Deposition Testimony of:

Brent Lirette

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Page 9:19 to 9:24

00009:19 Mr. Lirette will testify on
20 Topics 29, 30, and 33 of the notice, the
21 Weatherford corporate deposition notice.
22 BRENT LIRETTE,
23 having been first duly sworn, testified as
24 follows:

Page 10:01 to 10:04

00010:01 BY MR. MATTHEWS:
02 Q. Good morning, Mr. Lirette.
03 A. Morning.
04 Q. I'm Guy Matthews. We've never

Page 10:12 to 10:14

00010:12 For the record, by the way,
13 would you state your name?
14 A. Brent James Lirette.

Page 12:23 to 13:09

00012:23 Q. Who -- who did you -- are you an
24 engineer?
25 A. Yes, I am.
00013:01 Q. What kind?
02 A. I'm working as an engineering
03 manager for Weatherford.
04 Q. Are you an ME? Where -- where
05 did you go to school, in other words, and
06 what degree did you get?
07 A. I went to Nicholls State
08 University and have a bachelor's of science
09 degree in engineering science.

Page 13:19 to 13:21

00013:19 Q. And what degree did you get, ME?
20 A. A BS degree in engineering
21 science.

Page 13:23 to 14:01

00013:23 A. And so I have a -- a master's in
24 business administration.
25 Q. From?
00014:01 A. From Nicholls State, as well.

Page 14:03 to 14:07

00014:03 Prior to Weatherford, where
04 were you employed?
05 A. At Delta Shipyard.
06 Q. And where's that?
07 A. That's in Houma, Louisiana.

Page 14:09 to 14:16

00014:09 How long were you there?
10 A. I worked there for 11 and a half
11 years.
12 Q. And then you went to work for
13 Weatherford?
14 A. It was actually GEMOCO, which is
15 owned by Chromalloy, and then Weatherford
16 later acquired GEMOCO.

Page 14:20 to 15:07

00014:20 We were discussing -- what
21 you had said was, we actually gave the
22 lawyers a lot of materials. What I'm
23 trying to determine is all the materials
24 that you reviewed and gave to your lawyers,
25 either for or in preparation for this
00015:01 deposition or just general information, for
02 whatever reason you gave it to them. So
03 you said the Bly report.
04 What else?
05 And this is not a memory
06 quiz.
07 A. Okay.

Page 15:10 to 15:11

00015:10 A. The Chief Counsel's report of
11 the National Commission.

Page 15:24 to 16:20

00015:24 Q. Any Stress Engineering?
25 A. Oh, yes. I did read the Stress
00016:01 Engineering reports.
02 Q. That's all right.
03 What are they on?
04 A. They were on some testing that
05 we did on an M45AP float collar.
06 Q. We did?
07 A. Stress did.
08 Q. Yes. Did you work in
09 conjunction with Stress?
10 A. I witnessed the testing.
11 Q. Okay. They had three float

collars, right?
A. They had --
Q. Three -- three dual-flapper valve M45 float collars?
A. We actually provided ten float collars.
Q. Oh, you did? All right. Did they test three?
A. They tested at least three.

Page 19:05 to 20:21

00019:05 What else, other than the two reports that we've said and the Stress report? You had -- you participated or -- or were an observer of both Stress reports?
A. Only the actual testing. I -- and I've witnessed parts of the testing, not all.
Q. Okay. What else did you review?
A. Also the -- the daily operations reports from BP.
Q. Did you review the daily operations report for BP on April 19th?
A. Yes, I did.
Q. Where they talk about the nine attempts to activate or set the float collar?
A. Yes.
Q. Have you talked to anybody from BP with respect to the Weatherford float collar used on the Macondo well?
A. Yes.
00020:01 Q. Who?
A. Warren Winters and --
Q. Who?
A. Warren Winters.
Q. All right. What's his position? Who is he?
A. I'm not sure, but he was -- seemed to be in charge of the -- the testing that was done by Stress Engineering.
Q. Okay. So you -- you met him and discussed -- well, what did you discuss with him?
A. After the incident, we were asked to -- to meet with them to discuss how the -- the float collar operates.
Q. Was there a blockage?
A. I believe there was a blockage.
Q. Where?
A. I believe it was either above the float collar or the shoe.

Page 22:23 to 23:21

00022:23 Q. Other than the two people -- or
24 the one guy and the group of other guys
25 from BP around the Stress Engineering test,
00023:01 have you talked to anyone from BP about the
02 explosion, about what caused it, about what
03 happened at all?
04 A. No.
05 Q. Have you discussed with anyone
06 from BP any post-explosion events
07 surrounding the blowout or the oil flowing
08 out of control or contamination or
09 containment or any kind of cap to put on
10 the rig to snuff it? Did you discuss
11 anything with anyone from BP about any of
12 those things?
13 A. No.
14 Q. Okay. Did you meet and talk to
15 John Lance, David Campbell, David Fuqua,
16 John Benoit?
17 A. I -- I don't recognize any of
18 the names. I may have, but I wouldn't
19 know.
20 Q. Well, they were the four
21 Weatherford people on the rig.

Page 23:24 to 24:13

00023:24 A. Oh, I'm sorry. Repeat the
25 names, then. The only one I didn't was one
00024:01 of the -- oh, he wasn't on the rig at the
02 time. That's right. Ofather.
03 Q. No. You've met -- or talked to
04 Mr. Ofather?
05 A. Yeah, he's the only one. But he
06 wasn't on the rig at the time.
07 Q. His job was going to be to run
08 21 centralizers, wasn't it?
09 A. He was there to install some
10 centralizers.
11 Q. Sir?
12 A. He was there to install
13 centralizers.

Page 24:18 to 24:21

00024:18 Q. Do you know whether -- do you
19 know how many centralizers were run?
20 A. I understand that six bow-spring
21 centralizer subs were run.

Page 24:25 to 25:20

00024:25 Q. What's the function of a reamer?
00025:01 A. A reamer shoe is used to help
02 get casing downhole if there's a tight
03 spot.
04 Q. How?
05 A. It can be used to open up the
06 hole by --
07 Q. How?
08 A. -- by -- by reaming.
09 Q. Rotating?
10 A. That could -- that could either
11 be rotation or by moving the pipe up and
12 down.
13 Q. Vertically?
14 A. Yes.
15 Q. Or parallel to the hole, I
16 guess?
17 A. Yes.
18 Q. The longitudinal extent of the
19 hole?
20 A. Yes.

Page 26:14 to 26:25

00026:14 Q. What equipment did Weatherford
15 provide to BP for the 9-7/8 and 7-inch
16 production casing?
17 A. I believe we provided
18 centralizers and, I believe, DWP plug
19 system. The -- I believe the rest of the
20 equipment came from another company.
21 Q. Nexen?
22 A. Nexen, yes.
23 Q. It was in the will call Nexen
24 area or storage area that Weatherford has?
25 A. I believe so, yes.

Page 27:08 to 27:11

00027:08 Q. Ah. Do you know whether or not
09 Weatherford supplied the crossover tool
10 from the 9-7/8 to the 7-inch casing?
11 A. I don't believe we did.

Page 28:07 to 29:06

00028:07 Q. Okay. Do you know what the
08 design plan was for the 9-7/8 and 7-inch
09 production casing?
10 A. No.
11 Q. Do you know if there was a

design plan?
A. I wasn't involved in it.
Q. Do you know if the 7-inch casing was substituted for a long string of 9-7/8-inch casing?
A. I don't know that.
Q. Do you know if the 9-7/8 casing could not be used at a certain depth on down to 18,000 feet?
A. I don't know that.
Q. Did you study whether or not the formation pressure and the well pressure were very, very close to each other?
A. I read that.
Q. Okay. What's the effect of that? What does that mean?
A. That means that basically, surge pressures, when you're running the casing, could break down the formation or while you're circulating the cementing.

Page 32:04 to 32:10

Q. All right. The Stress Engineering tests that were performed that you observed, were the -- any of the float collars run under conditions that they were blocked; in other words, did you block the float collar so that you tried nine times to convert them?

Page 32:13 to 32:15

A. There was --
Q. Yes or no?
A. No.

Page 32:20 to 32:23

A. Okay. There's an attempt to simulate the -- the -- the rupture or the sudden surge of pressure from -- from the removal of debris by using a rupture disc.

Page 33:01 to 33:03

But what you didn't do was block above or in or below the float collar?

Page 33:14 to 33:16

00033:14 A. I said the flow was blocked by a
15 rupture disc, but not with debris or
16 anything.

Page 34:04 to 35:14

00034:04 Q. Okay. So if there's no rupture
05 disc, how will -- how will you remove the
06 tube, in other words, the flow-through tube
07 that holds the dual valves open?
08 A. It's shear screws in place, so
09 when you reach a certain pressure in the
10 range of 500 to 700 psi, the shear screws
11 will shear and the auto-fill tube will --
12 Q. You shear a -- you shear a pin
13 and the tube drops?
14 A. Yes. We shear some shear pins.
15 Q. Is there a ball involved?
16 A. Yes.
17 Q. Where is it?
18 A. The ball is, in this case, is
19 retained within the float collar.
20 Q. Where is it positioned before
21 the tube is dropped? Is it above the
22 flow-through tube or below it?
23 A. It's normally within the
24 auto-fill tube or slightly above within a
25 retained area.
00035:01 Q. Okay. It's at the top of the
02 tube?
03 A. If you're running it in, it
04 could be at the top of the tube, but
05 normally, it would -- it's -- it's a high
06 density ball so it would normally be on
07 seat.
08 Q. Okay. And you -- how much
09 pressure does it take to -- to either
10 remove the seat or push the ball through
11 the seat?
12 A. To push the ball through the
13 seat will take in the range of, I think,
14 around about 2,000 psi or greater.

Page 37:13 to 37:16

00037:13 Q. With respect to Stress at which
14 the test that you and BP, you Weatherford,
15 and BP observed, you're attempting to show
16 what with these tests?

Page 37:19 to 37:21

00037:19 A. I mean, I didn't design the

test.
Q. I didn't say you did. I want to

Page 37:23 to 38:05

What was the function or
purpose of the test insofar as you know?
A. As far as I know, it's to
simulate a -- a sudden surge of pressure
through the float collar to see if it would
damage the float collar.
Q. Ah. And that happened on the
Macondo well?

Page 38:08 to 38:19

A. It appeared to have occurred on
the Macondo well.
Q. On what, about the 9th or 10th?
A. Yes.
Q. About the 3100 pounds of
pressure?
A. Yes.
Q. Did you do any study to find out
what happened to that surge after it went
through the float collar?
A. That's a difficult question to
answer. We --

Page 39:02 to 39:09

Q. If you can answer, answer. If
you don't know, you don't know.
A. We try to determine what the
flow rate might be with that release of
surge pressure.
Q. Ah. Well, you've seen the
numbers with respect to what the flow rate
was, have you not?

Page 39:12 to 39:16

A. Yes, I have.
Q. And those numbers are -- the
flow rate numbers that you've seen are not
sufficient to convert the float collar, are
they?

Page 39:19 to 39:23

A. I'm not sure I understand your
question, but I do believe that the -- the

flow from the -- that resulted from the release of the 30 -- 3100 psi pressure was sufficient to convert the float collar.

Page 40:06 to 41:01

Let me show you the second page of 2598. This is the daily drilling report of April the 19th. Let me ask you first, what does Weatherford state, with respect to the float collar, the amount of gallons per minute required to activate -- or close the -- activate the flapper valves and close them?

A. Normally, it's in the range of five to seven barrels per minute.

Q. Can you anywhere on here find out for me that there's a rate of five to seven barrels?

Have you seen this?

A. Yes, I've seen this. I don't think it's on this report.

Q. It's not, is it?

A. No. I did see it on another report, though, that -- that there was return flow at the time of about 11 barrels per minute.

Page 42:09 to 43:03

Q. How did gas get into the production string?

A. There's gas in the annulus, and I -- I don't know the answer.

Q. How did it get -- it had to come through the float collar somehow, didn't it?

A. It could have come through the float collar, or it could have come through the casing above the float collar.

Q. You haven't read anything, have you, that the -- there was any opening, crack, fissure, break, of any joint or the casing or the crossover joints, have you?

A. I haven't read anything that showed that there was.

Q. That's right. You've read -- you've read the reports that discuss whether or not that happened and concluded that it did not, have you -- haven't you?

Page 43:06 to 43:21

00043:06 A. As I understand the reports,
07 they couldn't rule out that it could have
08 happened.
09 Q. That's not my question.
10 I thought those reports
11 concluded that it is more likely so than
12 not so that gas went up through -- or went
13 into the production casing through the
14 float collar.
15 A. The way I read it, it went up
16 through the shoe, which --
17 Q. All right.
18 A. -- means that it would go up
19 through the float collar.
20 Q. Yes, sir.
21 A. More likely.

