to the extent we could. Some of it got into the aspect of the availability of records.

Q. Can you state whether or not maintenance could have contributed to the failure of the BOP to seal?

A. In relation to the primary cause which we identified, which was the pipe off to the side, any three of the means for functioning the blind shear rams would have activated the blind shear rams, but they could not have sealed.

Q. Is it possible that the pipe deflected after the deadman would have functioned?

A. We do not believe so, no.

Q. Why would it have happened before rather than after that event?

A. Again, it gets into the issue of the series of events aligning with the physical evidence of the erosion we saw on the blind shear rams. If it had been afterwards, we would have seen a different

erosion pattern than what we physically saw.

Q. Are you aware of modifications that were made to the BOP that were not in accordance with Cameron's requirements or original diagram?

A. There was a series of 2000 drawings we had available, and a series 2004 drawings. All modifications we saw from the 2004 were recorded on the drawings.

Q. Were those approved by Cameron?

A. Those drawings were Cameron's drawings.

Q. So the modifications made to the BOP were approved by Cameron, is your understanding?

MR. JONES:

Object to the form.

THE WITNESS:

I could not answer that.

EXAMINATION BY CAPT. HIGGINS:

Q. Do you know if there were non-manufacturer parts used as part of that modification?

A. No, I do not.

CAPT. HIGGINS:

Thank you, Doctor.

JUDGE ANDERSEN:

Any other board questions?

Doctor, is there anything you would like to add that you have not had a chance to say?

THE WITNESS:

No. The one point I identified about the blue and the yellow has been brought up by Cameron.

JUDGE ANDERSEN:

Thank you for being here and focusing your professional ability on this important public task.

If any Party in Interest would like to submit a brief, not to exceed 25 pages --

CAPT. NGUYEN:

Dr. Kenney, you are dismissed.

JUDGE ANDERSEN:

We will talk about the timing and length of briefs Wednesday.

This will conclude today's scheduled testimony. There are no witnesses scheduled for tomorrow. This is because the

witnesses intended for tomorrow declined to appear and have not been served with enforceable subpoenas.

We resume Wednesday at 8:00 with the usual counsel meeting at 7:30.

(Which adjourned the proceedings for the day.)

REPORTER'S CERTIFICATE

I, Cathy Renee' Powell, Certified Court Reporter, do hereby certify that the foregoing proceedings were reported by me in shorthand and transcribed under my personal direction and supervision, and is a true and correct transcript, to the best of my ability and understanding;

That I am not of counsel, not related to counsel or parties hereto, and not in any way interested in the outcome of this matter.

_____

CATHY RENEE' POWELL, CCR

A
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