Deposition Testimony of:

Greg Garrison

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Page 8:10 to 8:13

00008:10 BY MR. PETOSA:
11 Q. Please state your name for the
12 record.
13 A. Greg Garrison.

Page 11:11 to 16:25

00011:11 Q. Okay? What's your professional
12 address?
13 A. The address of the company?
14 Q. Yes.
15 A. It's 15730 Park Row, Suite 400.
16 Q. And you're a principal in a --
17 in a -- in a company, correct?
18 A. Yes.
19 Q. And what's that company?
20 A. It's Oilfield Testing &
21 Consulting.
22 Q. And can you briefly describe --
23 explain for us what -- what Oilfield Testing
24 & Consulting is, what they do?
25 A. We -- we are a third party or an
00012:01 independent cement testing facility. We --
02 we follow API procedures for the oil field
03 and oil well applications from shallow, cool,
04 to hot and deep wells.
05 Q. Okay. And where is your company
06 located at? Where is its headquarters?
07 A. Houston, Texas.
08 Q. And what's the address?
09 A. 15730 Park Row.
10 Q. Okay. And how long has Oilfield
11 Testing & Consulting been an operating
12 entity, been in business?
13 A. The company, the entity, was
14 started November 2010.
15 Q. Okay.
16 A. We've been open for business
17 April 1 of -- of this year.
18 Q. Okay. Why don't you give us the
19 benefit of your background, training, and
20 experience, leading up to starting Oilfield
21 Testing & Consulting from, I guess, when you
22 said it started by way of a corporation in
23 November and became operational this April.
24 Give us the benefit of your background,
25 training, and experience, up till the
00013:01 company.
02 A. How far back? Just the oil
03 field experience?
04 Q. I guess college, and then take
05 us through your professional experience from
06 there.

A. Okay. I received a -- a BS in chemistry from Missouri State University. I got my graduate degree in chemistry from Oklahoma State University. Spent a couple of years -- two years from 1993 to '95 in a pharmaceutical industry. At that point, I joined Schlumberger, which is an oil field service company.
Q. Okay.
A. Spent approximately ten years with them in multiple disciplines, fracturing, acidizing and cementing. Most of my time was spent in cementing, the last eight years with Schlumberger. From '04 to '07, I worked with an international group out of Libya. We supplied different -- different oil field services in that country. From '07 to about June of 2010, we had a cementing company in Mexico, a basic startup service company. We started from the ground up, which involved buying equipment, putting together a bulk plant and putting together our slurries and our technology.
Q. And then after June of 2010, you moved into beginning the process of -- of -- or planning for Oilfield Testing & Consulting?
A. Yes.
Q. Okay. And do you have any other principals in the company with you?
A. Yes.
Q. Who are your partners or other principals in the company?
A. Well, on paper, no, just a couple of financial guys that have, you know, put the money behind the company to get us started.
Q. Okay. And -- and as far as staff goes, how many employees work for Oilfield Testing & Consulting?
A. We have three full time, not including myself, and two part times.
Q. Okay. And it has a fully operational lab?
A. Yes.
Q. Okay. All the current certifications, calibrations, and things like that?
A. Yes.
Q. Okay. And it appears, sir, that you were hired at -- your company at least was hired at some point to do some testing on behalf of the joint investigation team with regard to the cement slurries from the Macondo well; is that correct?

A. Yes.
Q. Okay. And did your company actually perform that testing?
A. Yes.
Q. And did it receive certain slurries and certain additives regarding the -- the cement from the Macondo well or representative samples of that?
A. Yes.
Q. Okay. And is that information set out in your report?
A. Yes.
Q. Okay. And -- and actually, you did produce a report, sir, your company at
00016:01 least, dated August 1st of 2011. If you open up the binder in tab 1, we have the report. It starts at Bates stamp DJIT and it ends in 129. We do not have the full Bates stamped copy. I apology with some technical issues, but we have the first and last page of the Bates stamp, sir. So the last page of -- of your report ends in Bates stamp 245.
A. Okay.
Q. Is this report, sir, first page dated August 1 of 2011, directed to a Mrs. Silvia Murphy with the JIT, the joint investigation team? Is this the complete report relative to the cement testing and analysis that your company performed on behalf of the JIT?
A. Yes.
Q. Okay. We're going to go ahead and mark that as exhibit 5937. What I'm going to ask you today, sir, is go ahead and, if you would, put the sticker on the bottom, kind of right-hand corner about where the Bates stamp is.
(Exhibit Number 5937 marked.)
Q. Or a little further above so it

Page 17:06 to 20:15

00017:06 Q. Now, were you involved in -- in either the testing itself or supervising the testing that was performed?
A. Yes.
Q. Okay. And with respect to the testing, were there specific protocols, the testing protocols, that you followed?
A. Yes.
Q. And who provided those protocols to you for the tests?
A. The -- the JIT.
Q. And if on a given test you were going to perform if there was no specific

protocols within that test, was there any other guidelines that you followed when you performed those tests?
A. Yes. We followed API guidelines.
Q. Okay. And is that something that would be considered standard in the industry?
A. Yes.
Q. Okay. Sir, I'd like to talk to you about your report and specifically refer you to page 27, section 9, the compressive strength.
A. 27. Okay.
Q. Now, so I understand it, you received these materials through the JIT; is that correct?
A. (Moves head up and down.)
Q. And -- and other materials came from certain other parties, correct?
A. Yes.
Q. And that's set forth on the sample description on page 3. I apologize. If we can back up for me --
A. Sure.
Q. -- under section 1.
Now, with respect to the samples that you received, the materials that were received, are they all set forth on page 3 of your report under section 1, sample description?
A. Yes.
Q. Okay. Did you receive a representative sample, an actual sample, sir, of the Macondo cement slurry?
A. Yes.
Q. Okay. And is that something that you also had the opportunity to test in some capacity as you were going through the different tests and procedures?
A. Yes.
Q. Okay. Let's go back to section 9 on page 27, sir, the compressive strength test.
A. Okay.
Q. What is this test attempting to do? What is it supposed to show?
A. The basic test is to show you, at a given time, and -- and temperature when the cement actually sets.
Q. Okay. And your company performed this test on the different compositions of the slurry as set forth here on page 27?
A. Yes.

MR. HILL: Object to form.
Q. Sir, I'd like to refer you to page 30. It -- it indicates under all the different, I guess, slurry formulations here, a test pressure of 3,000 psi.
What does that mean?
A. That's the confining pressure.
Q. Okay. Why is that the pressure that was chosen by your company?
A. Because we -- in -- in this particular case, we weren't given any other guidelines, so we followed the API recommendations.
Q. Okay. So API says that when you're doing a UCA compressive strength test that the standard pressure that you're supposed to test at is at 3,000?

Page 20:19 to 20:21

A. Yes. If -- if no other pressure is given, the -- the standard pressure is -- is 3,000 psi.

Page 21:03 to 22:01

Q. Okay. So when you're doing the UCA compressive strength test, if you increased the test pressure, if you start out with the standard of 3,000 and you continue to increase the pressure to see the impact, what -- what effect can that pressure increase have on the test results?
A. It can -- it can affect your test results.
Q. In what way?
A. It can shorten the time to reach a -- a certain strength, multiple things.
Q. What other things?
A. I -- in -- in some cases, it's possible that -- exact cases, I don't know, but I guess without testing, it's really hard to say.
Q. Okay.
A. But --
Q. Sir, with respect to the different slurry formulations that you tested at the test pressure of 3,000 psi, was there any strength at 12 hours?
A. No.

Page 22:03 to 23:19

00022:03 Q. And what does that mean?
04 A. It just means that at that -- at
05 that temperature and pressure, at the 12-hour
06 mark, there was no strength, which basically
07 is telling you that the -- the slurry is
08 still in liquid form.
09 Q. Okay. Sir, I'd like to refer
10 you to page 34, section 11, the foam
11 stability test.
12 Now, in this test, sir, you
13 tested also a number of different
14 compositions of the cement slurry, correct?
15 A. Yes.
16 Q. Okay. And you also tested
17 something you have listed as MAC4.
18 What is that on page 35 in that
19 first box?
20 A. That -- MAC4 is a specific
21 formulation using the cement from the rig.
22 Q. Okay. So this test, the foam
23 stability test, not only did you -- not only
24 did your company test the different
25 compensations as they're -- as is set forth
00023:01 in this top box on page 35, you also actually
02 tested the cement samples that were provided
03 to you from the Macondo well?
04 A. Yes.
05 Q. Okay. Basically, the rig
06 samples themselves, correct, sir?
07 A. The -- the cement, specifically
08 the cement.
09 Q. Okay. Now, with respect to all
10 the tests, sir, that -- that you performed
11 for foam stability, I'd like to turn you to
12 page 38. You tested both the unset foam and
13 on page 39, the set foam, correct, sir?
14 A. Yes.
15 Q. Okay. And with respect to the
16 testing on page 38 of the unset foam, what --
17 what does it mean here, sir, where every
18 sample that you tested showed bubble
19 breakout? What does that mean?

Page 23:21 to 24:05

00023:21 Q. You can answer.
22 A. The -- the -- the bubble
23 breakout is -- is just saying that once
24 the -- the foam is generated, we're seeing
25 bubble breakout, which is an indication that
00024:01 the -- the foam slurry is not stable.
02 Q. Okay. And what about settling,
03 sir? It looks like some of the samples
04 evidence settling. What does that indicate
05 when you're doing the foam stability test?

Page 24:07 to 24:13

00024:07 A. Nothing specific about the foam
08 stability, but it just says something about
09 the stability of the slurry itself.
10 Q. Okay. And also, it looks like
11 a -- a couple of the samples that were tested
12 for foam stability showed free fluid.
13 What does that mean?

Page 24:16 to 25:01

00024:16 A. It's -- it kind of goes hand in
17 hand with -- with settling. When you see
18 some settling, you typically have some free
19 water that's generated as well.
20 Q. Okay. And, sir, would you agree
21 that at least for purposes of the testing
22 that you did on the unset foam slurry, you
23 would interpret the test of all of the
24 different compositions of the cement slurry,
25 including the Macondo well sample that you've
00025:01 described, as not being stable?

Page 25:03 to 26:14

00025:03 A. That's correct.
04 Q. Okay. And you also tested the
05 stability of the set foam, correct?
06 A. Yes.
07 Q. Why would you want to test both
08 the unset foam slurry and the set foam slurry
09 as a company that does cement testing? Why
10 would you do both?
11 A. It was directed by the -- the
12 JIT.
13 Q. Okay. Is that something
14 normally, though, that's done when you're
15 testing for stability of a foam slurry? Do
16 you normally, in -- in your experience in
17 testing cement slurries, want to do both an
18 unset foam slurry test and a set foam slurry
19 test?
20 A. If I run a test and I see that
21 the -- the foam is unstable in -- in its
22 liquid state, no, I wouldn't go ahead and run
23 the -- the set cement.
24 Q. Okay.
25 A. I would not.
00026:01 Q. And do you normally -- you do
02 the unset foam slurry test first, correct?
03 A. That's correct.

Q. So if -- if you do not have directives in this case to go ahead and do the set foam slurry, if you begin the test, sir, the unset foam slurry and saw evidence as indicated here on the different samples that you tested that there was bubble breakout, you would not move forward and do the set slurry, correct?
MR. HILL: Object to form.
Q. The test of the set slurry, excuse me.