Page 44:20 to 45:07

00044:20 What if it isn't? What if
21 the 189 feet of production casing and the
22 reamer have no cement, or very little?
23 Have you ever seen any -- have you ever
24 seen anyone who -- or read any report
25 that's mentioned this or talked about this?
00045:01 A. I've read reports where they
02 find ratty cement, for instance, what they
03 call ratty cement on the shoe.
04 Q. What does that mean?
05 A. It means that it's not just
06 cement. It might be contaminated with
07 something else.

Page 45:22 to 46:01

00045:22 Q. I mean, the only way gas could
23 get into that production casing is through
24 the reamer shoe; isn't that correct?
25 A. Like I said, there could be a
00046:01 breach above the -- the shoe joint.

Page 46:10 to 46:14

00046:10 Q. Most of these reports say that
11 gas, hydrocarbons, came in through -- up
12 through the production casing, don't they?
13 A. They say it's more likely that
14 they did.

Page 46:22 to 46:25

00046:22 Q. Sure. Didn't those hydrocarbons
23 and fluids have to come and migrate through

the reamer up through the float collar, about 18,000 foot to the rig floor?

Page 47:05 to 47:06

A. Again, there might be another way for it to get there.

Page 47:23 to 48:03

Q. Did the Stress test -- Stress Engineering test conclude that the recorded flow-in rate was never high enough to convert the float collar?
A. Yes, if you exclude the -- the surges.

Page 48:05 to 48:08

How long have you been employed by Weatherford?
A. Including a time with GEMOCO, since 1984.

Page 50:04 to 50:08

BY MS. SULLIVAN:
Q. Mr. Lirette, I didn't have an opportunity to introduce myself to you during the break, but my name's Jessica Sullivan. I represent the United States.

Page 51:24 to 52:12

Okay. I've got a document in front of you at Tab 17. Yesterday I introduced this as Exhibit 2582.
Do you recognize this document?
A. Yes, I do.
Q. Okay. And what is it?
A. It's a tech unit for the flow-activated mid-bore auto-fill float collar, model M45AP.
Q. And this was the float equipment that was used on the Macondo well, was it not?
A. Yes.

Page 53:16 to 60:20

Q. Okay. And why was the -- the AO

document modified on January 25th, 2011?
A. We referenced the -- the model M45AP in that original document. We thought it would be useful, particularly in this case, to -- to have a tech unit that showed exactly how this was made and how they differed, which is basically just a non-rotating landing plate that is included above the float collar.
00054:01 Q. When you said in this case, you're referring -- you're referring to the Macondo litigation?
A. Yes. And also for our customers, of course.
Q. Okay. And have there been any additions or changes to this document, modifications, since January 25th, 2011?
A. No.
Q. Okay. There are quite a few sections in this document which indicate some specifications and performance ratings for the float equipment, the M45AP; is that right?
A. Yes.
Q. And now on this document on Page 1, there's a performance rating, back pressure ratings of 5,000 psi and a plug bump pressure rating of 6500 psi, which I believe were applicable to the M45AP; is that correct?
A. Actually, the -- the plug bump pressure for the seven-inch is actually 6800 psi.
Q. That's correct, I'm sorry. I --
00055:01 I misstated that.
And -- and those are the -- the back pressure rating and the plug bump pressure rating that we're talking about were the -- for the equipment used on the seven-inch on the Macondo well; is that right?
A. That is correct.
Q. Okay. Great. There's also an indication on Page 1, the conversion pressure for standard is 500 to 700 psi; is that correct?
A. Yes.
Q. And you testified earlier today -- today that that was the conversion pressure that was required to convert the float equipment on the Macondo well?
A. That is correct.
Q. Thank you.
Okay. In the very first sentence on Page 1 of 8, yesterday I asked

Mr. Clawson about this, but I think that you might be able to help me understand it a little bit more.

It states that the Weatherford flow-activated mid-bore auto-fill float collar contains the surge reducing and debris-tolerant PDC-drillable valve that allows low circulating rates without conversion.

My question is, what is meant by debris-tolerant PDC-drillable valve?

A. By debris tolerant, we mean that we make the bores as large as possible and as open as possible, but within the restraints of the size of the equipment so that it's less likely to be plugged off by cuttings or debris.

Q. Is there -- is there a particular amount of debris or size of debris that this equipment can tolerate?

A. Definitely, it's limited by the -- the smallest ID while you're running it in is 1.93 inches. So anything larger than that would tend not to -- wouldn't be able to go up.

Q. What about the amount of debris it can tolerate? Are there any indications as to how much debris this -- this equipment can tolerate?

A. It's very difficult to -- to pinpoint that amount. For instance, we did some testing on a -- a larger version where when we put two feet of sand above the float collar, we went to 3200 psi and couldn't pump through it.

And only when we let the pressure go and brought the pressure back up quickly were we able to get the sand to flow through the valve with about somewhere between 2500 and 3,000 psi.

On the other hand, we put four feet of sand on a later test and had a lower pressure to -- to break through, you know, with twice as much sand.

So it's very difficult to quantify. It depends on how it -- how the cuttings are -- are arranged or stacked up.

Q. But that's something that Weatherford has studied to attempt to determine how -- how this equipment will function when debris is present?

A. Yes.

Q. Okay. And you haven't -- it

would -- I guess it would depend on well conditions and the debris that we're talking about to determine how the equipment would function in a particular well?

A. Yes.

Q. Okay. We know on -- that on the Macondo well, a reamer shoe was chosen by BP at the -- at the bottom of the -- the shoe track to run on this well; is that your understanding?

A. Yes.

Q. Okay. And is the M45AP auto-fill float collar a -- suitable to run with a reamer shoe, in particular, the reamer shoe that was used on the Macondo well?

A. Yes. It can be run with a reamer shoe.

Q. Okay. In this -- this document marked at 2582, there's some discussion on Page 5 of 8.

In the section entitled makeup on casing string, it states that the flow-activated mid-bore auto-fill float collar should be run with a Weatherford MudMaster filter shoe.

And then it states, a guide shoe that has a minimum three and a half inch bore inside diameter may also be run, but at an increased risk of debris settling above the float collar, possibly resulting in plugging or early conversion of the float collar.

Is there also an increase risk of debris settling above the float collar or possibly plugging the float collar when you use a reamer shoe, particularly the reamer -- the type or model reamer shoe that was used on the Macondo well?

A. As compared to -- as compared to the MudMaster filter shoe, yes, there is an increased risk.

Q. Okay. And can you explain for me what that increased risk is?

A. The -- the filter shoe filters out the larger cuttings, drill cuttings, to keep them from going through the float collar. And so you have a less likelihood of the large cuttings, at least, packing off above the float collar.

Q. Okay. And there's no such filter, a MudMaster filter, on a reamer shoe; is that -- is that correct?

A. That's correct.
Q. Is there any kind of filtration system within a reamer shoe?
A. The ports may serve like a filter in that the -- the diameter of the -- of the ports would restrict cuttings larger than the diameter from coming through.
Q. Do you know what the diameter of the ports were on the reamer shoe that was used on the Macondo well?
A. Yes. On the reamer shoe, there were three 40-millimeter ports.

Page 61:04 to 61:14

Q. Okay. Weatherford -- does Weatherford have any -- any recommendations for running any particular types of -- of reamer shoes with respect to the M45AP float collar?
A. No, we don't have anything published.
Q. Okay. And do you know who made the decision to use a reamer shoe and not the MudMaster -- MudMaster filter shoe on the Macondo well --

Page 61:17 to 61:21

Q. -- if you know?
A. I don't know.
Q. Well, did Weatherford make that decision?
A. No.

Page 62:04 to 62:09

Is it your understanding that the -- the M45AP float collar equipment that was used on the Macondo well, that was -- that was chosen by BP for this -- this particular well?
A. Yes.

Page 62:18 to 64:12

What is Weatherford's recommended practice for conversion of the M45AP float equipment?
A. Basically to circulate at five to seven barrels per minute, which would produce enough pressure to release the

auto-fill tube.
Q. Okay. On Page 4 of 8 in this
document -- tech document that we're --
we're talking about today, there's some
conversion tables and some information
that's provided regarding the float collar,
preset conversion rates, and -- and it
confirms what you're -- you're saying --
what you testified to today, that -- that
500 to 700 psi is what's required to -- to
convert the -- the auto-fill float
equipment.
It's my understanding,
based on testimony that you provided
earlier today, that the way that occurs is
that you -- when you do achieve that five
to seven barrels per minute, flow rate in
the 5 to 700 psi pressure is established
for brass screws or sheared and the
float -- the auto-fill float -- the tube
falls through the -- the collars, the --
the two flapper valves, and then the
flapper valves shut -- or -- or they close
and seal the well.
Is that an accurate
representation of what happens?
A. Yes.
Q. Okay. It appears that
there's -- there's also an optional
conversion package for this piece of
equipment where you can -- you could
convert the equipment at a pressure of 300
to 400 psi --
A. Yes.
Q. -- is that right?
Was that option chosen by
BP and -- on -- for the Macondo well, if
you know?
A. I understand it was not.

Page 65:10 to 65:11

On Page 12 of this
report from Stress Engineering --

Page 65:13 to 67:06

And just for the record,
this is the document marked 197, HORIZON
incident float collar study analysis.
Q. I believe Stress did some --
some -- some calculations to determine what
the -- the flow rate based on actual data,
observed data, and -- and they concluded it

at the beginning of the Section 3.14, and I'll just read the statement.

As stated in Section 2, Weatherford's published data for float collar conversion flow rates indicate the minimum -- indicates a minimum flow rate of 5.3 barrels per minute for 14 ppg fluid.

Do you understand that statement to be accurate?

A. Yes.

Q. Okay. Further down in this Section 3.14, Stress also states in its report, The increased drill pipe pressure is not sufficient in itself (in most cases) to convert the float collar. What is needed to convert the float collar is sufficient differential pressure across the auto-fill tube. This is accomplished by increasing the flow rate through the unconverted float collar. The float collar will not convert from increased drill pipe pressure if there is: Blockage at the reamer shoe. In this case, pressure above and below the auto-fill tube are similar, thus, no conversion.

And blockage above the float collar, in this case, pressure end load is supported by the float collar components, thus, no conversion.

Do you agree with the statements as presented in this report made by Stress Engineering?

A. Yes.

Q. Did you assist Stress Engineering with determining the statements that are provided in this report?

A. No.

Page 67:11 to 72:04

Page 1 under performance, it indicates there's a back pressure rating of 5,000 psi for the 6 5/8 inch to 7 5/8 inch equipment, correct?

A. Yes.

Q. Can you explain what a back pressure rating of 5,000 psi means?

A. It means that it'll withstand the pressure from below the float collar, after it's converted, of 5,000 psi greater than the pressure above the float collar.

Q. And would a float collar ever experience 5,000 psi back pressure from pressure exerted by cement?

A. Yes, it could.

00068:01 Q. Okay. Can you explain a
02 situation in which it could?
03 A. If the -- the cement is much
04 heavier than the displacement fluid inside
05 the casing, it would exert a higher
06 pressure from the annulus side then from
07 above the float collar within the casing.
08 Q. Okay. Have you ever encountered
09 that -- that situation when converting a
10 piece of float equipment?
11 A. Yes. We've seen close to 5,000
12 psi.
13 Q. Okay.
14 A. Excuse me, that's not when
15 converting the equipment but when holding
16 back pressure.
17 Q. Right. During the --
18 A. That's the --
19 Q. -- the flow check, correct?
20 I mean, you would --
21 that -- that would be when you would see
22 this amount of pressure exerted on the --
23 from beneath -- underneath the float
24 equipment?
25 A. Yes.
00069:01 Q. Okay. All right. We're still
02 on the document behind Tab 17. At the very
03 end of this document is an operational
04 sequence diagram.
05 And for the record, just so
06 we all can understand how this works, can
07 you -- can you explain each -- each stage
08 that's depicted in this operational
09 sequence and -- on Page 8 of 8?
10 A. Okay. The first one, running in
11 hole. While running in hole, a flow would
12 be coming up through the auto-fill tube,
13 and that's why the ball is on up against
14 the retainer cage. The retainer cage keeps
15 the ball from being forced out of the float
16 collar and up the casing.
17 Q. Well, that's interesting. I
18 have a question for you about that.
19 So when you're running the
20 casing, that -- and that's depicted by --
21 in this -- on this page as running in hole?
22 A. Yes.
23 Q. The -- the ball that's contained
24 within the -- the retained ball within
25 the -- the auto-fill tube, correct? --
00070:01 A. Yes.
02 Q. -- that ball is -- is encased
03 within a -- what you're calling a retainer
04 cage?
05 A. Yes.