Page 26:16 to 28:09

A. That's correct.
Q. And the reason is why?
A. At the -- in the -- in the first set of tests, I already have a good indication that the foams are not stable.
Q. Okay. But in this case, you had protocols that you followed. So you went ahead in -- in doing the tests that you were asked to do. And in this case, one of those tests was a set foam slurry, correct?
A. That's correct.
Q. And so you tested the set foam slurry of all the different compositions, correct?
A. Yes.
Q. Including the Macondo well sample that we've talked about, correct?
A. Yes.
Q. On page 39 in this box, was any of the samples stable? And that's a bad way to say it. My grammar teacher will probably not be happy with me.
Were any of the set foam cement slurries stable?
A. On all the samples, we saw a segregation from top to bottom.
Q. Okay. And what does that mean?
A. It means that the system is not stable.
Q. Okay. And what -- what did you observe with the Macondo sample, the MAC4? What did your company observe, excuse me, sir?
A. In the -- in the allotted amount of time, according to the -- the JIT protocol, we never saw a system that was actually set or had compressive strength.
Q. Okay. And did that have any impact on any other additional test you intended to perform on the MAC4 sample?
A. Not this particular test.

Q. Okay. How about any of the other tests that you were -- your company was planning to perform on the slurry?

Page 28:11 to 28:13

A. The -- the foam -- the foam stability test, we -- we ran foam stability test on the representative samples and --

Page 28:16 to 29:05

A. Okay. Just to try to explain, we -- we ran the foam stability test on the representative samples. We -- we relayed those results back to the JIT. And -- and based on those results, it was -- they gave us -- told us which tests to run on the foam stability test, according to the -- the protocol on the rig sample.
Q. Okay. Okay. So if -- am I clear, sir, in summarizing the foam stability testing of the different compositions of the cement slurries that your company tested, that none of the cement slurries by way of the different compositions indicated that the foam was stable?

Page 29:07 to 30:10

A. That's correct.
Q. Okay. Sir, I'd like to turn you to page 43, figure number 20. Can you explain to us what that shows?
A. On 43?
Q. Page 43, figure number 20.
A. Number 20. That is the -- that is MAC4. And what -- what that is, is after -- after 48 hours, the -- the samples were -- were trying to illustrate is that the samples weren't set. And there was no way that we could, you know, follow our procedures to measure the top, middle and -- and lower section of the cube to determine density.
Q. Okay. Sir, I'd like to turn you to tab number 2, which is a document entitled Macondo well cement blend analysis. It begins with Bates numbers DGIT [sic] and then 350.
A. Okay.
Q. And it ends in Bates number 370. Sir, can you tell us what -- what this test

is relative to -- to your company?
A. Oh, okay. This is just analytical testing that was done. We -- we had the -- the rig sample, the cement rig sample. We sampled that and sent it out to a company called Intertek to do the analysis.

Page 31:05 to 31:12

Q. And in layman's terms, if you can tell us, sir, what was the purpose of this test or the tests that were done by Intertek?
A. They wanted -- they wanted to just look at the -- the solid surface, XRD, and a -- and a few other things about the cement.

Page 32:08 to 33:14

Q. Sir, I'd like to turn you to tab 3, which is a document entitled Macondo well evaluation of 60 percent foam quality, foam stability testing, beginning in Bates DGIT [sic] 736 and ending in Bates 743.
A. Okay.
Q. Can you tell us what -- what this test was, what was its purpose?
A. We were directed to run a base slurry and try to foam the representative sample to generate a foam at 60 percent quality.
Q. Is that what you -- your company did when it did the original foam stability test? Were you trying to foam it to 60 percent?
A. No.
Q. Why? Why wouldn't you have done that in your normal foam stability test that we've already talked about?
A. It wasn't a directive from the JIT.
Q. Okay. Is -- is testing -- doing a foam stability test, when you attempt to foam, get the foam to a 60 percent foam quality, is that something that is normal within the industry?
MR. CHEN: Objection, form.
A. No, not normal.
Q. Okay. And that's not something you would consider standard within the industry?

Page 33:16 to 35:05

00033:16 A. No, I wouldn't.
17 Q. And is that something that API
18 sets forth, that you should -- when you're
19 doing a foam stability test, that you should
20 attempt to test the foam with a 60 percent
21 foam quality?
22 A. It's -- it's something that API
23 doesn't address.
24 Q. Okay. And why -- why is the
25 60 percent foam quality test for foam
00034:01 stability test not something that's standard
02 within the industry?
03 A. We -- we typically don't try to
04 foam anything at that -- you know, at that
05 quality in an atmospheric or laboratory
06 condition.
07 Q. Why?
08 A. Well, from experience, industry
09 experience, it's very difficult to get a foam
10 to be stable at 60 percent.
11 Q. Okay. And you went ahead,
12 though, your company went ahead and did this
13 test because you were directed to do so,
14 correct?
15 A. Yes.
16 Q. And what did the test reveal?
17 A. That the -- the 60 percent
18 quality was unstable.
19 Q. Okay. What you just told us,
20 basically, the reason you wouldn't do it at
21 60 percent is because it's very, very
22 difficult to get the foam to 60 percent foam
23 quality to end up being stable, correct?
24 A. Yes.
25 Q. Okay. Sir, I'd like to go ahead
00035:01 and have you mark this -- this document, the
02 Macondo well evaluation of 60 percent foam
03 quality, dated August 2nd, 2011, beginning
04 with Bates DGIT [sic] 736 as exhibit 5939.
05 (Exhibit Number 5939 marked).

Page 35:10 to 35:17

00035:10 Q. So in summary, sir, would you
11 agree that in all the samples that your
12 company tested that were provided to you and
13 the different slurries, the compositions of
14 the slurries that your company blended,
15 including this August 2nd 60 percent foam
16 quality test, you were unable to generate a
17 stable foam slurry, correct?

Page 35:19 to 35:19

00035:19 A. Correct.

Page 36:21 to 36:23

00036:21 In addition -- so I didn't get
22 it down clearly. What were the years you
23 worked at Schlumberger?

Page 36:25 to 42:01

00036:25 A. Oh, from early -- late '95, '96
00037:01 to 2004 of September.
02 Q. 2004. So nine years?
03 A. Yes.
04 Q. And of those nine years, I
05 believe you said eight years were in
06 cementing?
07 A. Yes.
08 Q. Okay. And did that also include
09 foam cementing?
10 A. Some.
11 Q. And were you -- I believe you
12 were located in Houston, right?
13 A. For half the time.
14 Q. Okay. And -- and did you
15 support a certain region at your time --
16 during your time at Schlumberger?
17 A. Many regions, yes.
18 Q. Did you support the Gulf --
19 operations in the Gulf of Mexico?
20 A. Yes.
21 Q. Okay. So you are familiar with
22 deepwater wells in the Gulf of Mexico?
23 A. Yes.
24 Q. And the cementing of those
25 wells?
00038:01 A. Yes.
02 Q. And then I believe you said you
03 took three years and you started up a cement
04 company in Mexico?
05 A. That's correct.
06 Q. And what was the name of that
07 company?
08 A. Premier Cementacioanes.
09 Q. And what -- who -- who were the
10 operators that that cement company serviced?
11 A. We worked for Weatherford as an
12 integrated service provider and we also
13 worked for the National Oil Company of
14 Mexico.
15 Q. All right. Did that involve
16 work in the Gulf of Mexico?

A. No.
Q. Okay. Did it involve work in deep water?
A. No.
Q. Okay. So all onshore?
A. That's correct.
Q. Okay. Now, do you also belong to any -- have membership in any of the engineering societies?
A. Yes. I've been a member of the Society of Petroleum Engineers, the American Petroleum Institute. More specifically, the SC 10, which is the subcommittee for oil well cementing.
Q. Okay. And have you -- are you also a member of ISO, any work groups in ISO?
A. Not currently.
Q. Okay. Were -- were you, in the past, a member of work group two in ISO?
A. Yes.
Q. And that also relates to cementing?
A. Yes.
Q. As a member of subcommittee 10 on well cements, are you a member of any task -- current task groups?
A. Yes.
Q. What task groups are you participating in?
A. The current one is foam cement.
Q. And what is the purpose of that task group?
A. The charge of that task group is to find and evaluate better ways to design and -- and evaluate foam cement in the laboratory setting, trying to do things -- the way we do it in the lab, we try to do it in the field. Or vice versa, if that makes sense, yeah.
Q. I think it does.
And is that -- why -- why are you trying to do that, to -- to reevaluate how to design and test foam cement in the lab?
A. So we can simulate, if you will, field conditions better in the laboratory.
Q. And is this a recognition that the current API 10B-4 -- if this work relates to API 10B-4, correct?
A. Correct.
Q. And is it work to revise the current draft of API 10B-4?
A. It could.
Q. To revise or supplement, maybe that's a better way to phrase it?

A. Yes. If we find ways to, you know, do things better.
Q. And if you know, is the purpose of this task -- and -- and you're on this task group because -- because you were -- you were invited and -- and you voluntarily -- I mean, no one forced you on this task group, right?
A. That's correct.
Q. And -- and so you were invited as someone knowledgeable in foam cement and you agreed to participate?
A. Yes.
Q. And why did you agree to participate?
A. I think it's a very important topic in our industry.
Q. Important topic because -- why -- why do you think it's an important topic?
A. I think it's always important to find better ways to do things. The way we've done things in the past or even present today are not necessarily the best -- the best way to do them. So I think that there's always room for improvement. And so that's why I jumped on board on this particular subcommittee.
Q. Do you feel that the current API 10B-4 requirements are sufficient?

Page 42:04 to 42:06

Q. And I'm just asking for your personal opinion. It doesn't have to be the company's opinion.

Page 42:08 to 42:16

A. Yeah, it's -- it's hard to say. I mean, are there better ways to do things, possibly. Currently, right now, for what we know and -- and how we do things, it's -- it's not a bad guideline.
Q. Have you made any suggestions in this task group as to how to improve the testing guidelines?
A. Not to date, no.

Page 43:01 to 43:11

Q. Yes, the foam task group.
A. No.

Q. Okay. And -- and to make -- to be clear, like, for example, you know Mr. Fred Sabins, right?
A. Yes.
Q. You know, so Fred is leading up a smaller group to investigate how to best simulate the energy imparted by the foam-generating nozzle within the laboratory. Are -- are you aware of that?

Page 43:13 to 43:13

00043:13 A. Yes.

Page 43:21 to 44:02

00043:21 Q. Okay. And how long have you known Mr. Sabins?
A. I think the first time I met Fred Sabins was 2001.
Q. And would you consider him very knowledgeable in cementing?
A. He's --

Page 44:04 to 44:05

00044:04 A. He's got a lot of background in -- in cementing, yes, he does.

Page 44:07 to 44:23

00044:07 Q. Has he ever chaired the sub -- subcommittee 10?
A. A committee?
Q. Subcommittee 10 within API.
A. A task group or chaired these, or -- or chaired subcommittee 10?
Q. The subcommittee itself.
A. No, not that I'm aware of.
Q. Okay. Has he ever chaired any task groups, to your knowledge?
A. Yes.
Q. And have you participated on any of the task groups that Mr. Sabins chaired?
A. Yes.
Q. And did you find him to be competent and knowledgeable on those task groups that you worked with him on?

Page 45:01 to 45:03

00045:01 A. Yes.

02 Q. Would you consider Mr. Sabins to
03 have a lot of knowledge about foam cementing?

Page 45:05 to 45:08

00045:05 A. He's -- he's been around a long
06 time and has dealt with foam. Directly to
07 say that whether he does or not, I can't
08 answer. I don't know.

Page 45:21 to 47:05

00045:21 Q. So, Mr. Garrison, who would you
22 consider -- I mean, besides yourself, you
23 know, who are the top three people you would
24 name as knowledgeable in foam cementing,
25 then?
00046:01 A. Well, there -- there's several.
02 The top three, that's tough. Several guys on
03 API subcommittee 10 have had a lot of
04 experience with foam cement, more so than I
05 have.
06 Jerry Calvert has done a lot
07 with foam cement. Dave Stiles has done a
08 lot. Dan Mueller. Glen Benge is another
09 one, a lot of experience with foam cement.
10 Other guys that -- at the time,
11 Halliburton folks, Ronnie Falls had quite a
12 bit of experience. Ron Crook. And, again,
13 there may be other guys in the industry that
14 -- that I haven't been around. I mean, my
15 experience with other service companies to
16 date has really been with API and the folks
17 that have been involved with that
18 organization.
19 Q. Okay. And is it your testimony
20 that you wouldn't put Fred in this group of
21 folks that you just named?
22 A. Well, I've never worked with
23 Fred, or known of anything that he's done
24 with foam. I know there's been some papers,
25 but I have -- I've not read his papers. I --
00047:01 that part of it, I can't say how much
02 experience he's got with foam cement.
03 Q. Okay. So you're just not that
04 familiar with Fred's work with foam cement?
05 A. No, I'm not.

Page 47:08 to 48:06

00047:08 Now, is one of the things that
09 the API subcommittee, or task group that you
10 belong on, considering right now whether or

not to require a test at sort of foam -- foam generation conditions? Is that one thing that the API task group is considering?
A. Yes.
Q. And why are they considering that?
A. The big thing is, and the big discrepancy that we currently have in the industry, is that in laboratory settings, we're generating foams at atmospheric conditions. On jobs, you know, whether it's offshore or land, the foams are generated under pressure. So we want to try to simulate field conditions as close to possible as we can in the laboratory.
Q. Uh-huh. Is there also a concern that the current API standards cover testing of foam cement at placement conditions and foam quality and do not currently address testing at foam generation conditions and foam quality?

Page 48:08 to 48:11

A. That's -- that's correct.
Q. And I believe you said it earlier, that it's difficult to generate foam at 60 percent foam quality, correct?

Page 48:13 to 49:04

A. At atmospheric conditions, yes.
Q. Okay. So -- and I just want to understand this better.
Are you saying that if you were generating 60 percent foam quality at a thousand psi, it would be easier?
A. I can't -- I can't answer that question. But, you know, based on models and things that have been done in the past, we assume that, yes, under pressure you can do more things and stability changes under pressure.
Q. Okay. So stability increases under pressure; is that the suggestion?
A. That's the suggestion, yes.
Q. And do you personally agree with that?

Page 49:06 to 50:02

A. Just looking at foam itself and how foam is generated, you know, under

pressure, the one thing I can say is, I believe that foam bubbles are more uniform under pressure, which would lead to a more stable slurry, in my opinion.
Q. And can you explain the science behind that, why -- why foam -- why you believe foam is more stable under pressure? And we're talking apples and apples here, a 60 percent foam at atmospheric and a 60 percent foam under a thousand psi.
A. Just from the aspect of bubble size, you know, and how the bubbles work together, you know, in a matrix. I mean, that's -- any more detail -- but that's -- that's the -- that's my idea or my thinking behind, you know, foam under pressure.
Q. And is that related more to the -- the mechanism of generating the foam, the bubble size, or is it more related to the pressures?

Page 50:05 to 50:25

A. Some will argue both ways. I think it's probably a combination of both.
Q. I want to talk about the testing that OTC conducted at 60 percent foam quality.
Now, you were present for that testing, correct?
A. Yes.
Q. And Mr. Sabins was there?
A. Yes.
Q. And Dr. Beruite was there?
A. Yes.
Q. Did you know Dr. Beruite previously?
A. Yes.
Q. Okay. And is he considered an expert in cement?
A. Yes.
Q. Now, what was the purpose of the 60 percent foam quality testing, as far as you understood?

Page 51:06 to 51:08

A. Yes. It was my understanding that 60 quality foam represented the foam quality of the slurry at surface.

Page 51:13 to 51:18

00051:13 Q. Let me withdraw that.
14 Did you understand that
15 60 quality foam was what quality the foam had
16 to be when formed on the DEEPWATER HORIZON in
17 order to get the target density at the bottom
18 of the well?

Page 51:22 to 51:22

00051:22 A. Yes.

Page 52:08 to 52:12

00052:08 Q. If the foam doesn't -- if you
09 can't generate a foam at the top, at the
10 injection, at the nitrogen injection point,
11 will the -- will a foam form as the cement is
12 going down the hole?

Page 52:15 to 52:17

00052:15 A. Some believe it will, and
16 there's some people who believe it won't.
17 Q. And where do you fall?

Page 52:19 to 53:01

00052:19 A. In my opinion -- I don't know.
20 I can't really answer the question because
21 I've never seen a foam generated under
22 pressure.
23 Q. Okay. Now, when -- when you
24 generate foam on the -- when you generate
25 foam, it's done with the nozzle at high
00053:01 pressure, correct, very high pressure?

Page 53:03 to 53:20

00053:03 A. On --
04 Q. On the jobsite.
05 A. On the jobsite. High pressure?
06 Q. Well, the nitrogen is usually at
07 a high pressure --
08 A. Yeah.
09 Q. -- thousands of psi, and it is
10 injected into the foam.
11 A. Yeah. I mean --
12 Q. I'm sorry. Injected into the
13 cement to create the foam.
14 A. Yeah. The pressure's going to
15 vary based on flow rates of the liquid and
16 flow rates of the nitrogen, yes.

Q. And the -- the foam is generated due to the shear stresses that are placed on the cement as -- as the nitrogen's injected in.

Page 53:23 to 54:09

A. Yes. That's the idea of -- of the foam.
Q. And similarly, in the laboratory, you create those shear stresses, which have a certain magnitude, by putting the cement in a blender with air to generate those shear stresses to create a foam, correct?
A. Correct.
Q. So you believe that just being pumped down the casing can generate those type of shear stresses?

Page 54:13 to 54:21

A. My -- my contention is, I don't know the condition of the slurry once it goes through a foam cross or the nozzles, you know, however -- every service company has a different way to generate a foam. So, you know, at that point in time under pressure, if you can entrain air into a slurry under pressure will it be stable downhole, I don't know.

Page 55:09 to 55:12

Q. Can we take the nozzle out altogether and just pump air and cement down the hole and hope that it's going to mix and become foam?

Page 55:15 to 55:23

A. I think that's been tried, but, no, it does not generate a foam.
Q. Right. There's insufficient shear stresses just by being pumped downhole, right?
A. Correct.
Q. So isn't it important to investigate whether a foam is actually generated at the top?

Page 56:01 to 56:02

00056:01 Q. Isn't that what API -- the API
02 task group is debating?

Page 56:04 to 56:09

00056:04 A. Trying to -- trying to find a --
05 a method or a means to generate a foam under
06 pressure in the laboratory that closely
07 resembles, you know, what we do on a cement
08 job on surface, that's our objection [sic],
09 that's what we're trying to do.

Page 56:13 to 56:18

00056:13 Assuming that you're not part of
14 that portion, you agree that a portion of
15 that task group is advocating that somehow
16 cement companies and -- and independent labs
17 need to figure out a way to -- to simulate
18 that and evaluate it?

Page 56:21 to 56:25

00056:21 A. Yes. So we can -- you know,
22 the -- the objective has always been, in
23 cement testing, to find better ways to
24 simulate field conditions, and this is no
25 different.

Page 58:01 to 58:03

00058:01 Q. Is there any consideration in
02 your current task group of considering the
03 stability of the foam at the quality up top?

Page 58:06 to 58:13

00058:06 Q. And I thought the answer earlier
07 was yes, and I'm just asking to make sure.
08 A. Yes. That's -- I think that's
09 the -- the other side group. That's one of
10 the things that they're working on, yes.
11 Q. And is -- are the people who are
12 advocating that position also a knowledgeable
13 subgroup of your task group?

Page 58:16 to 58:16

00058:16 A. Yes.

Page 58:23 to 59:03

00058:23 Q. Right. But -- and I -- I
24 apologize for belaboring this, but I just
25 want to get -- get clear to -- to myself that
00059:01 there is a group of knowledgeable individuals
02 on your API subcommittee that believe this
03 needs to be investigated and is important.

Page 59:06 to 59:10

00059:06 A. Yes.
07 Q. Now, what happened -- I want to
08 walk through what happened when you did test,
09 when you tried to evaluate Halliburton's
10 slurry at 60 quality.

Page 59:12 to 59:16

00059:12 Q. Now, what is the procedure
13 blending up a cement slurry? Now, you've
14 prepared the cement slurry.
15 What do you do next to create
16 the foam in the lab?

Page 59:18 to 60:09

00059:18 A. Okay. So based on the volume of
19 the -- of the blender cup and the foam
20 quality that you want, you add the required
21 amount of liquid slurry, and from there
22 you -- you basically put your cap on and you
23 try to generate the foam.
24 Q. And you generate the foam using
25 a blender, correct?
00060:01 A. Correct.
02 Q. And API tells you to blend for
03 no more than 15 seconds to generate the foam?
04 A. Correct.
05 Q. And why does API recommend
06 15 seconds?
07 A. It's a -- it's a guideline that
08 they came up with when this recommendation
09 was developed.

Page 60:21 to 61:18

00060:21 Q. Okay. Fair enough.
22 Now -- so can we continue
23 walking through. You've -- you've got your
24 slurry. You've measured the correct amount
25 into your blender, leaving the rest open with
00061:01 air, filled with air, and you've capped it.

A. Yes.
Q. Now you blend it for the API recommended 15 seconds, correct?
A. Correct.
Q. And what do you see?
A. Well, first of all, you -- you typically hear a change in pitch on the blender itself when -- when a foam is generated. After the 15 seconds -- there's two caps. There's a top cap and then there's a pressure relief cap. So you crack the pressure relief cap and then you open your big cap.
Q. All right. And so you mentioned that there's a change in sound.
Did you hear the change in sound when blending this specific mixture?

Page 61:20 to 63:25

A. No, we did not.
Q. And what does the change in sound represent?
A. Well, the change in pitch usually represents, you know, a cup or a volume -- a volume change and a composition change inside the cup.
Q. So when it goes from cement and air to a foam, you hear a change in pitch?
A. Yes.
Q. And after relieving the pressure and taking off the cap, what did you see?
A. We saw, you know, the liquid with some -- with some bubbles, you know, in -- in the liquid. But we never saw a -- a foam.
Q. Okay. If you still have that report in front of you, I believe it was tab -- I'll just use the same one as the plaintiffs. It's tab 2 in our binder.
MR. HILL: 5939.
MR. CHEN: It's tab 2, 5935.
Thank you, Gavin.
Q. If you could flip to page 8, there's a picture there.
A. Correct.
Q. And it's labeled, depiction lack of foam after mixing, correct?
A. Correct.
Q. And was that what you saw after blending 15 seconds?
A. Yes.
Q. Or, actually, we can flip to the previous page, and it actually, I believe, says, you then put the cap on again and tried

to foam it another 45 seconds, correct?
A. Correct.
Q. So -- and then did you hear the change in pitch when you blended it another 45 seconds?
A. No.
Q. And after blending it 45 more seconds, did you relieve -- you know, use the little cap to relieve pressure and then remove the larger cap from -- from the blender?
A. Yes.
Q. And does figure 1 depict what you saw inside the blender?
A. Yes.
Q. Does figure 1 depict a -- a foam?
A. No.
Q. So would you call -- I mean, would you characterize this as an unstable foam slurry?