Q. Does that ball move up from the retainer cage down -- up and down through the auto-fill tube while you're running in the casing?
A. It -- it could. It depends on how -- how fast the -- the casing is being run downhole and also, the density of the fluid that's being run in, as to how high it would go up above the seat.
Q. So it -- it's part of its function? It can move up and down throughout the auto-fill tube while you're running in the casing?
A. Yes.
Q. Okay. But there's a cage mechanism on top to prevent that -- that ball that -- the auto-fill ball from escaping the -- the tube while you're running in the casing?
A. Yeah.
Q. Great. Okay. The next sequence is indicated as ball seated and circulating.
Can you explain that part of the operational sequence?
A. Yes. While circulating below the conversion flow rate and pressure, the -- the ball will be seated and flow is diverted through two ports to allow a low circulation flow rate without converting the float equipment.
Q. Okay. And then the next stage in the sequence is flow-activated conversion.
A. At this point, the -- the flow rate and our pressure is great enough to shear the shear screws and release the auto-fill tube so that the flappers are free to close after flow is stopped.
Q. And in -- in our case, the Macondo well, that was 500 to 700 psi at a pressure of -- of -- an anticipated pressure of five to eight barrels per minute; is that correct?
A. It would be pressure of five -- a flow rate of five to seven barrels --
Q. That's correct.
A. -- per minute and a pressure of 500 to 700 psi.

Page 72:06 to 72:09

And then the -- the last stage of the -- the operational sequence is the converted float valve?

09 A. Yes.

Page 72:13 to 75:15

00072:13 A. In that case, the flow is
14 stopped so that the -- a spring-loaded
15 flapper, so the flapper will seat and --
16 and seal off flow at that point from below.
17 Q. Okay. We had some discussions
18 with -- with Mr. Clawson about the call
19 that he received on April 19th from Brian
20 Morel of BP indicating they were -- that BP
21 was having some problems converting the
22 float equipment.
23 Are you familiar at all
24 with the -- the information that
25 Mr. Clawson received from BP or -- or any
00073:01 part of the conversation that BP had with
02 Mr. Clawson about the problems they were
03 experiencing when trying to attempt to
04 convert the floats?
05 A. Yes. I've heard about it and
06 read about it.
07 Q. Okay. Mr. Clawson testified
08 yesterday and today that he contacted a
09 Mr. Hebert at Weatherford. His first name
10 escapes me.
11 Do you know Mr. Hebert?
12 A. Yeah, John Hebert.
13 Q. John Hebert. Thank you.
14 He called Mr. Hebert to
15 request the amount of pressure that BP
16 could apply -- the maximum amount of
17 pressure that BP could apply to attempt to
18 convert the floats.
19 Are you familiar with that?
20 A. Yes.
21 Q. Okay. And then Mr. Clawson
22 testified yesterday and today that he
23 informed Mr. Morel that that was 6800 psi,
24 which complies with this tech sheet which
25 indicates the maximum bump plug pressure --
00074:01 or plug bump pressure is 6800 psi.
02 But we also talked to
03 Mr. Clawson today about something that's
04 in -- that appears in the -- the Chief
05 Counsel's report, some statement that he
06 made regarding what would occur if he -- if
07 BP pressured up to 1300 psi.
08 And -- and there's -- there
09 was some testimony about the Allamon
10 diverter tool and the ball that -- that's
11 used to -- I guess, I -- I'm going to say
12 trip that tool and close the -- the gate on
13 the diverter tool.

If at any time, I'm misstating or I'm -- I'm saying this incorrectly, I'd appreciate you -- you telling me that I'm not getting it.

But if that ball tripped the tool and -- and it -- Mr. Clawson couldn't indicate where in the -- in the pipe, in the sequence, that ball was when conversion attempts were -- were trying to be made.

But he did indicate to Mr. Morel, based on his testimony today and -- and yesterday, that at 1300 psi, I think that ball could blow through the -- the float equipment -- or it -- it could -- it could go through the float equipment.

I'm trying to understand if that's accurate and -- and if -- what, if anything, if you can tell me about the 13 -- the 1300 psi.

And just so you know, Mr. -- Mr. Clawson testified today that he got that number from -- from Mr. Hebert.

Can you explain to me if -- if that's your understanding of what can happen at 1300 psi?

A. Yeah.

Page 76:05 to 77:07

Is it your understanding that the Allamon ball or any other ball in the float equipment or anywhere else in the casing string could blow through the -- the float equipment at 1300 psi?

A. Okay. The 1300 psi is the amount of pressure that if -- if that ball, the 1 5/8 ball from Allamon, if it was sitting on top of the lugs and there was somehow packed off with -- around the ball or above the ball, that that would be the pressure that the lugs would break and the ball could be pumped through the float equipment.

Q. What lugs are you referring to?

A. The lugs are the retainer cage, those -- I call them lugs. I'm not sure what else -- those -- it's -- it's, like, three --

Q. Okay. Can we -- I'm going to show you a document so this is a little bit easier and we can identify it on the record. If you turn to -- to 17A, there's a property schematic for the float equipment, the M45AP.

05 MR. LEMOINE:
06 And that's an exhibit, isn't
07 it, Jessie?

Page 77:09 to 77:10

00077:09 Yes, it is. And I believe
10 it's marked as Exhibit 2583.

Page 77:13 to 78:07

00077:13 Q. Can you indicate on this
14 document -- I think we're going to need
15 another color pen -- what the -- where the
16 retainer lugs are located?
17 A. Okay.
18 Q. Do you a have red ink pen?
19 A. I'll mark them in red.
20 Q. Okay. So continue with your --
21 your explanation, or maybe you can repeat
22 what -- what you just told me about the --
23 the Allamon ball and those lugs.
24 A. Okay. If the Allamon ball were
25 resting on -- above those lugs and we were
00078:01 to bridge off above the -- above the
02 Allamon ball or at the Allamon ball, that
03 is the pressure that it would take to break
04 the lugs or the -- or at least we estimate
05 it would take to break the lugs and -- and
06 pump the ball through the float pump --
07 through the float collar.

Page 78:22 to 78:22

00078:22 (Exhibit Number 2599 marked.)

Page 78:24 to 79:06

00078:24 And we're going to mark that
25 as 2599.
00079:01 Q. Are -- are you aware of the
02 pressure that -- that was eventually the --
03 the pressure which established circulation
04 on the Macondo well and when BP declared
05 the floats converted?
06 A. It was around 3140 psi.

Page 79:09 to 79:20

00079:09 Q. So that's -- that's in excess of
10 the 1300 psi that you've -- you've
11 indicated could -- could cause that Allamon

ball to go through the -- the float equipment, is it not?
A. Yes, it is.
Q. Okay. Do you have any information or knowledge about whether or not that ball actually went through the -- the float equipment?
A. I would -- I would not know that, but --

Page 80:07 to 80:15

A. I would not know that it did. But instead of being on the lugs, I -- I would think that the debris would have -- or the cuttings would have been already above the float collar, possibly. It could have been at the reamer shoe, as I said before. But if there was debris, the ball would probably have been on top of that and not up against the lugs.

Page 80:21 to 81:18

Q. Okay. And, in fact, Stress Engineering -- did Stress Engineering look at this -- this scenario? Did they -- was that one of their -- their tests?
A. Well, they did do a test with the -- the ball seated on the lugs, and there was a -- a surge pressure in the range of about 3,000 psi when the rupture disc burst. And it didn't do any damage to the retainer cage.
Q. Okay. So does that mean that the ball -- that there was nothing -- nothing to indicate that there -- a ball would go through the float equipment?
A. Yes. The -- the ball did not go through and did not damage the -- the lugs on the retainer cage.
Q. Okay. But that was the -- the equipment that was manufactured for Stress? We're not talking about the actual equipment that was used on the Macondo well?
A. Yes, of course.

Page 82:13 to 83:05

Q. But have you done anything in response to the -- after the -- the blowout on the Macondo well? Have you prepared

any -- or engaged in any studies of -- of the equipment subsequent to the Macondo incident?
A. We -- we did perform a -- a test at six barrels per minute, basically similar to an API Category 3C. But that's six barrels a minute instead of ten.
Q. When did you do that test?
A. It's probably one to two months after the Macondo.
Q. And what was the purpose of that test?
A. Basically just to -- to verify that the equipment, the seven-inch collar in particular, could withstand the testing.

Page 83:19 to 84:01

Yesterday I -- I asked Mr. Clawson about this e-mail. This -- this AOL e-mail account, as I think we have surmised, is from a Vernon Goodwin from Allamon to Mark Hafle, who's a BP drilling engineer on April 19th. And he's attaching a document, and it states, this model is more debris tolerant.

Page 84:12 to 85:04

Q. So this is the M47AO.
Do you know if this type collar is more debris tolerant than an M45AP?
A. In the sense that it has less resistance to flow and a larger flow area, it's -- that is how we say that it's more debris tolerant, yes.
Q. We know that BP went with the M45AP float equipment on -- on the Macondo well.
Is there any other Weatherford float equipment that could have been used on the Macondo well other than the M45AP?
A. If you neglect the timing issues, this -- you know, this would have been an option.

Page 85:24 to 86:22

Q. Do you know if anybody from Weatherford was assisting with the -- the attempts other than -- than the

conversation that Mr. Clawson had with Mr. Morel? Were there any Weatherford employees that assisted with the attempts to convert the float equipment on April 19th?

A. I don't believe so. We had some Tubular Running Service people, but they normally don't get involved with the float equipment.

Q. Okay. I've looked at quite a few API documents since getting involved in this case. API RP65 part two, and then we've got the API RP10F. Those are the two that I've -- and they've been marked behind Tabs 32 and 33 in the binder.
And -- and based on my --
on my review, I wanted to ask you, do you know whether or not Weatherford considers float equipment to be a barrier to flow in the well?

A. We do not.

Page 86:24 to 87:01

And is that in compliance with the API RPs that we -- that I've just mentioned to you?

Page 87:04 to 88:01

A. It's in -- in RP65. It -- it states somewhere in there that float equipment is not considered a barrier in itself.

Q. What -- what do you -- what's the function -- what -- what is your understanding of the -- the function of float equipment on a well? What -- what's it designed to do?

A. In the case of the auto-fill equipment, it's designed to reduce surge pressure. It's designed after conversion to -- to keep the cement or -- or mud from coming back or U-tubing into the casing. And it's designed to serve as a landing for a plug system, lets you know that you've displaced your cement.

Q. Okay. We talked about the -- the back pressure, the 5,000 psi back pressure, earlier today, that the float equipment, the M45AP is -- is rated to withstand on -- on -- in a well, correct?

A. Yes.

Page 88:04 to 89:21

00088:04 And you just mentioned the
05 plug system. It's my understanding, once
06 the -- the floats are converted and you
07 begin to pump cement, you have the darts
08 and plug system is -- is utilized to
09 separate the cement during displacement
10 from other fluids in the well. And not to
11 get very technical with it, but as you're
12 pumping down, those plugs ultimately land
13 on top of the float collar --
14 A. Yes.
15 Q. -- is that accurate? Okay.
16 And one they're there, I'd
17 like to understand what -- what kind of
18 pressure would be required to unseat those
19 plugs that are now sitting on top of the
20 float equipment?
21 A. To move the plugs up the casing,
22 we did do a test on that, and we -- we
23 found it to be 165 psi at ambient
24 temperature.
25 Q. When did you do that test?
00089:01 A. I think it was a few months
02 after the Macondo incident.
03 Q. Why did you conduct that test?
04 A. To the -- to determine if the
05 plugs might have prevented the cement or
06 whatever from -- from coming up, had the
07 floats been damaged.
08 Q. And what were the results of
09 that test?
10 A. It took 165 psi to push the
11 plugs up the casing.
12 Q. Do you know what the -- the
13 amount of differential pressure -- what
14 the -- what differential pressure was
15 observed at the conclusion of the -- the
16 cement job during the float check on the
17 Macondo well?
18 A. I know that we were testing --
19 we -- not we. But Stress Engineering was
20 testing at 40 psi. So I believe that to be
21 the pressure BP had estimated.

Page 91:01 to 92:04

00091:01 Q. On -- on Page 100 of the Chief
02 Counsel's report, there's an indication --
03 if I can get there. In the second -- the
04 second paragraph -- I'll just read this to
05 you so you can -- you can follow along.
06 Although rig personnel

deemed the Macondo flow check to be a success, the check was actually inconclusive because of the small density differential between the cement and drilling mud in the well. Halliburton's April 18th model predicted 38 psi of differential pressure.

And then it states, the Chief Counsel's team calculations based on actual volumes pump indicated a U-tube pressure of about 56 psi, an inconsequential difference.

So my question is, is if the differential pressure between the cement slurry and the annulus and the fluid in the casing, in this case, is -- is only 38 psi to -- to 56 psi, based on this -- this information in -- in the Chief Counsel's report, is that a sufficient -- in your opinion, is that a sufficient differential pressure to rely upon as an indicator that the float valves are holding?

Page 92:07 to 93:07

A. It's difficult to answer. We -- we actually -- I mean, Stress Engineering tested to 40 psi and -- and the floats did hold.

Q. Right. But -- but I think you -- you indicated earlier the testing that you conducted stated that the -- in order for the -- the plug -- the plugs to -- to lift off of the -- the float collar, it would take 165 psi?

A. Yes.

Q. So if we're -- if we're observing 38 -- or if their observations are modeling by Halliburton at 3800 psi and the Chief Counsel's saying that it could be high as 5600 psi, Stress Engineering saying it might be -- or modeling or -- or testing at 40 psi, how can you tell if -- if the -- if the plugs are holding or the -- the floats are holding?