Page 64:02 to 64:13

A. Yes.
Q. Now, the additional 45 seconds, you've now blended the slurry for a total of a minute?
A. Yes.
Q. And that imparts, basically, four times the energy that API recommends for using to blend a slurry?
A. Yes.
Q. So you've given this slurry all of the opportunity in the world, really, to -- to foam, if it can?

Page 64:15 to 65:10

A. Yes.
Q. I mean, what other steps could you have taken to try to make it foam at 60 percent?
A. In this environment, none that I'm aware of.
Q. And then it states at the last paragraph of page 7, due to foam -- due to lack of foam quality, the slurry was checked for density in a container with a known volume. The density was measured at 11.3 pounds per gallon, which equated to approximately 30 percent foam quality.
Did I read that correctly?
A. Yes.

Q. And was that what you observed?
A. This, yes.
Q. And what does it tell you when you are trying to form a 60 percent by quality -- by volume foam and you get a 30 percent foam quality?

Page 65:12 to 65:17

A. This particular measurement just shows that the -- the liquid has, you know, 30 percent gas entrained.
Q. Okay. Now, this -- and it also tells you it doesn't form a 60 percent foam, quality foam.

Page 65:19 to 66:05

A. Yes. In this case, yes.
Q. Now, if Oilfield Testing & Consulting -- and if I say OTC, you know what I'm talking about, right, your company, OTC?
A. Yes.
Q. Now, if OTC were evaluating a job for an operator and it saw that -- and it knew that the foam was going to be generated at 60 percent on the rig, and it ran this test, would it recommend to the operator that it could proceed at the cement contractor's recommendation?

Page 66:08 to 66:21

A. Tough question. I've not been put in that situation. Obviously, if you ran a test and it was unstable, you would tell your client, or I would tell our customer, but --
Q. So -- so let's take it in small steps.
First, you would tell your customer about the test results, right?
A. Yes.
Q. And any time there are unstable test results, that's something that the service company or the cement lab should tell the customer about?

Page 66:23 to 67:22

A. Yes.
Q. So the customer can, you know, discuss the issue and -- and see whether it's

important or the ramifications of this risk.
A. Yes.
And it also depends on what stage you're testing. Are you talking about pilot testing, field blend testing, design testing? Under -- under design circumstances, you know, maybe the -- you're not going to go report that this first test that I ran failed. You're going to try to redesign and make it work before you report the results to the customer. Again, that depends on what stage of the testing that I'm running.
Q. Okay. So -- and so you named design, pilot and field testing.
Now, the order in which that testing occurs generally is design testing first, right?
A. Yes.
Q. And that's when you are still changing the constituents of the cement slurry to design the cement slurry?

Page 67:24 to 70:05

A. Yes.
Q. As far as you understand?
A. Yes. You're trying to optimize your slurry to meet the requirements of -- that are set forth by, you know, the client.
Q. And then pilot testing comes next?
A. Yes.
Q. And what is pilot testing? How is it different from design testing?
A. From, you know, my days at Schlumberger, pilot testing was trying to use the current additives and cement that are, you know, at the facility where the job's going to be called out.
Q. So to be clear, is that -- is that rig samples or is it lab stock?
A. Okay. So design is, a lot of times, lab stock, or may not be the current things that are at the location or district.
Then the pilot is, you're trying to get samples or representative samples from the district that -- that could potentially go out on the job.
Q. Okay. I think I understand. So the design could actually be run with -- well, maybe I don't understand.
A. Well --
Q. So -- maybe the pilot would be from the lab that would be servicing that rig

or that job?
A. That's correct.
Q. And design could be in another lab with cement, possibly of the same type, but from a different foundry or different plant?
A. Yes.
Q. Okay. So -- but the pilot is also run with lab stock, but just lab stock from the area would be servicing that job?
A. Correct.
Q. And then the field test, how is that -- how is that different from the pilot test?
A. Well, you -- you're trying to use the same additives and things from the pilot that you would -- hopefully, you're going to use for the actual job. Sometimes it works and sometimes it doesn't. Lot numbers can change and -- and things of that nature.
Q. Okay.
A. But the -- the field blend test is a representative sample of the material going to the jobsite.
Q. Okay. Does it necessarily have to be a sample from the jobsite?

Page 70:07 to 70:18

A. Well, in my opinion, you -- you want something from a sample that's going to the job. If you're going to run a field blend test, I mean, that's pretty much what that means, I want to test what's going to the job and what's going to go downhole.
Q. Fair enough. But my question is, there's been some charge that the transportation and moving of cement out to the rig and storing of cement in the bins can drastically change the properties of the cement.

Page 70:20 to 70:24

Q. Now, would you just want the same lot that's sent out to the rig, or do you necessarily need to send a helicopter to the rig to get a sample, bring it back and test it?

Page 71:03 to 71:05

00071:03 A. If -- if I'm doing the job, is
04 that what you're asking me?
05 Q. Yeah, if you're doing the job.

Page 71:07 to 71:14

00071:07 A. A place where I can get a
08 sample, a flowing sample, you know, moving
09 from one spot to another, if I can get a
10 sample of that, I would be content, if that's
11 the stuff that's going to the rig.
12 Q. Okay. So if it's of the same
13 lot that's on the rig, that's a good sample
14 for you?

Page 71:17 to 71:18

00071:17 Q. Well, it gives you good
18 information about what's on the rig?

Page 71:22 to 72:06

00071:22 A. If I have -- if I have a
23 representative sample of what's on the rig --
24 of what's on the rig, I feel comfortable with
25 that.
00072:01 Q. Okay. Now, are -- now, taking a
02 step back at the pilot, pilot testing, you're
03 using lab stock.
04 Now, in your opinion, is lab
05 stock representative of what you have on the
06 rig if it's the exact same mixture?

Page 72:09 to 72:15

00072:09 A. Exact same mixture?
10 Q. It's the exact same slurry
11 design, but you're pulling it from lab stock.
12 Does that give you information
13 of how the cement would behave if you're
14 mixing it on the rig even if it's from a
15 different lot?

Page 72:18 to 73:10

00072:18 A. If it's different lots, it will
19 give you some indication on how it's going to
20 perform.
21 Q. Right. It may not be exactly
22 the same, but it'll give you information
23 about how it will perform?
24 A. Correct.

Q. So, for example, when you are testing here, and I'm talking about -- pointing to the 60 percent foam quality test, you were not testing rig samples?
A. That's correct.
Q. You were testing lab stock?
A. That's correct.
Q. Now, do you think this lab stock gives you information as how to -- as to how the rig samples would have performed had you tested them at 60 percent foam quality?

Page 73:12 to 73:22

A. It gives you some indication.
Q. Now, we were talking about communicating with the -- the customer if there were -- if there were -- if there was problems with stability.
Now -- and you mentioned, I believe, that if it were in the design phase, maybe that's something you wouldn't communicate to the customer because you're still tweaking the slurry composition, correct?

Page 73:24 to 73:24

A. Correct.

Page 74:01 to 74:05

Q. Now, let's say you're at the pilot stage and now you are -- now you have your slurry composition. Because usually at the pilot stage, the slurry composition is now set, correct?

Page 74:07 to 74:14

A. No, not -- not set.
Q. Oh, it's not set?
A. Concentration-wise or additive-wise? I mean --
Q. Additive-wise. I mean, I understand that concentration still can be tweaked in response to the lab results.
A. Typically --

Page 74:16 to 75:06

A. -- the additives are set.

Q. Okay. And that's the purpose of the pilot test, right? Now you have your slurry design, the ingredients, and now you need to optimize it for the job?
MR. HILL: Object to form.
A. Correct.
Q. Now, if you have pilot tests that show you have foam instability, is that something that needs to be raised with the customer?
A. Only if -- if I can't make a change and generate a stable foam.
Q. And when you mean make a change, sir, are you saying add more foamer, for example, to -- to create a stable foam?

Page 75:08 to 76:06

A. It depends on what I see.
Q. Okay. So -- but, what other possibility? I mean, you could add or sub -- you could change the concentrations of the slurry ingredients. That's one possibility, correct?
A. Yes.
Q. And what else could you do to run another successful test?
A. You're saying change the -- change the concentrations of the ingredients I have?
Q. Right. What else is there to do?
A. Well, for that particular slurry --
Q. Right.
A. -- there's nothing else that you can do.
Q. Okay. Would you consider -- would you consider changing the conditioning time one of the variables that you could play with to get a stable -- get an unstable slurry result into a stable slurry result?

Page 76:10 to 76:11

A. Not typically, no.
Q. Okay. And why not?

Page 76:13 to 76:21

Q. Why wouldn't you do that?
A. I -- well, depending on what you see. There's other things I can change

concentrations of. Maybe the -- the slurry is -- is settling, which can cause foam instability. Maybe I need more surfactant. Maybe I need less. There's different things that I can change, or ratios that I would try first.

Page 77:16 to 77:19

00077:16 Q. Have you ever done that before in your experience, your ten years or so working with foam cement?
A. No, I have not.

Page 79:04 to 79:20

00079:04 Q. Now, have you published any papers previously on foam cementing?
A. On foam cementing, no.
Q. Okay. And on the general topic of cementing, have you published any papers --
A. I've --
Q. -- or articles?
A. I've been part of some publications.
Q. About how many? Can you estimate?
A. Let's see. Not that many with Schlumberger. Internal, maybe half a dozen.
Q. Okay. In publications such as Oilfield Review, correct?
A. Yes.

Page 79:23 to 80:25

00079:23 Q. And is there anything else that you've done in -- in your experience or training that we haven't covered that you
00080:01 believe gives you expertise in -- in foam cementing?
A. I wouldn't -- I wouldn't define myself as a foam cement expert. And when you say, you know, an expert, it's not so much design as it is design and application. I've been part of, you know, all sides, but I don't have the -- the background that a lot of folks do in foam.
Q. Okay. Well, I want to break it apart. I mean, I want to talk first -- I guess right now I'm talking about, do you have expertise in sort of the design and testing of the foam cement, setting aside the

actual operation of -- of getting it down in -- in place?
A. Yes. I -- I have. And -- but I will say that foam cementing is -- is one of the -- if you look at all the testing that I've ever been a part of, the smallest concentration has been foam cement.
Q. Okay. Fair enough. And is that because Schlumberger has its own proprietary lightweight cements that are not foam?
A. That's part of it, yes.

Page 81:10 to 81:11

Now, how do cement companies compete for business?

Page 81:13 to 82:20

Q. The -- I mean, Mr. Garrison, you've started one up --
A. Right.
Q. -- and tried to run it and get -- get customers before, right?
A. Well, first and foremost, it's always been price driven. And then technology is -- is another piece of that.
Q. And technology is what we were talking about, like Schlumberger has its proprietary blends of --
A. Yeah.
Q. -- certain cements and Halliburton has its proprietary blends, and BJ --
A. Correct.
Q. -- has its blend?
A. That's correct.
Q. And research and development and technology in the -- in the cements?
A. Yes.
Q. And do the cement companies generally have -- and I'm talking about for the larger cement companies like Schlumberger. When you worked there, did they have -- are their -- are their special products proprietary to them?
A. Yes.
Q. And -- and by proprietary, that means the properties and characteristics of that cement are not -- not well-known to the industry, but it's well-known within the company?

Page 82:22 to 83:23

00082:22 A. Yes.
23 Q. And, you know, obviously the --
24 in addition to sort of proprietary cement,
25 there's also proprietary additives that each
00083:01 company markets with its fancy trade name?
02 A. Yes.
03 Q. And you would expect that those
04 are proprietary also, meaning people outside
05 the company don't have a lot of experience
06 with -- with how those additives work?
07 A. That's correct.
08 Q. But people within the company,
09 you know, one selling point is the -- is the
10 proprietary cements and additives themselves,
11 correct?
12 A. Yes.
13 Q. And one selling point of the --
14 of the company is also its expertise with its
15 cements and additives?
16 A. Yes.
17 Q. And would you agree with me that
18 in addition to what you've named, one
19 thing -- one way in which cement contractors
20 compete -- service companies compete for
21 business is by their technology and their
22 expertise in what they do, cementing?
23 A. Yes.

Page 84:06 to 86:10

00084:06 Q. There's really two parts to a
07 cement job. Bear with me. One is sort of
08 the design and the testing of the cement
09 slurry, one is the -- and the cement
10 program -- and one is the execution of the
11 program?
12 A. Correct.
13 Q. Or -- I mean, or do -- do you
14 sort of think of it in more pieces? And
15 we'll go with how -- how you like to think
16 about it.
17 A. Well, only because of my
18 background, but, you know, the -- the one --
19 the one way we've always looked at it or have
20 been focused on looking at it is design,
21 execution and then evaluation. I think -- I
22 think all service companies have that
23 mindset.
24 Now, they may use different
25 terminologies, but I think those are the
00085:01 three things that are up front and foremost.
02 Q. Okay. And what are the
03 different pieces of design, generally?

A. Slurry design, you also using software to, you know, design the job and how you're going to place it. And design can also be logistics, what equipment needs to go out, what people need to go out. That can slide over into execution as well.
Q. And is testing part of the design, the slurry design?
A. Yes.
Q. And what are the general pieces that are operations you consider as part of execution?
A. You know, the -- the people, the equipment. And then --
Q. And the actual execution of the job?
A. Yes. And, you know -- and also execution includes, you know, moving materials from a warehouse or a bulk plant to the job site.
Q. Okay. And pumping the cement slurry and --
A. Mixing and pumping, yes.
Q. -- and placing it in the right place, right?
A. Correct.
Q. And what about evaluation, what parts do you believe constitute evaluation?
A. You know, logging the cement job, you know, other -- other things can include pressure testing. It depends -- it depends on the operator and the --

Page 86:13 to 87:01

A. It depends on the -- the operator and -- and their guidelines and what they do.
Q. Okay. Now, we were talking about the -- the slurry and, you know, each of the companies, they sell their own company slurry and their company additives. And -- and part of what they sell also is their expertise with their products, right?
A. Correct.
Q. And would you expect that the customer should know as much about the -- the cementing contractor's products as the cementing contractor itself?

Page 87:03 to 87:13

A. Not necessarily, no.
Q. Right. Because these are

proprietary blends and additives. How could the customer know as much?
A. Typically, it's not the case.
Q. Right. And that's why you hired the cement company, because they have these products but they also have this expertise with the products to use them and design them properly, design your job properly?
A. Yes.

Page 88:03 to 88:13

Q. Now, the service company is sort of the expert in its own products and how to design those products and how they work together to -- to make a good cement slurry, right?
A. Yes.
Q. And that was true in your experience at Schlumberger?
A. Yes.
Q. And that was true in your experience at the startup company in Mexico?

Page 88:15 to 88:20

A. Yes.
Q. And because the cementing contractor is the expert in its own products and how those products interact with each other, the customer relies on the cement company to -- to know how its products work?

Page 88:23 to 89:20

A. Yes.
Q. And it relies on the cement company to know how to mix those products together to make a good cement?
A. Yes.
Q. And now I want to move on to modeling programs. And I think you said that part of the design was having software to design the job, right?
A. Yes.
Q. And a lot of cement companies also have their own proprietary software to evaluate the job?
A. Yes.
Q. For example, Schlumberger has software called CemCADE, I'm sure you're very familiar with?
A. Yes.

Q. And Halliburton has software called OptiCem?
A. Yes.
Q. I believe they're replacing it now with something called the iChem, but --

Page 89:22 to 90:03

Q. -- previously they used some software called OptiCem, right, to your knowledge?
A. Yes.
Q. Now, is that software made publicly available to everyone, or is it proprietary to the service company?

Page 90:05 to 90:09

A. You -- you can purchase the software.
Q. You can purchase -- is it the full version of the software that the service company is using?

Page 90:11 to 91:01

A. My understanding, no, it's not the -- the full version.
Q. So the service company still has a version that's proprietary to it that it uses to design jobs?
A. Yes.
Q. And that's one of the competitive advantages of each service company that has proprietary software that it uses?
A. Yes.
Q. And because it's proprietary, you would -- like the -- the cement products, you would expect the service company to be an expert in using it, but not so much the customers that don't have it?

Page 91:03 to 92:08

A. Most people would expect the -- the service companies using the software to be the -- the expert.
Q. To be an expert in its own software?
A. A lot -- a lot -- a lot of people who use the software may not be so-called experts, but they have knowledge on

how to use the software --
Q. Right.
A. -- and -- and to understand what it tells them.
Q. Right. Fair enough.
But compared to the customer, you would expect the service company, as part of its package of services, to also have -- you know, we have a proprietary software that we're going to use to assist you on the job, correct?
A. Correct.
Q. And another selling point is we have people, maybe not everyone, but we have some people who are very expert at using this software who will assist you on your job?
A. Correct.
Q. So another selling point for cement companies is that they have personnel who -- who can run the company's proprietary software to help design the -- the cement program?
A. Yes.

Page 92:14 to 92:17

Q. Is that something that customers rely on cement companies to do, which is run their proprietary software to design the cement program?

Page 92:20 to 92:22

A. To design the placement of --
Q. Right. The cement program to place the cement in the right place?

Page 92:25 to 93:11

A. Yes.
Q. And one purpose of the cementing program is to -- is to make sure that you have -- you're able to get the cement in the right place, the target destination?
A. Yes.
Q. And part of the design of the cement program is to make sure you have enough circulation, enough spacer and other pieces in the cement program in order to get your cement to the area that -- that you want?

Page 93:13 to 93:13

00093:13 A. Yes.

Page 93:25 to 94:17

00093:25 Q. You wouldn't expect
00094:01 Schlumberger's service guys to just on the
02 back of a napkin sketch out how to do the
03 cement program and pump that job without any
04 modeling?
05 A. In today's environment, no.
06 Q. Right. You would expect that
07 they would use CemCADE or -- or other
08 Schlumberger proprietary software and model
09 that job to see how it turns out before
10 advising the company to go forward?
11 A. That was a -- a practice, a
12 common practice, yes.
13 Q. And the -- and the -- and
14 customer, because it doesn't have the
15 software or the expertise, would have to rely
16 on the cement company's expertise to design
17 that cement program?

Page 94:20 to 95:13

00094:20 A. Typically, yes.
21 Q. Now, at Schlumberger or the
22 startup cement company, did you have a chance
23 to work with operators?
24 A. Yes.
25 Q. And did you ever work with BP?
00095:01 A. On -- on a few occasions, yes.
02 Q. Okay. And would you agree with
03 me that cementing is sort of a specialized
04 field? I mean, you have people called cement
05 engineers --
06 A. Yes.
07 Q. -- who -- who are trained and
08 have knowledge and years of experience with
09 cement?
10 A. Yes.
11 Q. And at the operator, for
12 example, at BP, do they have cement engineers
13 working on every well?

Page 95:15 to 95:17

00095:15 A. Yes. They have engineers, yeah.
16 Q. I'm -- I'm sorry. Do they have
17 cement engineers assigned to every well?

Page 95:19 to 96:05

00095:19 A. Not that I'm aware of. If
20 you're saying specifically an engineer for
21 cementing only, no, I'm not aware of that,
22 no.
23 Q. Instead, they have -- I mean,
24 generally, their engineers are drilling
25 engineers, right?
00096:01 A. Correct.
02 Q. And do you expect a drilling
03 engineer with ten years of experience to have
04 the same amount of cement expertise as a
05 cement engineer with ten years of experience?

Page 96:07 to 96:15

00096:07 A. No. I wouldn't suspect so, no.
08 Q. Because it's a different field?
09 A. Yeah.
10 Q. A different specialty?
11 A. Yes.
12 Q. And that's why operators like BP
13 hire cementing contractors, for their
14 expertise?
15 A. Yes.

Page 96:17 to 97:18

00096:17 Q. And when you, at Schlumberger,
18 worked with BP, do you know if Schlumberger
19 had a -- had a Schlumberger cement engineer
20 placed in-house at BP?
21 A. Yes.
22 Q. And was that -- was that
23 Schlumberger employee, or engineer, the --
24 what was the purpose of having a Schlumberger
25 cement engineer at BP?
00097:01 A. At the time, the engineer had
02 multiple hats. He was doing stimulation and
03 cementing in some cases. Bigger customers,
04 you had maybe a stimulation engineer and a --
05 and a cementing engineer. But the whole
06 purpose was to assist them with job design,
07 coordinating information to and from the --
08 Schlumberger to the client.
09 Q. And also to answer questions
10 related to Schlumberger's products and
11 cement?
12 A. Yes.
13 Q. And based on your experience,
14 would you -- would you think that BP, you
15 know, the BP wells team and drilling
16 engineers, would rely on that Schlumberger
17 engineer for the jobs that Schlumberger was

doing?

Page 97:20 to 102:01

A. Yes.
Q. Now, what test does OTC typically conduct when a customer comes in and says, I have this foam cement, can you check it and see if it's okay?
A. Well, in the -- in the one instance, it's just been foam stability.
Q. Oh -- oh, because you -- you've only been operating for a few months? You've only had -- other than the testing for the government, only one customer has come with foam cement?
A. Yes.
Q. And you were only asked to test foam stability?
A. Yes.
Q. Did -- do you -- what test -- so taking a step back, what tests would you run if a customer came and said, we are running a foam -- foam cement, Mr. Garrison, could you evaluate this for us?
A. Depending on well conditions, you know, you'd -- we'd probably first want to look at the slurry stability of the base slurry, sedimentation, free water. If everything there looks good, you know, we would try to generate the foam under -- you know, the foam quality required for downhole conditions.
Q. Okay. And can you just list out the tests that you would run on the base slurry?
A. Well, first, we would look at mixability and rheology.
Q. Okay.
A. And then we'd run a free fluid test. And then from there, we would -- we'd look at foam stability.
Q. Okay. So other than mixability, rheology, and free fluid, would you run any other tests on the base slurry?
A. No. Not -- not just to look at foam stability, no. If you're asking me to look at the slurry, is it stable, can you generate a foam, those are the things that I would do.
Q. Okay. So you had previously mentioned sedimentation.
Is there a different test for that, or just when you're looking at the tests, observe for sedimentation?