Because we don't -- it's not 165 psi. I'm -- can you -- can you determine if it's the plugs or if it's the floats, based on a pressure that's less than 165 psi?

A. I cannot.

Page 93:25 to 95:05

00093:25 Q. You weren't involved with --
00094:01 with that positive-pressure test, were you?
02 A. No.
03 Q. And do you know if anyone from
04 Weatherford was involved with that
05 positive-pressure test?
06 A. I'm not aware of anyone at
07 Weatherford.
08 Q. Okay. Do you know whether or
09 not the -- the Weatherford float equipment
10 and the plugs are strong enough to
11 withstand a positive pressure casing test
12 if there's no cement beneath the -- beneath
13 the set plugs? Can -- can that Weatherford
14 equipment withstand a positive-pressure
15 test?
16 A. Yes.
17 Q. Okay. And I believe, based on
18 BP's Bly report at Page 82, the -- the
19 positive-pressure test, it went up to
20 2700 psi.
21 So the -- could the float
22 equipment withstand that positive-pressure
23 test without set cement beneath the
24 equipment?
25 A. The positive-pressure test being
00095:01 within the casing --
02 Q. That's correct.
03 A. -- with the plugs bumped on --
04 on the float collar, yes, the plugs would
05 withstand that pressure with the floats.

Page 95:11 to 96:11

00095:11 Q. We talked a little bit earlier
12 about those four -- four brass screws
13 that -- that hold the -- the float
14 auto-fill tube and they're needing to be
15 sheared, and that's what causes the
16 auto-fill tube to fall out and the -- the
17 flapper valves to flip up and then seal the
18 well. We talked about that earlier.
19 What kind of quality
20 control process does Weatherford have for
21 determining whether or not those shear
22 screw pins will break or shear at the
23 correct pressure?
24 A. We received batches of screws
25 and we -- the -- the vendor does a test on
00096:01 them and -- so that we do incoming
02 inspections, testing, to see if it's within
03 range.
04 Q. Okay. And -- and when you say
05 within range, we're talking about the

M45AP.
What would be the -- the range that we're talking about here?
A. I don't recall the -- the shear range, but there is a -- an established upper and lower limit on the shear.

Page 96:17 to 96:17

8 behind Tab 17, Exhibit 2582.

Page 97:19 to 99:01

Q. Okay. If you can turn, again, to Tab 30. On Page 1 -- there's a -- again, look back to the Stress Engineering float collar study analysis.
In the first paragraph under drilling data interpretation Stress states, while it is not known where the blockage was located, the data suggests that the blockage was on the -- on the Macondo well -- was located at or below the float collar.
Do you -- do you agree with that statement made by Stress?
A. Yes.
Q. Okay. And -- and what evidence is there that the blockage was located at or below the float collar?
A. While they were pressuring up to -- to break circulation, it took a -- they had to pump in a certain amount of barrels to get so much pressure. I think it was about 360 psi per barrel.
And based on the compressibility of that fluid, I understand that would put the obstruction somewhere around the shoe, either above or below the float collar.
Q. But you -- you don't know for sure exactly where the -- the obstruction was, based on the -- the testing that was -- your -- your observation or your comments are based on the testing that was conducted by Stress; is that correct?

Page 99:04 to 101:25

A. It's based on the -- the amount of flow-in pressure that it took to free the obstruction.
Q. Stress also concludes in its

executive -- executive summary that based on a review of the data, the recorded flow-in rate was never high enough to have -- to have converted the float collar; however, it is possible that the float collar converted from increased transient flow during one of two flow surge events.

And Stress, further along in the report on Page 2, indicates that those two flow surge events, they -- they document them as flow surge one after a 3121 psi pressure spike with 42 gallons per minute flow in and 48 -- 486 gallons per minute peak flow out.

Last attempt to convert, 419 at 16:17:35 and also a flow surge number two, after a 2900 psi pressure spike with 179 gallons per minutes flow in and 295 gallons per minute flow out, attempt to burst bottom plug on 420 at 0:25:0.

Do you agree with the statements made by Stress regarding the -- the possible float-collar conversion during two flow surge events?

A. Yes, I do.

Q. Okay. We've talked a little bit with Mr. Clawson about these -- the -- the bursting of the -- the bottom plug port. I believe he indicated earlier -- this morning and today that the -- the bottom plug port is -- is designed to burst at 900 to 1100 psi.

Is that your understanding?

A. Yes.

Q. And on -- during Stress's test and I -- it indicated or it stated that it was observed, indicated that this burst plug ruptured at 2900 psi. Yeah.

Is that unusual? I mean, the burst -- the burst plug is supposed to burst at -- I'm sorry, the bottom plug's supposed to burst at 900 to 1100 psi, and it -- it didn't on the Macondo well.

What's your understanding of -- of what may have happened with respect to that bottom -- bottom plug and -- and not rupturing at 900 to 1100 psi?

A. I think one of two things could have happened. Either there might have still been debris on the top upper surface of the float collar. And when the -- the bottom plug arrived, it -- it shoved that debris of cuttings into the throat of the valve and possibly plugged off.

The other thing that could have happened is that some of the solids in the cement above the bottom plug could have settled out and bridged off, which -- which made it difficult to transmit the pressure to the rupture sleeve.

Q. And your -- your opinion or your -- your understanding is -- is based on what? What data are you -- are you considering to determine that problem?

A. Previous experience on -- on bottom plugs that have ruptured high. That's basically it.

Page 103:02 to 103:21

Q. Okay. Just so it's clear on the record, when you say "bridging off," can you explain what that means?

A. That you get an accumulation of solids and they pack off and -- similar to the way we think, you know, cuttings might have bridged off or packed off above the float collar, you know, just settled out.

Q. When you say that, I think of blockage. That's -- that's -- when you say pack off or -- or bridging, I think block. Is that -- am I right to think that that -- that's blocking the path or the flow of fluids or whatever else you're pumping in a well? I mean, that -- packing off, bridging off, means blockage, right?

A. It is a blockage.

Q. Thank you.

A. It creates a blockage.

Page 104:08 to 104:08

BY MS. SULLIVAN:

Page 104:13 to 104:16

Are you aware of any prior problems with attempts to convert the M45AP equipment on any well in which it was used?

A. No.

Page 111:04 to 111:08

BY MR. DART:

Q. Good afternoon, Mr. Lirette. My name is Henry Dart. I'm special counsel to

07 the Louisiana Attorney General's office,
08 and I represent the state of Louisiana.

Page 111:16 to 112:20

00111:16 Q. It's -- it's a statement that a
17 public corporation's required to file with
18 the Securities and Exchange Commission, and
19 it -- it's supposed to talk about all the
20 various issues that the corporation might
21 have. And I want to read you a quote from
22 the March 31st, 2011, 10-Q, which is the
23 quarterly report, from Weatherford.
24 And it says, quote,
25 Weatherford provided the following services
00112:01 and products to BP on the Macondo well.
02 Number one, connected and tightened four
03 intermediate casing strings and one tapered
04 production string (long string).
05 Number 2, furnish a liner
06 hanger on one casing string. Number 3,
07 furnished centralizers, most of which were
08 not used in the well. And 4, provided
09 float equipment on the long string. The
10 float equipment consisted of a reamer shoe,
11 a float collar, and wiper plugs. The float
12 collar is designed to control backflow or
13 ingress of the cement through the shoe
14 track while the cement hardens, close
15 quote.
16 Were the four things that
17 I've just read out the only four things
18 that -- services or products that
19 Weatherford provided for the Macondo well?
20 A. As far as I know.

Page 113:17 to 114:01

00113:17 Q. Okay. Number 3, it says,
18 furnished centralizers, most of which were
19 not used in the well.
20 Do you know anything about
21 the centralizers?
22 A. I understand we furnished six
23 bow-spring centralizer subs that were run,
24 and there were some other centralizers that
25 were furnished that were not put on the
00114:01 string.

Page 114:04 to 118:02

00114:04 And then the fourth item is
05 float equipment, which you've been talking

about most of the morning, and I'll ask you some questions about that, as well.
Let's talk about centralizers for a minute.
In 1995, I believe you wrote an article, with others, that I'd like to show you. I've marked it as Exhibit 3000.
(Exhibit Number 3000 marked.)
Q. It's entitled A New Approach to Calculate the Optimum Placement of Centralizers includes Torque and Drag Predictions.
Did you write that article or co-author it?
A. I co-authored -- mostly edited. This was mostly written by Holger Kinzel.
Q. Okay. But you did have input, at least editing input into this article?
A. Yes, I did.
00115:01 Q. All right. In the abstract, it says, a good primary cementation requires careful selection of centralizers and their placement on the string.
Do you agree with that statement?
A. Yes.
Q. All right. And in the introduction on Page 1, where it says Page 153 -- I guess this is the IADC -- what is this, a publication of some sort?
A. Yes. It's -- it's published by SPE and IADC.
Q. Okay. And in -- in the introduction on the first page it says, The key factor for a successful cementation job is the replacement of the mud in the wellbore by the cement slurry. Hydraulic considerations call for the need of a good centralization of the string for all sections in which a good -- a good cementation is required.
Is that a fair statement?
A. Yes.
Q. Okay. Now, in this article, did
00116:01 you and your colleagues come up with new computer models, simulations, of downhole conditions for centralizer placement?
A. We -- basically, we were adding torque and drag calculations to centralize the program that we had.
Q. So you had a computer program already?
A. Yes.
Q. Correct?

A. Yes.
Q. And then you were adding certain enhancements to that program?
A. Yes.
Q. Okay. And I presume that made it better?
A. Yes.
Q. Okay. In your Section 8 at Page 158 of the -- of the document. I'm -- I say Section 8. It's Section 5, I'm sorry. It says, Model Calibration Based on Field Cases.
Do you see that?
A. Yes.
Q. It starts off and says, The predicted standoff in a given borehole configuration cannot be verified directly. No practical means exists to the measure -- to measure the standoff downhole. Verification must be done using secondary methods. One method is to correlate the cementing success to the predicted standoff values. The judgment on the cementing success can either be based on the logging results, for example, from cement bond logs or on other technical methods, such as pressure tests.
Is that a fair statement?
A. Yes.
Q. And how do you correlate good standoff with logging tools, such as cement bond logs?
A. Generally, if you get a good cement bond log, it's quite likely that you have a good standoff, as well, or a sufficient standoff to enable the -- the mud to be replaced by cement.
Q. So a cement bond log would be a verification procedure by which you could determine the success of the standoff of your centralizers, correct?
A. Yes.

Page 118:05 to 118:07

Q. Okay. And do you think that it's good industry practice, after running a cement job, to conduct a cement bond log?

Page 118:12 to 118:22

A. It -- it depends. I mean, it would help you to verify that -- or at least try to verify that you get a good

cement coverage in the annulus.
Q. I mean, that's the purpose of the cement bond log, isn't it, to verify good coverage of the cement?
A. Yes.
Q. Okay. And do you think that's good industry practice to conduct such a log after a cement job?

Page 119:02 to 119:23

A. I think it's -- it's not always done, but I would think it's helpful.
Q. In the conclusion of your article on the next page it says, The set of equations described an API Specification 10D were revised, corrected and put into a powerful computer algorithm.
Is that the computer program you were describing earlier a moment ago?
A. Yes.
Q. Okay. So your new set of equations enhance that computer algorithm, correct?
A. That's correct.
Q. Does Weatherford use that computer program today to make calculations of centralizer placement?
A. Yes, we do.
Q. And do you do that at the request of customers?
A. Yes.

Page 120:07 to 122:15

Q. Okay. Do you know if BP sought that service for the Macondo well?
A. I'm not aware that they did.
Q. Okay. I'd like you now to look at another document that has already been marked as Exhibit 354. It's an API technical report, 10TR4, entitled Selection of Centralizers for Primary Cementing Operations.
Have -- have you ever seen this paper before?
A. I believe I have.
Q. Okay. And if you turn to --
A. Yes, I definitely have seen this.
Q. You have?
A. Yes.
Q. Okay. All right. Right

after -- the first page after the table of contents, I don't -- yes, it's Page Number 1, Section 2. It says, Benefits of Centralization.

Are you there?

A. Yes.

Q. Okay. And it says, When performing primary cementing jobs, the casing should be centralized in the wellbore for three reasons.

Number one, to help get the casing to bottom (this includes reduction of the potential for sticking of the string).

Number two, to help move the casing during the mud conditioning and during the cementing job.

And number three, to provide an optimal path for fluid flow during mud conditioning and cementing, allowing for effective mud removal to achieve zonal isolation.

Do you agree that those are the three primary benefits of centralization?

A. Yes.

Q. Okay. And it goes on to say, right after that, Field experience -- experiences, numerous large-scale experiments and computer simulations have shown that poor casing centralization can be detrimental to the cement job, particularly in narrow annuli. Therefore, a good centralization program should aim for high levels of standoff, which produces improved mud removal, particularly across critical areas of the wellbore, that is, those areas where isolation is required.

Do you agree with that statement?

A. Yes.

Page 122:20 to 123:18

Q. Okay. Let's see. If you'll look at, I guess, Page 10. It would be in the upper left-hand corner is the page number.

I think you're there.