A. Typically, you can observe sedimentation in a free water test.
Q. Okay. What foam tests would you run?
A. I would -- I would run a -- I would try to generate a foam.
Q. Okay. You would try to generate a foam under API, 15 seconds of blending?
A. Yes.
Q. Would you do API's unset foam stability test, you know, the two-hour graduated cylinder?
A. It depends. Depends on what the customer wants. But if I have a stable foam at that point in time, yeah. We -- we would probably do more things with the slurry, itself, the base slurry, technique time, make sure we have enough pump time. And then at that point, we would go back, run another foam stability test, generate a foam. And then you could do, you know, the set foam stability as well.
Q. Oh, okay. I see what you're saying. You would -- you would do a subset of the tests first?
A. Yes.
Q. And then once you recognize that it can generate a foam, you would go back and test the base slurry a little bit more?
A. If I had other, you know, characteristics that the client was interested in. If they give me a compressive strength number at a specific time, if they give me thickening time requirements, then I would go and -- and do that.
Q. Okay.
A. Then I would come back with my final design and see if the -- if the slurry is still -- has foam stability.
Q. Okay. And can we just list out all those tests? If the customer came to you and said, hey, Mr. Garrison, I want to understand this cement slurry that I'm being recommended, what test would you run? So I think you named compressive strength and thickening time.
What other tests would you run on the base slurry?
A. In the design phase? You know, if -- if they're asking for thickening time and compressive strength, you know, that's what I would run.
Q. Uh-huh. Well, let's say we're at the -- we're at the field phase already. You just want to check everything.

00102:01 A. Okay.

Page 102:14 to 102:17

00102:14 What types of tests would you
15 run to give the customer input on whether to
16 set that slurry or go back to the contractor
17 with more -- more questions?

Page 102:21 to 104:04

00102:21 Q. Well, let's take one step back.
22 Is that the type of work that OTC does,
23 confirmation testing?
24 A. We do confirmation testing, yes.
25 Q. And did I sort of describe the
00103:01 scenario correctly, or -- or what -- when
02 does the customer come to you for
03 confirmation testing?
04 A. Anytime.
05 Q. Okay.
06 A. But -- but they specifically
07 tell me what they want tested. They -- they
08 don't leave it to my discretion to say, you
09 know, here's a slurry, what do you think we
10 should test?
11 Q. Okay. Fair. Fair enough. I
12 see the problem with my questions.
13 So let's set the stage. The
14 customer brings you a slurry to test for foam
15 stability.
16 What tests do you run?
17 A. I would -- well, if they -- if
18 they walked in and said, here's a slurry, is
19 it stable, well, the first thing we would do
20 is mix it up and we would try to generate a
21 foam. We would assume at that point, unless
22 they say otherwise, that the base slurry is
23 stable.
24 Q. Okay. And then after you're
25 able to generate a foam, what other tests
00104:01 would you run?
02 A. If they left it to my
03 discretion?
04 Q. Yes.

Page 104:06 to 104:14

00104:06 A. I might recommend, you know,
07 looking at the -- the stability of the set
08 cement.
09 Q. And would you also recommend
10 looking at the stability of the unset

cement -- unset foam?
You know, API talks about observing a graduated cylinder over two hours.

Page 104:16 to 106:07

A. Well, that's -- that's part of the foam stability test.
Q. Okay.
A. You generate a foam and you -- you pour it up in their graduated cylinder. There -- there can be conditioning of the base slurry. You know, some people have -- when you're doing a free fluid test of the base slurry, you condition, pour it up, and you let it set.
Q. Okay.
A. Okay?
Q. I misunderstood it.
A. So if you're -- if you're asking me to do a foam stability test, I'm going to take the right amount of slurry, I'm going to foam it, and I'm going to pour it up into a graduated cylinder and observe.
Q. Got it. Got it. Okay.
And -- and why is it important to observe the slurry in a graduated cylinder? Those graduated cylinders are transparent, you can see through them, right?
A. Yes.
Q. And why is it important to observe the foam in a graduated cylinder?
A. The whole principle is the same as the free fluid test. The free fluid test is designed the same way --
Q. And --
A. -- to be able to see settling stability, you know, in that graduated cylinder.
Q. And is it easier to see settling and stability in the graduated cylinder as opposed to when the cement sets and it -- now, when the cement sets, it changes color, right?
A. Right.
Q. And so is it easier to see these changes, these signs, in a graduated cylinder as opposed to set cement?

Page 106:09 to 106:14

A. Visual, yes.
Q. Right. Visual signs?

A. Visual, yes.
Q. And that's why it's important to -- to do this, this first test before possibly doing the set cement test?

Page 106:16 to 107:12

A. Yes.
Q. Okay. If you could, in your binder, flip to tab 1. And this was marked this morning as exhibit 5937.
And this is the -- the cement testing that you did at the -- at the request of the JIT, correct?
A. Correct.
Q. Now, if you could turn to page 38.
A. Okay.
Q. Now, 38 sets out, basically, the -- the results of your unset foam -- foam slurry test?
A. Yes.
Q. And then 39 sets out the results of your set foam slurry test?
A. Yes.
Q. Now, this morning -- and let me just ask you again: On page 38, do any of these test results indicate to you that the foam cement is stable --

Page 107:14 to 107:23

Q. -- on page 38?
A. No.
Q. Okay. So going down to the last row, MAC4, that is the Macondo rig sample, correct?
A. Correct.
Q. Now, does anything in that row indicate to you that that test was somehow good as opposed to any of the other tests?
A. No, same result.

Page 108:06 to 108:11

Is there anything in the row labeled MAC4, which is the rig blend, correct? --
A. Correct.
Q. -- that indicates the unset foam slurry test indicated that sample was stable?

Page 108:13 to 109:06

00108:13 A. No.
14 Q. Okay. And it actually indicates
15 that there was bubble breakout on that
16 sample?
17 A. Yes.
18 Q. And what is bubble breakout?
19 A. It just means that I'm -- my --
20 my foam was basically falling apart. When
21 you say bubble breakout, I'm losing volume
22 inside my graduated cylinder.
23 Q. Okay. And -- and when you foam
24 a slurry, the -- the -- a stable foam, the
25 air particles are very small. You can't see
00109:01 them, right?
02 A. Yes.
03 Q. And is bubble breakout also when
04 the air -- the bubbles inside the foam are
05 coalescing and gathering at the top and --
06 and you can see bubbles?

Page 109:08 to 109:24

00109:08 Q. Or does that describe some other
09 way in the industry?
10 A. Maybe not so much actually
11 seeing the -- the bubbles themselves, but you
12 see it change in volume --
13 Q. Uh-huh.
14 A. -- which is an indication of --
15 of bubble breakout or foam instability.
16 Q. Okay. If you could turn to
17 page 42.
18 Figures 17 and 18 show the
19 Macondo MAC4 sample in the graduated
20 cylinder, correct?
21 A. Correct.
22 Q. And are these pictures good
23 enough to really determine whether or not
24 those samples are stable?

Page 110:01 to 110:10

00110:01 A. No. The -- the pictures don't
02 do the -- the actual testing justification,
03 no.
04 Q. Because some folks had pointed
05 to these pictures and said, hey, look, the --
06 the -- from these pictures, it appears that
07 the Macondo's -- the sample from the Macondo
08 well was stable.
09 Would you disagree with those
10 statements?

Page 110:12 to 111:08

00110:12 A. You can't take, you know -- it's
13 very difficult to take a picture of a
14 graduated cylinder and say whether -- what's
15 inside is a stable foam or not.
16 Q. Right. And so you -- did you
17 personally observe when -- when this sample
18 was poured?
19 A. Oh, yes, sir.
20 Q. Okay. And -- because, I mean,
21 this sample is the -- this sample's the key
22 sample. I mean, this is the one from the
23 rig, right? So you observed it --
24 A. Yes.
25 Q. -- when the test was conducted?
00111:01 So if we flip back to page 38
02 for the Macondo 4 -- MAC4 sample indicates
03 bubble breakout, that's something you,
04 Mr. Garrison, observed?
05 A. Yes.
06 Q. And whether or not it's depicted
07 in the picture, you observed that there was
08 loss in volume and bubble breakout?

Page 111:10 to 116:13

00111:10 A. That's correct.
11 Q. And that is a sign of an
12 unstable foam?
13 A. So it's a parameter that we've
14 followed in the industry for -- for years,
15 yes.
16 Q. Okay. Now, let's turn to
17 figure 20, which is on page 43.
18 A. Figure 40 -- which page?
19 Q. Page 43, figure 20.
20 A. I'm sorry. Yes.
21 Q. Now, this -- this picture shows
22 the MAC4 Macondo cement that you -- that you
23 were curing in the cubes?
24 A. Yes.
25 Q. And -- and the text says, cement
00112:01 cubes were not hard-set after 48-hour curing
02 period, correct?
03 A. Correct.
04 Q. And -- and that's what you
05 observed?
06 A. Correct.
07 Q. Now, looking at the picture,
08 what does the picture show us? I mean,
09 there's these cubes. There's a device
10 sticking in one of the cubes.
11 What does that depict?
12 A. Are you talking about the -- the

bottom right-hand corner or --
Q. Or -- or just describe it generally. I mean, there's four samples, and can you describe what -- what the purpose of pulling out one of the samples in front of the boxes and what the purpose of having a utensil stuck in one of the samples represents?
A. Well, it -- what we saw, what we observed, was the samples were -- were mushy, but some consolidation. But you would consider, you know, no compressive strength. Maybe lots of gel strength, if you will. As
00113:01 compared to figure 19, when the samples come out, you know, they are consolidated, a two-by-two cube.
Q. Okay. And what is depicted there with the -- what is the utensil that's stuck into one of the cubes?
A. That's a spatula.
Q. And why did you take a picture with a spatula stuck into the cube?
A. Just to show that it was not set, that it was -- there was some consolidation or gel strength because the spatula is stuck up. If it would have been strictly liquid, the spatula would have fallen over.
Q. And that indicates that the cube is soft enough that you can stick a spatula in there?
A. That's correct.
Q. And if you look at the pictures -- they're hard to see, but do they depict that there is a loss in volume from the cement?
A. The -- the actual -- you know, the picture that you see, it's very hard to
00114:01 tell. But, yeah, there -- we -- we observed, you know, loss of volume.
Q. And you were there when they opened this up and took a picture?
A. That's correct.
Q. And the cubes are filled to the top when you begin the test?
A. Yes.
Q. And so a loss in volume, what does that mean?
A. It -- it depicts an instability of the -- of the slurry.
Q. And you personally, Mr. Garrison, observed that?
A. Yes. I observed the pouring, the mixing and also the -- the pulling of the samples.

Q. Now, what is the purpose of -- counsel earlier this morning asked you about the compressive strength testing that was done on these samples, correct? Do you recall?
A. Yes.
Q. Now, you ran the compressive -- the UCA testing at 3,000 psi?
A. Yes.
Q. And you testified that was your direction from the JIT?
A. No, it was not.
Q. Okay. Why did you run it at 3,000 psi?
A. It's -- when -- when we were supplied with the protocol, there was -- there was no directive on pressure. So -- so based on no directive, we follow API procedures.
Q. Uh-huh. Now, the API -- and that's a table in API, right?
A. Well, it's just that all UCAs are ran at 3,000 psi as a standard working pressure.
Q. Right. So we're talking about API 10B-2.
A. Yes.
Q. And it has a table in there for -- that lists standard pressures and temperatures to test compressive strength?
A. Yes.
Q. Now, does API tell you that if you have more information about the well, the actual well pressures and temperatures, you should use those in your testing?
A. It does not say that, no.
Q. Okay. Is it good practice to use the actual well temperatures and pressures when you're doing your UCA test?
A. Most -- most people believe so, yes.
Q. Okay. And if you, Mr. Garrison, OTC, were provided with the bottomhole pressure that the cement would see in the field, would you use that or would you use the API generic 3,000 psi?

Page 116:15 to 117:14

A. If -- if my customer asked me to run at the bottomhole pressure, I would. If not, I would run 3,000 psi.
Q. So your standard practice is to run 3,000 psi even if you're given information about what the actual downhole

pressure is?
A. Yes.
Q. Why is that your typical practice?
A. Because I follow instructions from my clients. I let my clients decide what they want to do and how they want to do it. If they ask my opinion, then that's something totally different. But if they give me a test protocol and they say they want to run compressive strengths, I let them decide how, when, where, and why they want to run it.
Q. Well, let's say they're asking your opinion.
What is your recommendation, Mr. Garrison, if I have my downhole pressure, 14,000 psi, what I should run my compressive strength test at?

Page 117:16 to 118:07

A. The industry has run 3,000 psi for the longest time, even the -- some of the deepest hottest wells in the world at 20-, 25,000-foot depth. And they've got, you know, 15-, 16,000 bottomhole pressure. They still run compressive strength at 3,000 psi.
Q. Uh-huh, uh-huh.
A. So on a critical well, some -- some would run at the bottomhole pressure and some would -- I'm not sure which way I would go. I really don't. I really don't know which way I'd go.
Q. Would you agree or disagree that if it's run at bottomhole temperature and pressure, that would be more representative of the actual compressive strength development at the bottom of the well?

Page 118:09 to 118:12

A. It's -- it's possible.
Q. Now, why -- why does the -- why do some people in the industry run 3,000 psi even on the deepest wells?

Page 118:18 to 118:21

A. The base argument is this, that here's another case that we do not, as an industry, simulate downhole conditions in the lab.

Page 119:13 to 119:17

00119:13 Q. Would testing at 3,000 psi as
14 opposed to the actual higher downhole
15 pressure give you a more conservative number
16 to use for compressive strength development
17 time?

Page 119:20 to 120:20

00119:20 A. It's possible. I mean, some
21 people have -- have run tests to say that at
22 higher -- at higher pressures, you know, I
23 get compressive strength development quicker.
24 And some -- some have seen -- because of
25 additive response, they've seen compressive
00120:01 strengths to be a little bit longer. So
02 there's been some mixed experience with more
03 pressure or less pressure in -- in a UCA.
04 Q. Okay. And -- and that is
05 because in the examples -- you would agree
06 with me, typically, the cement would set up
07 faster if you're -- if it's at higher
08 pressure, typically?
09 A. That's what you would assume,
10 yes.
11 Q. And it -- and the exception is
12 if you have an additive or something in your
13 cement that reacts with the pressure, that
14 causes it to set up slower?
15 A. Yes, that's correct.
16 Q. Now, would testing at the
17 downhole pressure be more prohibitive, then,
18 because it stimulates that effect of the
19 pressure on that additive or component of the
20 cement?

Page 120:22 to 122:15

00120:22 A. It could be, yes.
23 Q. Now, do you think compressive
24 strength testing should always be run at
25 3,000 psi to be more conservative with the --
00121:01 with the compressive strength development
02 time?
03 A. Hard to say. I mean, that's
04 a -- that's a tough question and only because
05 a lot of -- a lot of operators, in my
06 experience of what I've seen, it's one of
07 like the last properties that they test.
08 They want to make sure they get it in place.
09 And typically, there's plenty of time to do
10 other things while the cement's setting and

they're getting strength in 24 hours or 12 hours or whatever the case may be.
So running compressive strength has never been a real priority for a lot of operators. They want to see, you know, do I get strength? But it's never been an issue of, well, if -- if I run it at 3,000, what's the effect at 12,000 if this is my actual bottomhole pressure? That's -- that's something that's really never come up --
Q. Okay.
A. -- you know, in -- on day-to-day operations at my experience and time with Schlumberger.
Q. Okay. Now, what is the purpose of -- of a UCA cement compressive strength test?
A. To let you know when -- when your cement has set, when I have set cement.
Q. And what do you consider set cement? What strength would you consider set cement?
A. 50 psi.
Q. 50 psi?
A. I mean, that's -- the cement is set. It doesn't have a lot of strength, but it's set.
Q. And is that the industry standard for when you can now continue with operations that disturb the cement?

Page 122:17 to 123:05

A. I can't honestly answer that question. I can tell you a little bit what I know, but 50 is not a number that they typically shoot for, no.
Q. Okay. I mean, because I've heard it's 500 that they're looking for before proceeding.
A. Land -- land offshore numbers are different. Some -- some shoot for a hundred, if I have a hundred, or if I have 500. Some want a thousand, you know, before they go back and do things, yes.
Q. So what is your experience with wells in the Gulf of Mexico?

Page 123:07 to 123:14

A. My -- my experience has been -- has been 500. It's been the number that most people, you know, relay.
Q. Okay. So the purpose of the UCA

test is to find out -- if you agree with me -- is the purpose of the UCA test to find out how long you have to wait on the cement before you can continue operations?

Page 123:17 to 123:21

A. It's -- it's used as a guideline, or it can be used as a guideline.
Q. Right. Because otherwise you would just do crush compressive strength if you wanted to know the ultimate strength.

Page 124:03 to 124:04

Q. Crush compressive tests would give you the ultimate compressive strength.

Page 124:07 to 124:16

A. Well, that's not true. I mean, you're going to see -- if I run a UCA, or if I run -- you know, nondestructive versus destructive is what we're talking about.
Q. Uh-huh.
A. In most cases there's a close correlation between the two. So if I have, for instance, 4,000 psi in 24 hours on a UCA, I'm going to be in that same ballpark with cubes.

Page 124:20 to 124:24

If we only wanted to know the ultimate strength, or get the ballpark number for the ultimate strength, we wouldn't have to do a UCA, we just set it on the side and let it set and then test -- crush it later.

Page 125:01 to 125:24

A. Well --
Q. To get that ballpark number at the end of 48, 24 hours.
A. Under -- under the same conditions.
Q. Absolutely.
A. Yes.
Q. But instead, it's done under UCA because the -- the time at which it sets is a parameter that cement companies and operators are interested in, right?

12 A. It's been an effective tool to
13 look at when my cement sets, just as you
14 stated. So with -- if I do -- I can do the
15 same thing with cubes, but, you know, over a
16 24-hour period I probably need a set of 12
17 cubes to get the same type of curve that I
18 could get with UCA.
19 Q. Is a cement -- is a cement
20 contract -- so you said that the -- the time
21 at which the cement sets coming out of a UCA
22 compressive strength test is an indication of
23 when the cement should set at the bottom of
24 the well?

Page 126:02 to 126:06

00126:02 A. Under a specific set of
03 conditions, yes.
04 Q. So is it appropriate to use that
05 as an indication of -- of when the cement
06 sets?

Page 126:10 to 126:14

00126:10 A. In my experience, people use it
11 as a guideline. They would look at a -- or
12 they would get a -- a UCA graph or data from,
13 you know, a service company, and they would
14 use it as a guideline.

Page 127:03 to 127:05

00127:03 Q. Well, you -- you said it's an --
04 it's a rough number as to when the cement
05 would set, right?

Page 127:07 to 127:09

00127:07 A. Correct.
08 Q. Why wouldn't it be an exact
09 number?

Page 127:11 to 128:13

00127:11 A. I think the heat-up rates, you
12 know, how quick does the -- the cement get to
13 bottomhole static temperature again, how you
14 simulate that in the lab, probably -- we may
15 not be as conservative in the lab as, you
16 know, actual field conditions. I mean,
17 that's the big issue. How quick does the
18 well, you know, come back up to temperature

once all these fluids have been pumped and now they're static again. So, I mean, that's the parameter.
So, you know, are we -- are we heating up to bottomhole temperature quicker in the lab or are we doing it downhole quicker? So that's why I'm saying it's a guideline.
Q. Okay.
A. Under -- under these conditions, under this heat-up rate, back to this temperature, this is when the cement sets up in the UCA.
Q. Okay. So the UCA compressive strength test result gives you a guideline as to when the cement will be set?
A. Under a specific set of conditions, yes.
Q. Under a specific set of conditions.

Page 128:20 to 129:05

Q. The operator gets a UCA compressive strength test result and graph from the service company, right?
A. Correct.
Q. And the graph actually will call out when 50 psi strength is achieved and when 500 psi strength is achieved typically?
A. Yes.
Q. And can the customer use those numbers as a guideline as to how long to wait on cement?

Page 129:09 to 129:12

A. Yes, they can.
Q. Okay. Have you ever heard of anything -- and -- I mean -- because that's the purpose of that UCA test, right --

Page 129:14 to 129:16

Q. -- is to get those 50 and 500 psi numbers so that the operator can use them?

Page 129:19 to 129:25

A. As a guideline, yes.
Q. Right. So the operator receives -- asks for this testing, receives

it, and it can rely on test results to give it a guideline as to how long to wait before proceeding with operations that affect the cement?

Page 130:04 to 130:04

A. Yes, they can.

Page 130:10 to 131:03

Maybe we can break it out -- down into little -- little pieces. Have you ever recommended to any service operator that they wait 24 to 48 hours to wait for the cement to set regardless of what the UCA test says?

A. No, I have not.

Q. And have you ever heard anyone else make that recommendation?

A. Not that I recall.

Q. Okay. And have you heard of that being an industry standard at any time, that the cement -- sorry, that the operator should wait at least 24, preferably 48 hours, before doing anything that would disturb the cement, even if the UCA test says you can take operations much earlier?

A. No, I've not heard anyone recommend that, no, not me.

Page 131:05 to 131:11

Q. And you've never read any literature that says that?

A. Not that I recall.

Q. And at all the conferences you've ever attended, you never heard a speaker get up and say that?

A. No.

Page 131:21 to 132:09

Q. Okay. You understand what swabbing and surging pressures are?

A. Yes.

Q. Move pipe up and down, it can pull and create a small suction or it can create a small pressure.

A. Yes.

Q. Now, you're familiar with synthetic oil-based mud, right?

A. Yes.

06 Q. And it is slightly compressible?
07 A. Yes.
08 Q. And in a way it can act as a
09 shock absorber.

Page 132:11 to 132:11

00132:11 A. Sounds logical, yes.

Page 133:23 to 134:03

00133:23 Q. Okay. Now, do you agree with me
24 that design -- that in order to have a good
25 cement job you have to have a good stable
00134:01 cement slurry and you need to place it in the
02 right place?
03 A. Correct.

Page 134:14 to 135:01

00134:14 Q. Do you agree with me that you
15 have to have a good cement that's placed in
16 the right place --
17 A. Yes.
18 Q. -- to have a good cement job?
19 Do you agree with me that a bad
20 cement placed in the right place is not a
21 good cement job?
22 A. It's not a good alternative, no.
23 Q. And that that cement, you would
24 not consider a successful cement job if you
25 placed an unstable cement in the right
00135:01 location?