A. Okay.

Q. Almost to the bottom of the page it says, a note. It says note.

Do you see that?

A. Yes.

Q. The critical standoff ratio is

at the sag point of the casing, but those calculations require the use of a simulator.

Is that -- is a simulator the type of computer program that you have described that Weatherford has?

A. Yes, it is.

Q. Okay. So this -- this paper is saying, look, to -- to determine the placement of centralizers, you should run this computer model to determine where those centralizers should be placed to prevent sag in between the centralizers?

Page 123:21 to 125:08

A. Actually, I mean, when I first started working there, you know, we didn't have the -- as sophisticated of computer model.

Q. Sure.

A. You could actually do even some hand calculations to determine the standoff. It gets a little more complicated, but it can be done.

Q. Sure. But in today's day and age with computers that you can put in your pocket now, it's good industry practice to run a computer model rather than to do the hand calculations?

A. Yes.

Q. Okay. And if you back up to Section 3.3. It's on Page 8, if you could go back two pages.

Where it says Selecting the Type of Centralizer, do you see that?

A. Yes.

Q. It says, The selection of the proper centralizer for a particular well application is a critical engineering consideration.

Do you agree with that?

A. Yes.

Q. And there are different types of centralizers, aren't there? There's slip-ons, they're in-line centralizers, there are bow-strings, there are hard centralizers, all different types?

A. Yes.

Q. And is that what this sentence is referring to, that in order to select the right type of centralizer for use, you've got to do some serious engineering to determine that?

Page 125:12 to 128:04

00125:12 A. It's to be considered. Things
13 need to be taken into consideration when
14 you're selecting the centralizer.
15 Q. Sure. Sure. Were you involved
16 in the, I guess the redesign of the slip-on
17 centralizers that Weatherford sells after
18 the Thunder Horse incident where the
19 centralizers all bunched up and got lost
20 downhole?
21 A. Yes, I was involved.
22 Q. Okay. Can you describe the
23 redesign, what -- what you did to make
24 those centralizers better?
25 A. Okay. The -- I don't believe
00126:01 that we changed the centralizers as much as
02 the stop collar that holds it in place.
03 Q. Okay. Fair enough.
04 A. The -- the stop collar, as I
05 recall on the Thunder Horse, I believe
06 there was a -- a very hard casing that was
07 run, high chrome casing, and a high
08 hardness. And because of the chrome, some
09 stainless steel set screws were run.
10 So we -- we found out after
11 the problem, that the set screws were --
12 were not hard enough to get a good bite or
13 grip into the casing. And that probably is
14 what caused these stop collars to slip at a
15 lower than expected force.
16 After that incident, BP was
17 asking us to design a stop collar to hold
18 higher -- much higher loads. And so we
19 went to a thicker stop collar instead of --
20 Q. Can I stop you for just a
21 second?
22 A. Yeah.
23 Q. BP asked you to do this, to
24 redesign the stop collars?
25 A. No. They asked us to try to
00127:01 increase the holding force, to come up with
02 a stop collar with a higher holding force.
03 Q. But it was at BP's request?
04 A. Yes.
05 Q. Okay. I'm sorry, keep going.
06 A. Okay. So we came up with a
07 thicker stop collar. Did some tests on
08 them, along with the set screws, and used
09 epoxy, added epoxy to help hold the stop
10 collar to increase its holding force.
11 Q. Okay. And -- and what was --
12 the purpose of the epoxy was to hold it in
13 place even better than the set screws?
14 A. That is correct.

Q. How long, generally, does epoxy take to set up -- or the epoxy that was envisioned for these stop collars?
A. Actually, it starts curing not long after you apply it. So it has some benefit, almost immediately. But in the case of these stop collars, we recommend that they -- you allow 48 hours for them to set before running.
Q. Okay. So that's -- that's a -- a Weatherford recommendation, that if you use these stop collars and use this epoxy resin, that a curing time of 48 hours be allowed before they're put in use?
A. Yes.

Page 128:11 to 128:15

Q. Sure. But if these changes to the stop collars were made at BP's request, would it make sense that somebody at Weatherford told BP what you all were doing?

Page 128:18 to 128:23

A. It would seem that way.
Q. Okay. And it would also seem reasonable that if -- if the 48-hour setup time for the epoxy was one of the considerations for this redesign, that BP would know about that, as well, right?

Page 129:01 to 129:04

A. I'm speculating, but --
Q. Makes sense?
A. I don't know.
Yes.

Page 129:08 to 129:14

And I believe you said earlier that float equipment was not -- or is not a barrier against fluid flow.
Is that what you said?
A. It's in -- in the RP65. The way a barrier is defined is not considered a barrier in -- in and of itself to flow.

Page 131:10 to 132:07

00131:10 The -- the shoe track that
11 was put together by Weatherford for the
12 Macondo well had a reamer shoe at the
13 bottom, correct?
14 A. Yes.
15 Q. Then it had 189 feet of casing,
16 correct?
17 A. Yes.
18 Q. And then it had the float
19 collar, float equipment, correct?
20 A. Yes.
21 Q. And as you just said, there
22 are -- well, you didn't just say this. But
23 at -- at the reamer shoe, there are ports
24 at the bottom to allow flow through the
25 reamer shoe?
00132:01 A. Yes.
02 Q. And at the float collar end at
03 the top, there is the auto-fill tube that
04 as you're running the casing down the hole,
05 it allows flow of fluids up through the
06 casing to prevent surge pressure, correct?
07 A. Yes.

Page 133:03 to 134:01

00133:03 The purpose of having the
04 openings in the reamer shoe and the
05 auto-fill collar is to allow flow as you're
06 running the casing down to prevent this
07 buildup of pressure, right?
08 A. To prevent an increase -- or a
09 significant increase in the surge pressure
10 from running the casing in the hole.
11 Q. Right. Because if -- if it --
12 if there were not these openings, if it was
13 just a solid surface and you started
14 running this down, it would force the mud
15 up through the annulus and it would just
16 come gushing out into the mud pits, right,
17 as the pipe displaced it?
18 A. Yes. Surge pressures would be
19 high and you could break down the
20 formation.
21 Q. Sure. So you have these
22 openings so that as the casing goes down
23 through, the fluid can flow up and it
24 doesn't create as high a surge pressure as
25 if it didn't have those openings?
00134:01 A. Yes.

Page 139:14 to 139:18

00139:14 Q. Now, as I understand the -- the

way the auto-fill tube converts is by a combination of pressure and flow; is that fair?
A. Normally, yes.

Page 141:20 to 142:06

Q. So the -- the speed of the flow, the barrels per minute, determines the size of the -- of the conversion holes that Weatherford would put in an auto-fill tube, correct?
A. Yes.
Q. So you would know -- or you would have to know, Weatherford would have to know, in advance, what the flow rate of the well is going to be in order to sell an auto-fill tube that has the right size holes in it, right --

Page 142:09 to 142:25

Q. -- conversion holes?
A. The -- the customer could know it just as well as we do.
Q. Okay. But somebody has to know it, right?
A. Yes.
Q. Somebody has to know, hey, we're going to run this -- this well at two to four barrels a minute or five to eight barrels a minute, in order to tell you when they're buying this thing, this is the size conversion port that I want in my auto-fill tube, correct?
A. I presume so.
Q. Somebody's got to know that, right?
A. Yes.

Page 144:09 to 144:17

Can you look at the specifications of the float collar that was sold by Nexen to BP and determine which one of these conversion options was in place in that particular float collar?
A. Yes.
Q. How can you determine that?
A. There is a -- a spec sheet attached to the drawing.

Page 145:04 to 146:02

00145:04 Q. Okay. How does that salesperson
05 determine -- you know, they say, okay,
06 Nexen's got a -- got an M45AP float collar
07 that BP wants to buy. Let's go in the
08 warehouse. And, yes, there's the M45AP
09 float collar.
10 How can that salesperson
11 determine whether it's an Option 1 at two
12 barrels a minute or an Option 2 at ten
13 barrels a minute?
14 A. There's a -- a work audit number
15 assigned to each order and especially --
16 particularly in the case of these two float
17 collar that we furnished. And basically,
18 we go back to the bill of materials and the
19 specification sheet. It ties into the part
20 number of the part that was ordered.
21 Q. Okay. So you can look at the
22 part number of the particular float collar
23 and determine, looking at that number,
24 whether it's in Option 1, ten barrels a
25 minute or an Option 2, two barrels a
00146:01 minute?
02 A. Yes.

Page 146:10 to 147:02

00146:10 Q. Where -- where do you find the
11 drawings associated with a particular piece
12 of equipment?
13 A. We have a -- a system we call
14 WindChill that manages all of our drawings
15 and bill of materials.
16 Q. For each float collar that's
17 built, is there a separate drawing for that
18 piece of gear?
19 A. There is a particular drawing.
20 It may be used on several different float
21 collars that are manufactured at different
22 times, but -- but, you know, it would be
23 specifically for that particular part
24 number.
25 Q. Okay.
00147:01 A. Each part number has a specific
02 set of drawings associated with it.

Page 147:14 to 147:20

00147:14 Q. Okay. I'd like you to look at
15 Tab 1 now with the Bates page ending in
16 858, which I believe is the delivery ticket
17 for the particular float collar that went
18 to the Macondo well.

A. What is the number?
Q. 858. It might be on your

Page 147:24 to 149:04

Q. Okay. And you see on -- on that page, the second item is the M45AP float collar?
A. Yes.
Q. Can you tell from looking at that description or that part number or something, what the conversion option was for that particular float collar?
A. What I could do is go to either of the two part numbers shown. There's what we call a WindChill part number, the first one, 1366513 and -- into the WindChill system, and it would give us the bill of materials and the drawings for that particular float collar.
Q. Okay. All right. And the -- the size of the conversion port in the auto-fill tube would be included in that drawing?
A. It would be in the drawing package.
Q. Okay. Are these float collars off-the-shelf-type items, or do you manufacture them specifically for a specific job?
A. Usually when they're made out of premium threads like these were, not only made to -- to an order.
Q. Premium threads being the Hydril 513?
A. Yes.

Page 149:09 to 150:02

Q. Okay. Now, let's talk about the reamer shoe for a moment.
Did that reamer shoe have baffles in it?
A. It had a baffle in it.
Q. A baffle.
And what is the purpose of the baffle?
A. The purpose, I believe, was to catch the auto-fill tube.
Q. Okay. What -- can you describe the configuration of the baffle? Is it a screen or a -- how -- what does it look like?
A. It had -- I believe there were

6 holes in it that were about 1-3/8, 12 holes that were about three-quarters of an inch, and a -- one hole that was about 1.1 inches in diameter.

Page 150:18 to 150:22

Q. And presumably the holes are to allow fluid to pass through as we had discussed with the reamer shoe ports and the auto-fill tube, right?
A. Yes.

Page 151:05 to 151:25

Q. Okay. What was the size of the ports in the reamer shoe, the 1 1/2-inch, did you say?
A. Yeah, about 1.575.
Q. 45 -- 40 millimeters?
A. Yes.
Q. So you have smaller holes in the baffle than you do in the reamer ports, right?
A. Yes. Slightly smaller, yes.
Q. Okay. So if material was small enough, barely, to pass through the ports in the reamer shoe, they could conceivably get trapped at the baffle?
A. Yes.
Q. Okay. And -- let me ask you this: What -- do you have a theory, or does Weatherford have a theory, as to precisely where the -- the clog was in the shoe track that caused the float-collar conversion problems?

Page 152:03 to 154:15

A. My theory is, it could have been on top on of the float collar or at the shoe. I can't tell which it was.
Q. All right. Fair enough. Can you explain either of those theories? How would it get tracked -- get trapped at the reamer shoe and how would it get trapped on top the float collar?
A. As you run in the hole, anything that is suspended by the mud would be drawn in with -- with the fluid that is in the well; in other words, if fluid enters the well and it has cuttings in it or whatever, and it's small enough to go through the

ports, then it could go up above the reamer shoe and above the float collar.
And at some point when the flow stops, cuttings would tend to settle down. So they could either settle down in the -- above the reamer shoe, or they could settle above the float collar.
Q. Could they settle in the conversion port holes once -- once the circulation stops, as you said, and the ball in the -- in the auto-fill tube sinks down to the -- to the seat? Could some of those particles also come down right behind the ball and clog the conversion port holes?
A. Yes, they could.
Q. All right. And what would be the effect of that?
A. The effect would be that you could convert at a lower flow rate. Basically, as soon as -- if they were completely clogged, as soon as you pressure up to the 500, 700 psi, the auto-fill tube would shear and so the flappers could then hold back pressure.
Q. Okay. What -- what's the purpose of these conversion holes, then? Why -- why do you have conversion holes if you can do it that easily?
A. Because sometimes when you're running in the hole, you might get stuck. You want to be able to circulate. And they allow you to circulate at reduced flow rate. But at any rate, you can still circulate and help to try to free your casing.
It also prevents -- when you're picking up the casing out of the slips, it keeps the -- keeps you from swabbing the well, basically --
Q. Suction pressure?
A. -- and pulling the auto-fill tube out prematurely.
Q. Okay. All right. So -- okay. So if -- if those conversion ports were clogged in our hypothetical, then the moment you pressured it up to 5', 600 psi, it would just convert?
A. Yes.

Page 154:18 to 155:01

How -- how would -- I think you already did. If -- if -- if you're running the shoe track through down to the

bottom of the hole and you have debris making its way up to the top of the shoe -- of the float collar, when you stopped, then that -- that debris would have a tendency to settle down on top of the float collar; is that what you said?

Page 155:04 to 155:17

A. It could, yes.
Q. And it could also go back down into the auto-fill tube?
A. It could, yes.
Q. All right. But it wouldn't get past the ball, 'cause the ball has now settled to the bottom of the auto-fill tube?
A. I would -- I would tend to think most of it would not go past the ball.
Q. Okay. What is the size of the opening at the top of the cage in a caged ball M45 unit?
A. I can't recall.

Page 156:05 to 156:21

Q. 2599 is the exhibit you're looking at.
A. I believe it's a little bit less than 2-3/8 inch. I don't recall. It -- it's not on the drawing.
Q. Okay. What keeps the ball -- the ball's a two-inch ball -- that keeps it from going up through the -- the port?
A. The lugs on the retainer cage that we highlighted earlier in red.
Q. Okay. So the -- the cage itself has lugs sticking out that keep the ball from going past it?
A. Yes.
Q. But it allows fluid to go around the ball and up the -- the port?
A. Yes.

Page 157:10 to 157:11

EXAMINATION
BY MR. CHEN:

Page 157:19 to 160:09

So on the top of the retainer -- you have retainer opening and

then you have what you call lugs, correct?
A. Yes.
Q. And then as you're running the casing into the hole, the ball is held on in place by the lugs and it can't leave the retaining cage?
A. Correct.
Q. Do you know the size of the openings -- or let's put more bluntly -- the size the debris that can get past the ball as it's held by the lugs in the retaining cage?
A. I believe the ball is a two-inch diameter.
Q. Uh-huh.
A. But the -- the cage itself is larger where the -- where the ball is held in place.
Q. Okay.
A. So I know it's at least larger than the inlet diameter of the -- of the -- the flow area is larger than the -- the ID of the ball seat, which is 1.93 inches.
Q. Right.
A. So the flow area is larger than that.
Q. Well, the maximum of flow area is larger than that, right?
A. Yes.
Q. But you also have the lugs in place?
A. Yes. But even with the lugs in place, the flow area is larger past the ball that's retained.
Q. Right. But the flow area is actually divided into at least three pieces, 'cause there's three lugs, right?
A. It's -- the ball is caged below the lugs and -- and then -- you know, so once you get past the ball, the ball's sitting on the -- on the lugs and -- and not surrendered by it. It's just touching on the lower -- on the upper end of the ball, if you will.
Q. So do you know what the largest size particle that could pass by the ball as it's being -- as it's held in place by the lugs is?
A. I don't know without looking at some drawings.
Q. Uh-huh. Do you have a rough understanding of what that size would be?
A. It might be in the range of three-quarters of an inch.
Q. Okay. And when Ms. Sullivan of

00160:01 the U.S. Government was asking you about
02 the term flow tolerant, is that term
03 related to tolerant of flow going past the
04 ball as it's being run into the -- the hole
05 and also tolerant of the flow of the same
06 particles as you're pressuring up to
07 convert it later?
08 A. Yeah. The term is debris
09 tolerant.

Page 160:11 to 160:17

00160:11 A. And, yeah, it means that it's
12 less likely than some other types of auto
13 fill to be clogged with debris.
14 Q. And less likely clogged by
15 debris, more likely to function as
16 intended?
17 A. Yes.

Page 160:20 to 161:03

00160:20 Now, you would agree with
21 me that there's benefits and there's
22 advantages and disadvantages to running
23 centralizers, correct?
24 A. Yes.
25 Q. One of the advantages to running
00161:01 bow-spring centralizer is that you have the
02 type with the stop collars, they can move
03 around and they can bunch up?

Page 161:08 to 162:20

00161:08 A. Yes.
09 Q. It's possible?
10 A. Yes.
11 Q. And you've seen that in your
12 experience?
13 A. Yes.
14 Q. And Weatherford customers have
15 complained about that at least once in your
16 experience?
17 A. Yes.
18 Q. Another possibility for
19 bow-spring centralizers is the bow springs
20 can break off while you're running the
21 casing, and those pieces of metal can cause
22 the casing to get stuck or -- or other bad
23 things can happen?
24 A. Yes.
25 Q. So there are advantages and
00162:01 disadvantages to weight when you are

selecting centralizers to use for your casing?
A. Yes.
Q. The centralizers that BP ran on -- at Macondo were inline centralizers or centralizer subs.
Do you remember -- do you know that?
A. They were centralizer subs.
Q. And centralizer subs are attached between casing joints, and they are unable to move along the casing?
A. That is correct. Because the -- we machine a relief or a recess to where the -- where the bow springs could contact to prevent movement.
Q. So in at least one significant way, they are more advantageous than a bow-spring centralizer with a stop collar?

Page 162:23 to 164:19

A. Yes.
Q. Okay. And are they also more tolerant to being handled so that the -- the springs don't break off of inline centralizers?
A. In a tight hole situation, yes.
Q. Uh-huh. Do you know that the Macondo well was a near vertical well?
A. Yes.
Q. And is that a consideration that takes place in determining how many centralizers to run?
A. Yes.
Q. Generally in a vertical well, you would run less centralizers than in an inclined well?
A. Yes.
Q. Did you know that the Macondo well had a dogleg where they had to cement one area and drill around it, kick off and drill around it?
A. I'm aware of that.
Q. And is that another consideration for when you're determining the number of centralizers to run?
A. Yes.
Q. And when you have a dogleg in a well, do you tend to run less centralizers or more centralizers?
A. Less. Let me clarify that.
Q. Okay.
A. In a lot of cases, there is a planned dogleg, and if you're going to be

cementing that interval, you would probably have to run more because the -- as you pull tension around a dogleg, it would tend to put more load on the centralizers, so you would tend to run more at that point.
Q. Okay. But here, the dogleg was a few thousand feet up and they were not cementing that interval, they were actually cementing an interval further down?
A. That's right.
Q. And in that case, you would not need those additional centralizers that you just described, right?
A. That's correct.

Page 165:15 to 165:20

Q. I see. Does running a baffle with the reamer shoe, in effect, act as a filter because it is preventing some of the larger particles from going past the baffle?
A. In that sense, yes.

Page 166:08 to 168:21

Q. Now, we looked at literature for the M45AP this morning and it does not recommend running a float shoe with that float collar, does it?
A. No, it did not.
Q. And does -- does Weatherford recommend running a float shoe with that float collar?
A. We do not.
Q. Now, you testified that you went out and observed the Stress Engineering testing; is that correct?
A. Yes.
Q. And was there opportunity to provide input into that testing if you so desired?
A. Yes. We were allowed to preview the -- the plan, the test plan.
Q. The protocol was sent to you in advance of the testing, and then you were allowed to observe the testing?
A. Yes.
Q. Now, how many days were you out there watching the Stress Engineering testing?
A. Probably seven to ten days, somewhere in that range.
Q. And from what you observed and

what you reviewed, did the engineers at Stress Engineering use good protocols in their testing?
A. Yes.
Q. And did they devise good experiments to test the properties of the Weatherford float collars?
A. Yes.
Q. And do you agree with the results of their testing?
A. Yes.
Q. And you've read the Stress Engineering report, correct?
A. Yes.
Q. And do you agree with the conclusions of the report?
A. Yes.
Q. Now, earlier today, there was some questioning on different ways the hydrocarbon could get into the casing.
Do you remember that?
A. Yes.
Q. And the question was whether or not there was some way other than through the shoe. And -- and you said possibly through the casing.
Do -- do you remember that testimony?
A. Yes.
Q. Now, you've reviewed several reports regarding the DEEPWATER HORIZON incident, correct? You've reviewed the Bly report, the Presidential Commission report, and the Chief Counsel's report, or portions of that?
A. Yes.

Page 169:07 to 170:03

Q. In the reports that you reviewed, do they say that it is more likely than not that the cement failed and the hydrocarbons came off the shoe track?
A. Yes.
Q. And when you indicated that -- that possibility was that there was a casing breach, you were just noting that as a possibility, right?
A. Yes.
MR. BOWMAN:
Object to form.
A. That was in the reports --
Q. Okay.
A. -- as a possibility but not likely scenario.

Q. So let me re-ask that.
Why did you mention a breach -- what is the basis for mentioning a breach in the casing?
A. Just in the reports, it was mentioned they couldn't rule it out.

Page 170:13 to 170:18

Q. And based on everything you've reviewed, is there any data or evidence that you've seen suggesting that there was, indeed, a casing breach?
A. No. I would have nothing to support that.

Page 170:24 to 171:12

You understand that BP checked with Weatherford to see whether or not the seven-inch equipment from Nexen would be appropriate for the Macondo well, correct?
A. I don't know that, personally.
Q. Okay. Well, Mr. Clawson testified yesterday that he confirmed for BP that that equipment would be appropriate.
If he said that, would you agree that he would be someone who -- who knew that?
A. Yes.

Page 171:15 to 172:14

Q. So we had some questioning on a software package that Weatherford has for determining centralization.
Do you recall that questioning?
A. Yes.
Q. And Weatherford -- when BP discussed the Macondo well with Weatherford, Weatherford didn't offer to run that software for BP, did it?
A. I'm not aware that we did.
Q. Okay. Did -- did Weatherford recommend to BP that it should use Weatherford's software to determine centralization?
A. I am not aware of.
Q. Or placement of centralizers?
A. I'm not aware that we did.

Q. Or a number of centralizers, to your knowledge?
A. I'm not aware.
Q. And then, to your knowledge, did Weatherford recommend to BP the low conversion option for the float collar?
A. I'm not aware of that.

Page 173:09 to 173:25

Q. Okay. But to your knowledge, that you are personally aware of, do you know if Weatherford had communicated those potential issues with that model --
A. No, not --
Q. -- to BP?
A. -- not personally, not before the incident, but possibly since.
Q. Okay. Thank you.
And one more question on centralizers.
If you had to recommend, based on your engineering judgment, cost being no objective, what type of centralizers to run, what would you recommend?
A. Bow-spring centralizer subs.

Page 174:10 to 174:20

EXAMINATION
BY MR. GOFORTH:
Q. All right. Sir, I asked this morning Mr. Clawson some questions about some e-mails having to do with some O-ring modifications that might have been performed prior to the Macondo well.
Are you familiar with that and the darts?
A. You might have to explain a little further on the darts. Yes.

Page 175:02 to 175:15

Q. Look at the second page of that, would you, sir? Actually, maybe the third page.
Got an e-mail from -- from Mike Bock.
Do you know Mike Bock?
A. Yes, I do.
Q. Does he work with Weatherford?
A. Yes.

Q. All right. And he's e-mailing Jim Hollingsworth and Brent Emerson.
Do you know Jim Hollingsworth?
A. Yes, I do.

Page 176:01 to 177:08

Q. Okay. Well, Mike Bock sends him this e-mail. And he's -- he's talking about -- he says, looks like we're doing a small redesign on our SSR darts.
Do you see where I'm talking about?
A. Yes, I do.
Q. All right. And he says that they're running our plug sets -- we are running our plug sets on the Halliburton VersaFlex liner that is utilizing an Allamon surge tool.
And then he goes on to say that engineering -- I guess that's Weatherford engineering? --
A. Yes.
Q. -- actually went and tested pumping our darts through Allamon surge tool and the O-ring seal was damaged or pulled out of the groove.
Are you familiar with -- with -- now with what I'm talking about?
A. Yes, I am.
Q. Okay. Mr. Hollingsworth responds in the e-mail just above it and says, I don't feel very comfortable running a dart with the Allamon tool that we know may have problems.
And he sent that to -- to Bryan Clawson.
Mr. Clawson was -- was the man who was selling the dart to -- to BP; is that right?

Page 177:11 to 177:12

A. He's our salesperson for BP, yes.

Page 177:21 to 178:15

Q. All right. Okay. Why was it -- why was it that you were being called upon to run the -- run your dart with the Allamon tool, then? Do you know that?

A. Yes, I do know that.
Q. And what was -- what's the answer to that?
A. The -- well, the -- the -- our plug system was going to be run with the Allamon tool.
I guess I didn't understand your question.
Q. Why was it going to be run with the Allamon tool?
A. The diverter tool reduces -- helps to reduce surge pressure.
Q. I know. But why -- why didn't you use your diverter tool?
A. I don't know. I guess BP had a preference for that tool.

Page 178:22 to 180:19

All right. Then the next e-mail in the chain, Clawson is -- is e-mailing back to Mr. Hollingsworth. And he -- and he says, Jim, this was run through WFT engineering.
That's Weatherford engineering?
A. Yes.
Q. It's for the BP Macondo well, which he says he had a special SSR plug set built just for this job for a 9-7/8 by 7-inch combination long string. Job should be up in a few days. If Weatherford has issue with Allamon, I need to know it, because I'm setting jobs up daily with them.
So here's a salesman talking to his boss -- I guess his boss -- saying, hey, man, I'm about to make us a lot of money here. We need to run this -- to -- to sell this product, which as I read it.
Is that basically what you're reading that Mr. Clawson's saying?
A. As I read it, it's -- he's saying that if we have an issue with Allamon, he'd like to know about it because -- the one I'm aware of was -- as far as an issue with Allamon, was the O-ring coming out of the groove.
Q. Right.
A. That's the only --
Q. And I think that's what they're talking about here.
A. Yeah, and that's -- that's the only problem.

Q. Okay. Well, Mr. Hollingsworth's response -- just above that, and he says, I have a problem with running our darts through a tool. Doesn't matter whose tool it is. That could damage the dart and prevent it from performing its intended task.

What is the dart's intended task?

A. The purpose of the dart is to separate the fluids above and below cement and mud usually.

Page 181:02 to 181:15

A. And then it -- it continues -- it runs down the -- it wipes the drill pipe and it latches into the -- in this case, it was a top dart we had trouble with, so it latches into the top plug and it launches the top plug.

Q. Okay. Does it -- does it do that cleaning before it latches to the top plug?

A. Yes. It's wiping the drill pipe.

Q. The dart is?

A. The dart is. It's wiping the drill pipe, separating fluids --

Page 181:17 to 181:17

A. -- on its way to the top plug.

Page 182:07 to 183:08

Q. Okay. Tell me how -- what -- what the function or the purpose of the O-ring seal is.

A. The O-ring seal serves as a -- as a blockage to flow past the nose when it engages with the -- what we call a top dart receiver.

So it serves as a backup, because we also have a metal-to-metal seal where the aluminum shoulders -- aluminum nose shoulders up on the top dart receiver and also seals there. So it's a duplicate seal, if you will.

Q. And so if the -- the O-ring is damaged, you say that you've got a backup?

A. Yes, it would still seal.

Q. All right. So -- so the -- the

O-ring, is that the -- does that serve as the primary seal?
A. It is a seal. It's one of two seals.
Q. You wouldn't want to -- to send a dart down a well with the O-ring dislodged or damaged, would you, sir?
A. We'd prefer not to. In fact, what we did with this seal was, we actually glued it in place before running it.

Page 184:11 to 184:15

Q. Did you do so on -- on these -- these darts that were used in the Macondo well?
A. We glued the -- the seals in place.

Page 184:25 to 185:07

Q. Okay. Did it go through the Allamon tool in the Macondo well?
A. From all indications, it did.
Q. Do you know whether or not it damaged it again?
A. I -- from prior field runs with the Allamon tool, I would say it should not have been damaged.

Page 186:12 to 187:14

Q. The -- Gary Bordelon on the first page said, I spoke with Brent Lirette, and we have modified the dart O-ring and have his engineering approval as a functional tool for this application. He can't respond to e-mails right now, but is on the mobile if further clarification is necessary, or call me on mobile.
And signed off by -- by Gary Bordelon, right?
A. Yes.
Q. And you say that modification is some glue?
A. Yes.
Q. And then I want to know -- this was -- this is dated April 14th, which is six days before the Macondo well blowout.
And it was, like, four or five days before -- five days, I guess, before this dart would be used, right?
A. It seems right.

Q. Okay. So did you have a chance to go back and modify other darts that would have been used in the Macondo well?
A. We would have modified the -- the one that was run. And if there was a backup, it would have been modified, as well.

Page 190:06 to 191:19

Q. What is the worst thing that could happen if the dart -- or the O-ring does not create a seal inside the wiper plug?
A. You can get -- well, first of all, the -- the metal seal would tend to seal off the passageway. But if it did not, you could get some bypassing of -- this case, it would have been displacement fluid above the top plug.
Q. That would bypass the -- the plug?
A. It would bypass through the nose.
Q. Yeah.
A. But actually, the clearance is so small, that mud would seal off those cracks so I wouldn't expect any bypassing at all, even without the metal seal.
Q. All right. Did you perform any test to -- to make sure that the -- that the O-ring either wouldn't, again, come out of its groove or come unsealed?
A. No.
Q. Have you used that sort of glue before on -- on O-rings of this sort?
A. We do bond seals, elastomer seals, to aluminum.
Q. So is that what gave you faith that the glue is going to hold?
A. Yes.
Q. Do you think there were any -- any conditions in the Macondo well that would -- would have some effect on the -- on the glue?
A. No.
Q. I'm talking about below -- before the blowout, of course.
A. No.

Page 199:15 to 199:18

EXAMINATION
BY MR. BOWMAN:

Q. Good afternoon. My name's Bruce Bowman. I represent Halliburton. I have a

Page 199:21 to 200:07

Q. You were asked some questions, I believe, by BP's lawyers about reasons to put in centralizers or maybe not to put in centralizers.
Do you remember that?
A. Yes.
Q. Okay. To you, would it make sense and a good reason to put in centralizers if it showed that channeling would occur in the cement without centralizers?
A. Yes.

Page 200:19 to 202:10

First of all, Weatherford has not done a flow path analysis, has it? Or has it?
A. No.
Q. Okay. Now, I think most people can at least agree that -- that hydrocarbons, in all probability, came out of the pay zone into the annulus.
Does that make sense?
A. Yes.
Q. Okay. Now, generally, doesn't gas travel upward?
A. Yes.
Q. Okay. Do you have any explanation as to why the Bly report seems to indicate it went downward before it then went upward?
A. I -- I don't know that it specifically said that it went downward, but --
Q. Well, how's it going to get -- I mean, if -- you understand that the pay zones are above the bottom of the production casing, right?
A. I understand that they were reported to be. Where they're actually are, I'm not sure.
Q. Well, I understand. And all this is a little theoretical, because it's all been cemented over, right?
A. Yes.
Q. Okay. But assuming that they are above the reamer shoe and -- and the rathole, and they come in in the annulus,

somehow if it's going to go up the production casing, it has to get in the production casing, right?
A. Yes.
Q. Okay. I guess one way is, it could just go right through if there was a breach of the casing, right?
A. Yes.

Page 202:13 to 203:12

Q. The other way is, it would somehow have to go down to get back up, right?
A. Yes.
Q. Okay. Do you have any explanation as to why gas in that situation would have gone down before it went back up?
A. There was talk about -- in the reports about some possible swapping of fluids between the -- the rathole fluid and the cement. And the other would be if there -- there was a -- a pay zone or whatever at or below the shoe.
Q. Okay. Now, what you told me about the swapping of fluids, is that based on something you know? Is that based on something you read in the Bly report?
A. It's based on what I know and -- and what I read in the Bly report. But I'm familiar with the need, in some cases, to put, you know, a mud with a high density or high gel strength in the hole.
Q. And do you know if that happened in this case?

Page 203:16 to 203:16

A. I -- I read that it did not.

Page 204:06 to 208:16

Sitting here today, you don't have an opinion -- and if you do tell me -- as to whether the blockage was at the float collar or at the reamer shoe; is that correct?
A. That's correct.
Q. Okay. As far as you're concerned, one is just as likely as the other?
A. Yes.

Q. Okay. So let's talk about -- first of all, let's assume there's a blockage at the collar. Okay? And somehow it's eventually unblocked by applying, I guess, 3100-and-something psi, right?
You following me so far?
A. Yes.
Q. Okay. Describe the downward pressure and the upward pressure in that situation.
Would there be any?
A. The -- there's a hydrostatic pressure at that depth of the well below the -- below the float collar. And, of course, above would be the differential pressure of 3140 or whatever --
Q. Okay.
A. -- was applied.
Q. And so the 31's applied. And let's say if the float collar, it burst through. Okay? Is there all the pressure, then, going to be downward, or is there going to be any pressure back upward?
A. It would tend to be downward.
Q. All downward, okay.
Now then, let -- let's assume the blockage was at the reamer shoe. All right? And it's eventually unblocked.
Is there pressure downward and upward or just downward?
A. Well, the -- the pressure acts in all directions, so I've got --
Q. Okay.
A. -- to correct myself. But -- but the flow would be downward when it's relieved.
Q. Okay. The flow would be downward, but the pressure would actually go both -- both directions, would it not?
A. Yes, it does.
Q. Okay.
A. I'm sorry.
Q. Has Weatherford tried to do any calculations and have you done any calculation on how much pressure would have actually been caused in that situation?
A. I don't follow you.
Q. Okay. You have the blockage. And let's say it's released.
Have you done any calculations on how much pressure is then released?
A. No, other than the pressure that's supplied --
Q. Okay.

A. -- is released.
Q. Is there a -- could there -- would there be a buildup of pressure if something's continuing to press down and not able to unblock it and then suddenly blocking it, and it's suddenly released very quickly?
A. Do you mean the -- the rate at which the --
Q. Yes, sir.
A. -- pressure declines?
Q. Yes, sir.
A. Yes. It's shown on the Stress Engineering study.
Q. Okay. Would the rate that the pressure increased at the Macondo have any effect -- let's assume it's at the reamer shoe -- would it have any effect on the float collar above it?
A. I understand it was only one barrel per minute.
Q. I'm not talking about the flow. I'm talking about the actual pressure release.
A. When the pressure's released?
Q. Yes, sir.
A. What would be the effect of -- on the flow rate?
Q. Well, would it have any effect on the float collar?
A. Yes.
Q. Okay.
A. If it's suddenly released, yes, it could convert the auto-fill tube. And that's what the testing by Stress Engineering tended to show.
Q. Okay. But, again, you hadn't done any testing on that, or have you?
A. Stress Engineering did the testing.
Q. Well, okay. Did they actually try to simulate exactly what happened, and do you know if they did?
A. They tried to simulate what happened. Of course, there's no way to do that on the surface.

Page 209:01 to 209:12

Q. Okay. Do you know if there's an increasing flow path developing for the first 10 or 15 seconds after the plug let go?
A. I don't know.
Q. Okay. Do you know if the plug

let go?
A. I can't be sure what happened.
Q. Okay. But you think the plug let go?
A. It would appear to me that the plug landed and we flowed through it.

Page 209:23 to 210:18

Q. Where'd the bottom plug land?
A. It should have landed on the float collar. And by the volumes pumped --
Q. Okay.
A. -- it appears to have landed on the float collar.
Q. Okay. And where was the float collar located when it landed?
A. It was in the -- in the casing, of course --
Q. Right. Right.
A. -- near the bottom -- at the top of the shoe joint. Exact depth, I don't know off the top of my head.
Q. Here's what I'm getting at: Are -- are you comfortable that the collar was located exactly more or less where it was supposed to be or that it had been moved?
A. It's more or less where it was placed on the string.

Page 211:03 to 211:17

Q. Okay. And what about the top plug, where was that supposed to land?
A. Top plug lands above the bottom plug.
Q. And have you done an analysis to see if there -- at the time the top plug landed was the time it was supposed to have landed?
A. Yes, I did look at that.
Q. And what was the answer?
A. It's pretty much on schedule.
Q. What do you mean by "pretty much"?
A. I think it was within about five barrels.

Page 212:19 to 213:04

Q. Okay. And do you know which OptiCems you saw? How many?

A. Two. There was one before the job and one -- a post job.
Q. OptiCems?
A. (Moves head up and down.)
Q. Okay. So the ones you saw, did it have 21 centralizers or 7?
A. I believe the pre-job one had -- had a number of them, more than -- more than seven.

Page 213:21 to 214:12

Q. Okay. You were asked some questions earlier about if the Allamon ball was pressured and it was over 12' or 1300 psi, if it could go through the auto fill?
A. Yes.
Q. Okay. Kind of a dumb question, but if it did, what happens to the ball that's in the auto fill that's supposed to go someplace?
A. All that would happen is that the auto-fill tube would be injected and -- and the equipment would be converted.
Q. Okay. Just right then. So when that Allamon ball came through, it also knocked the other ball through?
A. Yes.

Page 214:18 to 215:04

Q. Okay. And, again, what did Hydril have to do with the equipment that went into the Macondo well?
A. There were Hydril threads on the float equipment.
Q. Okay. Have you seen any of the test they did?
A. I saw an inspection report.
Q. Okay. And did the inspection report look normal to you?
A. Yes. As I recall, everything was okay.

Page 217:21 to 219:06

(Exhibit Number 3004 marked.)
Q. Have you seen this e-mail before?
A. I may have.
Q. Okay. And we can see that it's a -- from Bryan Clawson and, of course, you

know Brian -- Brian Morel, attaching additional information for the actual WFP M45AP equipment. So let's look at what's attached.
A. Okay.
Q. The very first sheet is a drawing of what?
A. Drawing of a seven-inch M45AP float collar.
Q. Okay. And when Mr. Dart was questioning you about if you could tell from looking at something, what -- how much something was supposed to be circulated to convert it, and you said you'd need a drawing, can you look at this drawing and tell?
A. Yes. In the title block it says five to seven barrels per minute, 500 to 700 psi.
Q. Okay. Okay. So from looking at this, we know that BP knew that what, as far as -- can you just repeat that?
A. That five to seven barrels per minute or 500 to 700 psi is the conversion flow rate and pressure.
Q. Okay. Do you have any explanation why they never, then, planned to run more than one to four barrels per minute?
A. No.

Page 224:19 to 225:05

EXAMINATION
BY MR. FITCH:
Q. Mr. Lirette, I just introduced myself. Let me do it formally. I'm Tony Fitch, and I represent two Anadarko companies that are collectively referred to in shorthand in this case as Anadarko. Am I correct that -- that you had no substantive involvement in matters relating to the Macondo well prior to April 20, 2010?
A. Yes.

Page 225:13 to 227:09

Let me return to this issue, if I may, that -- that you've testified about earlier regarding whether the Allamon ball was -- was resting on -- on top of the float collar.
Is it your conclusion that

the ball was or was not resting on top of the float collar?
A. I would think that it -- by the time that it was finally --
Q. Down there?
A. -- initially it was not. When they initially tried to pressure up to convert the equipment and initiate flow, but it may have been there when it was finally opened up for flow.
Q. Okay. I thought you testified earlier that -- that it -- it was probably not sitting on the -- the lugs on the top of the -- the float collar because debris probably had already gotten there ahead of it?
A. Yeah. If the debris was accumulated above the float collar, then it would probably be resting above.
Q. Okay. And is it your testimony that if -- if that was the situation, then the -- that ball would not have been blown through the -- into and through the float collar?
A. No. I'm -- I'm just saying that it would not -- it probably not be under the debris.
Q. Okay.
A. After the initial blockage was unclogged, then it could have flowed through for sure. I mean -- or actually been clogged by the retainer.
Q. Now, with respect to this, you testified, did you not, that -- that subsequent to April 20, 2010, Weatherford did some testing of -- of this possible scenario; is that right?
A. No.
Q. Was testing done with respect to this issue?
A. By Stress Engineering.

Page 228:04 to 230:22

Q. Okay. And so it was BP and not Weatherford that requested that test?
A. That's correct.
Q. Okay. Now, as -- as I understood it, you testified that -- that the ball -- and correct me if I'm wrong, I may well be -- that in that test, the -- is this an actual test, or is this a modeling test? It's a test with the real stuff; is that right?
A. Yeah. It's a test with the

equipment.
Q. Okay. With comparable --
A. The same --
Q. -- model?
A. -- same part number was made the way that it was made to the Macondo well.
Q. Okay. And -- and did the test include having the Allamon ball on top of the float collar?
A. One of the tests -- one or maybe more, had the Allamon ball on top of the float collar.
Q. Okay. And did the -- was there a test run with the ball on top of the float collar and then pressuring up to 3100 pounds per square inch?
A. Yes.
Q. And it was your testimony, was it not, that in that test, the -- the ball, the Allamon ball, was not forced into the float collar, correct?
A. That is correct.
Q. Okay. And does one conclude from that, that since the 3100 psi didn't push the ball through the float collar, that the 1300 psi, that apparently was applied in this case, did not do so?
A. The -- the 1300 psi is based upon complete -- not just the ball alone, but also there being some kind of a blockage around the ball that would pressure up on the -- the whole system and break the lugs. So it would be a larger diameter under pressure than just the ball itself.
Q. The ball plus the debris would be under the pressure?
A. The ball or the debris.
Q. Now, that 1300 figure is -- was -- was provided by Mr. Hebert, to the best of your understanding from what you've learned, correct?
A. Yes.
Q. And -- and what is that 1300 figure based on? Where did that come from?
A. I believe it was based on a test where we put a mechanical load on top of a ball and pressed down on the ball and broke the lugs to see -- and we took that load and divided by the area on the inside of the -- the retainer cage to get an equivalent pressure that it would take to break it with a clog in the system, if you will.
Q. Okay. In -- in Weatherford's

view, what is the bottom line here? Did the Allamon ball break into the -- and then go through the -- the float collar or not?

Page 230:25 to 231:15

A. I don't know.
Q. Weatherford doesn't know; is that correct?
A. That's right.
Q. Okay. And so Weatherford doesn't know whether or not that scenario would have caused the float collar to fail to convert, correct?
A. I think it doesn't really matter. Either way, it would have converted. If the Allamon ball stayed on top, it would have converted with the surge. If the Allamon ball broke through the retainers, it still would have converted the float equipment to hold back pressure.

Page 234:10 to 235:14

Tell me exactly what a wiper plug looks like, what it basically consists of.
A. It has a -- a hard core --
Q. Okay. It's got a core.
A. -- which is cylindrical. And then it has some fins that wipe -- the fins are a soft, non-case urethane material which are flexible. And the fins are bonded to the core.
And as they are -- as pressure's applied above it, it travels down and wipes the casing and separates mud from cement or other fluids in the casing.
Q. When it's -- when it's doing both, its wiping function and its separating function, how -- how is -- I understand the wiping concept pretty well, but what is the separating concept?
A. Basically, it -- it -- normally, you'll pump a fluid ahead of it that's different from the fluid --
Q. Right.
A. -- above it, and it keeps the two from mixing.
Q. Oh, okay. All right. For -- for 9-7/8 casing, how big is the core of the wiper plug? What's the diameter?
A. I don't recall, but it would be

14 along the range of five inches or so.

Page 235:23 to 236:07

00235:23 Q. Uh-huh. And -- and how about
24 for -- for seven-inch casing, how big is
25 the core and how big are the fins? How
00236:01 long are the fins?
02 A. Again, the same core is used for
03 both.
04 Q. Okay. And that core is how --
05 is what size?
06 A. I think in the range of about
07 five inches --

Page 236:10 to 236:19

00236:10 Q. So -- so that core will fit into
11 the seven-inch casing?
12 A. Yes.
13 Q. And are all the fins the same
14 length, or are they different lengths?
15 Because here, we have both 9-7/8 casing
16 and -- and seven-inch casing.
17 A. There are two fins that wipe the
18 9-7/8 casing, and the remainder are for the
19 seven-inch.

Page 239:18 to 240:19

00239:18 Q. Okay. You've been asked several
19 times about the purpose of the float
20 collar. And -- and am I correct that
21 the -- the basic purpose of the float
22 collar is -- is to hold back the mud and
23 cement once the float collar is closed?
24 A. Yes.
25 Q. Is the float collar effective in
00240:01 holding back, in addition to mud and
02 cement, hydrocarbons?
03 A. It would not be as effective.
04 Q. It would not be as effective.
05 And why is that?
06 A. Because the -- for instance, in
07 the case of testing, we put sand in the
08 mud. In -- in the case of this job, we
09 have cuttings coming --
10 Q. Uh-huh.
11 A. -- up the casing. So there is
12 always that possibility of when the -- the
13 flappers seat, that you don't get a perfect
14 seal.
15 Q. Okay. And -- and what you've

just laid out is -- is at least basic common knowledge within the drilling industry, I would assume, correct?
A. Yes.

Page 241:07 to 241:24

If, in fact, there were a perfect seal, flappers -- I mean, there was conversion and it was time for the flappers to go up and they're up, will they hold back hydrocarbons in that situation?
A. They may not.
Q. And is that because of the nature of the flappers or the nature of hydrocarbons or what?
A. I would say the nature of the -- the flappers and the hydrocarbons and that they have a low viscosity and can go places where drill mud and cement can't go.
Q. And is it for that reason that the -- that a float collar is not considered by Weatherford or by the API to be a failure?
A. Yes.

Page 242:15 to 244:23

Q. Does Weatherford have any indication that there are any defects in the shear pins used in this float collar?
A. No.
Q. Does Weatherford have any indication that there were any defects in -- in any parts of the float collar that -- that it provided --
A. No.
Q. -- for the Macondo well?
A. No.
Q. And does Weatherford have any information that there are any defects in the centralizers that it provided for the Macondo well?
A. No.
Q. Okay. Did you testify that another test that has been done showed that 165 pounds per square inch of pressure was needed to -- to raise or unseat or -- or move up the plugs?
A. Yes.
Q. Okay. And was that testing done by Weatherford or by -- or is that part of the Stress testing?
A. It was done by Weatherford.

Q. Okay. And why was that testing done?
A. To determine if the -- the plugs themselves could hold the pressure that was anticipated on the Macondo well.
Q. The -- the pressure that was what on the Macondo well?
A. That was anticipated.
Q. Anticipated. Okay.
And -- and, in fact, there was information that there was a -- a differential in the well at -- at 30 -- 38 pounds per square inch, correct?
A. Yes.
Q. And so since 38 is less than -- than 165, it's pretty plain that that differential could not have unseated the plugs, correct?
A. Well, there -- we did our test at ambient temperature, and there was a -- the temperature downhole was -- it could have been in the range of 200 degrees Farenheit.
Q. Uh-huh.
A. And that probably would make things a little more flexible, so it could be lower.
Q. Could be?
A. Lower at temperature than it is at ambient.
Q. As -- as lower as -- as 38?
A. I don't think it would be quite that low.

Page 245:11 to 245:16

Q. Since we know that the 38 pounds per square inch was -- was not adequate to unseat the plugs, isn't it the case that the flowback that was observed at the well was not an adequate basis for concluding that the float collar had converted?

Page 245:19 to 246:01

A. You said flowback. I guess you meant pressure --
Q. Yes.
A. -- is not adequate?
I -- I don't know what that pressure was, so it's -- it's hard for me to answer. If it was 38 psi, I would say, no, it probably would not move the plug.

Page 247:16 to 247:20

Q. Okay. Would it have been wise in Weatherford's view, under these circumstances, for BP simply to run down or set another bridge plug before starting to displace 3400 feet of mud?

Page 247:23 to 247:23

A. In retrospect, I would say that.

Page 248:01 to 248:12

Q. With respect to the -- the -- with respect to those O-rings that there was testimony about, is -- is it correct that the O-rings that Weatherford supplied for use -- to BP for use in the Macondo well were of the glue -- that the revised or modified version, that included the gluing of the O-rings?
A. Yes.
Q. So those O-rings supplied to BP for the Macondo well were glued?
A. Yes.

Page 248:24 to 249:10

Q. Okay. There was a problem with -- at one point in time, with the slip collars -- on slip-on kind of centralizers?
A. The stop collar.
Q. Stop collars.
A. Okay.
Q. Okay. There was a problem, right?
A. Yes.
Q. And it was studied and it was remedied, as you've testified, correct?
A. Yes.

Page 249:13 to 250:07

Q. Okay. And so the -- the stop collars that were shipped to the DEEPWATER HORIZON for use at the Macondo well included the new revised version of the stop collars, correct?
A. Yes.
Q. Okay. Does -- but -- but, in fact, the -- those additional 15 stop

collars, you've come to learn, were not used, correct?
A. That's what I understand.
Q. Or -- or the associated centralizers, correct?
A. Yes.
Q. Okay. Does Weatherford know whether or -- or not there was adequate centralization of this well through the use of six centralizers?
A. It -- it was a vertical well, but I -- I don't know.

Page 250:18 to 250:21

EXAMINATION
BY MR. JACKSON:
Q. Mr. Lirette, my name's Don Jackson. I'm -- I represent Dril-Quip. I

Page 251:08 to 253:13

Have you yourself done any work or analysis to try to come to an opinion or conclusion about what path the hydrocarbons took from the formation to the surface of this blowout?
A. Mostly, I've read the reports and -- and, you know, what I know, I guess, is based on what I've read.
Q. In addition to reading the reports, have you done anything else to analyze that subject?
A. Not that I can recall.
Q. Okay. Aside from the reports you've read, do you have an opinion as to the path of the -- of the hydrocarbons and the blowout?
A. I -- I really don't know where it came from.
Q. Or what path the hydrocarbons took. In other words -- excuse me -- I probably asked that poorly.
We know the hydrocarbons came from the formation --
A. Yes.
Q. -- right?
So my question really is about the path they took from the formation.
Is it fair to say that you don't have a personal opinion on that?
A. It does appear that it came up the casing through the casing. From what

point, I'm not sure.
Q. Okay. I think you have agreed with several of the -- of the lawyers who've asked you that according to the reports that you've read, it is certainly more likely than not, at least those reports concluded that it's more likely than not, that the flow path was through the shoe track, correct?
A. Yes.
Q. And was not through the annulus or through the annulus and then into the casing somehow, correct?
A. Yes.
Q. And you don't have an opinion, sitting here today, that that's incorrect, right?
A. That's right.
Q. What you have told me is that it appears to you that the flow path was through the casing, starting wherever it started and then proceeding up through the production casing, correct?
A. Yes.

Page 254:04 to 254:16

Q. Does Weatherford have a position, sitting here today, on what Weatherford believes was the flow path of the hydrocarbons in the Macondo well blowout?
A. As representing Weatherford and -- and nobody above me or whatever, but I would only say that it somehow came up the casing from whatever path it might be.
Q. Which is -- the opinion that you've expressed is also your own personal opinion, correct?
A. Yes.