Page 135:03 to 135:10

00135:03 A. No.
04 Q. Have you ever -- when you did
05 these tests did you look at the -- the set
06 foam stability test -- did you look at the
07 sections that were at the very top, that were
08 the light -- light density ones with the
09 higher concentration of air in them?
10 A. Yes.

Page 135:15 to 136:05

00135:15 Q. Okay. Have you -- have you read
16 any papers or attended any seminars
17 discussing use of foam cement as basically a
18 filter to allow -- during production -- to
19 allow flow of hydrocarbons, but to block

sediment?
A. Things have been discussed, yes.
Q. And that's because very -- very porous foam -- foam cement, if it has large bubbles in it, can be very porous, or permeable, I guess, is the right word.
A. Yes.
Q. So it's permeable to flow, although it can still block sediment and sand?
A. Yes.

Page 137:07 to 137:12

Q. Well, anywhere. Let's say you -- you want to prevent flow from this area to the other area and you have cement in the middle. Do you need a hundred feet of cement to prevent that flow -- a hundred feet of good set cement to prevent that flow?

Page 137:16 to 137:24

A. Well, I don't think you can answer that question based on feet. I mean, because it comes down to a principle of hydrostatics once the slurry -- the slurry's in place in the annulus. So, you know, if -- if you contain a -- an overbalanced situation in the annulus, maybe it's five feet, maybe it's a hundred. I wouldn't know unless I did the calculations.

Page 138:19 to 138:25

Q. And that's what I'm talking about. So you would agree if you have isolation, you have good centralization, good -- hundred percent centralization, hundred percent displacement efficiency and you have five feet of cement that sets up good there, that could be sufficient?

Page 139:05 to 139:11

A. My understanding in theory, yes, I would think so.
Q. And you would agree if you had three, four hundred feet of good set cement that's properly placed, good displacement, good centralization and it's set, that that would be a good barrier to flow?

Page 139:15 to 140:20

00139:15 A. Yes.
16 Q. Have you ever cement -- have you
17 ever advised, or when you were at the service
18 company, poured a cement job where the
19 operator used a rathole underneath the casing
20 or liner?
21 A. Yes.
22 Q. And is that common, to leave a
23 rathole?
24 A. In some -- it has been. It's
25 not something I've observed a lot, but
00140:01 I've -- I've been associated with some, yes.
02 Q. And in the Gulf of Mexico,
03 ratholes can be left for a variety reasons,
04 like in case you drop tools in there or other
05 things, right?
06 A. Yeah, possibility, yes.
07 Q. And in every case where there is
08 a rathole, in your recollection and
09 experience, did the operator spot a heavy
10 pill in the rathole?
11 A. In -- in most cases I believe
12 that's correct, yeah.
13 Q. But not every case?
14 A. Not specifically about the Gulf
15 of Mexico. I know situations on land where,
16 you know, they did not.
17 Q. And in those situations where
18 you didn't spot a heavy pill and you
19 cemented, the cement is sitting on top the
20 rathole, correct?

Page 140:22 to 141:03

00140:22 A. Correct.
23 Q. And did the cement set up in the
24 shoe in those instances?
25 A. As far as I remember, yes.
00141:01 Q. And would you ever refuse to run
02 a job because the operator didn't spot a
03 pill, a heavy pill in the rathole?

Page 141:05 to 141:10

00141:05 A. Not that I'm aware of.
06 Q. And is that something that the
07 industry is concerned about, contamination
08 from the rathole, or does it not really
09 matter if you have hundreds of feet of cement
10 in your -- in your shoe?

Page 141:13 to 141:16

00141:13 A. From a cement placement
14 standpoint, yeah, it's -- it's something
15 that's considered, yeah. It's critical. Can
16 be.

Page 141:22 to 142:02

00141:22 Q. The -- the -- I think you used
23 the word that it is critical from a cementing
24 perspective. I mean, I just want to
25 understand. Are you saying that it is
00142:01 critical to spot that heavy pill in the
02 rathole from a cementing perspective?

Page 142:04 to 142:13

00142:04 A. It depends.
05 Q. Okay.
06 A. It depends. And it depends on
07 your fluids, what's in the hole, the weight
08 of the fluid and what you're going to be
09 putting in the hole as well.
10 Q. At what density differential
11 between the cement and the mud in the rathole
12 would you consider approaching this critical
13 need to -- to spot a heavy pill?

Page 142:16 to 142:20

00142:16 A. I wouldn't know until I tested
17 it to find out.
18 Q. Okay. So it's something that
19 the cementing company should test and see
20 whether it makes a difference?

Page 142:22 to 143:04

00142:22 A. Typically they do. I mean, it's
23 something that I've always been a part of
24 and, you know, we want to make sure that
25 there's no fluid swapping. That's what we
00143:01 want to make sure of.
02 Q. So if the cementing company is
03 concerned, they should test it and make a
04 recommendation to the operator?

Page 143:06 to 143:23

00143:06 A. Maybe not so much test it --
07 Q. Uh-huh.

A. -- but definitely do some calculations. One thing that we would do at Schlumberger was basically do a -- a balance plug and -- balance plug equation, take a look at it and see what we think would happen based on the weight of those fluids, the volume of those fluids.
Q. And that's a similar calculation where you have heavy cement sitting on top of mud?
A. Correct.
Q. And if it was an issue that there was cement in the shoe, heavy -- heavy cement in the shoe sitting on top of the mud, the service company should raise it so that it can be rectified before the job?

Page 143:25 to 144:07

A. At Schlumberger we would discuss that with the customer.
Q. And is that good practice, in your opinion, if -- if this were an issue, is that good practice for the cement company to address it with the operator?
A. In my opinion, yeah, I think it is.

Page 144:17 to 144:22

Q. Mr. Garrison, you -- you said that you've worked with BP before, right?
A. Yes.
Q. Does BP -- in your experience, is BP the type of company that cuts costs and endangers its people and contractors?

Page 144:25 to 145:08

Q. Did you personally observe any cost-cutting or placing safety below cost?
MR. PETOSA: Form. Square.
A. Not that I personally observed, no.
Q. Okay. And in the industry, have you ever heard that BP has a reputation of being a cost-cutter that puts cost in front of safety?

Page 145:10 to 145:10

A. Not that I've heard of.

Page 145:15 to 145:16

00145:15 Now, Halliburton was the cement
16 contractor for the Macondo well, right?

Page 145:18 to 145:23

00145:18 Q. You know that?
19 A. That's my understanding.
20 Q. Okay. Now, would Halliburton,
21 as the cement contractor, be responsible for
22 the design of the cement slurry for that
23 well --

Page 146:01 to 146:02

00146:01 Q. -- based on industry
02 expectations?

Page 146:05 to 146:11

00146:05 A. Yes, it's -- it's a -- it's a
06 dual thing, right? I mean, everyone's
07 involved, things you discussed. But, you
08 know, when you're talking about the design of
09 a cement job, things are done, things are
10 relayed, and hopefully, everyone's in the
11 same loop of communication.

Page 146:25 to 146:25

00146:25 Q. I will ask it in a non-leading

Page 147:02 to 147:03

00147:02 Who is responsible for designing
03 the cement slurry for a well?

Page 147:06 to 147:13

00147:06 A. It's -- both parties involved
07 make decisions on how you design, what you
08 design, and what's the test -- what's the
09 criteria of the fluid and what you want --
10 what expectations you have of that fluid.
11 Q. And who's responsible of making
12 sure that the cement slurry meets those
13 expectations?

Page 147:16 to 147:19

00147:16 A. From a testing standpoint, the
17 service company is -- is charged with meeting
18 those expectations, the things that are laid
19 out by the customer.

Page 148:01 to 148:03

00148:01 Q. You tested -- you tested the
02 Halliburton slurry design, correct?
03 A. Yes.

Page 149:22 to 149:24

00149:22 Q. Right. The -- the slurry design
23 that you tested here, would you recommend
24 someone pump that downhole?

Page 150:03 to 151:02

00150:03 A. What I tested, no.
04 Q. Now, you tested at 13 foam
05 quality, and you also tested at 18 and a half
06 foam quality, correct?
07 A. Yes.
08 Q. Why did you test at those two
09 foam qualities?
10 A. We were instructed by the JIT.
11 Q. Okay. Now, when you personally,
12 Mr. Garrison, and OTC, do foam stability
13 testing, what -- do you test at the downhole
14 foam quality?
15 A. That's correct.
16 Q. Okay. Would you test at the
17 downhole foam density if the foam quality
18 were different? Gas is no longer ideal under
19 high pressures, correct?
20 A. Okay.
21 Q. Do you agree?
22 A. Yeah, yeah.
23 Q. Okay. So downhole under
24 pressure, it may take 18 and a half percent
25 foam -- nitrogen by volume to reach 14 and a
00151:01 half pounds per gallon?
02 A. Okay.

Page 151:04 to 151:14

00151:04 Q. And at surface, it may only take
05 13 percent of gas by volume to reach
06 14.5 pounds per gallon.
07 Did you understand that was why
08 you were testing those two foam qualities?

09 A. No.
10 Q. Okay. But you in your practice
11 would test the foam quality downhole?
12 A. That's correct.
13 Q. And is that an industry-accepted
14 practice?

Page 151:16 to 151:24

00151:16 A. By API guidelines, yes.
17 Q. Okay. Now, if you were
18 advised -- have you heard of the concept of
19 stop work before?
20 A. Stop work?
21 Q. Stop work authority.
22 In the oil field, anyone can
23 stop the job if it's unsafe?
24 A. Okay. Yes, I have. I have.

Page 152:05 to 152:10

00152:05 Q. Now, if you had -- if -- if you
06 had this cement slurry that you tested and
07 you did not have a stable foam test result,
08 would you -- do you believe that a cementing
09 contractor should stop the job until this
10 stability issue is fixed --

Page 152:13 to 152:24

00152:13 Q. -- is figured out?
14 A. Yeah. I mean, if -- if -- if
15 there was an issue, you definitely want to
16 fix it.
17 Q. Yeah. So -- so if you -- if you
18 were seeing these types of results, you,
19 Mr. Garrison, would expect the cement company
20 would first talk to the customer, correct?
21 A. Yes.
22 Q. And then also say, hey, we can't
23 go forward with this cement job until we
24 figure out these problems?

Page 153:02 to 153:04

00153:02 A. Yes.
03 Q. Do you think it's safe to pump
04 an unstable foam cement downhole?

Page 153:08 to 153:10

00153:08 A. Safe-wise?

09 Q. In terms of not isolating the
10 hydrocarbons that are in the formation.

Page 153:14 to 154:02

00153:14 Q. I mean, the purpose is to
15 isolate the hydrocarbons --
16 A. Right.
17 Q. -- and keep them in the
18 formation, right?
19 A. Yeah, I mean, pumping an
20 unstable slurry, period, is not a -- is not a
21 good practice.
22 Q. Right. And, you know, if the
23 purpose is to prevent hydrocarbons from
24 coming into the pipe and coming up to the
25 surface and you pump an unstable foamed
00154:01 cement, it's not going to achieve that goal,
02 right?

Page 154:05 to 154:07

00154:05 A. That -- that would be the
06 assumption, yes.
07 Q. So won't that be unsafe?

Page 154:10 to 155:10

00154:10 A. Yes.
11 Q. Okay. Now, if you could, turn
12 to tab 1 again. And this is exhibit 5939.
13 If you could, turn to page 8 of tab 9 --
14 of --
15 A. Page 8?
16 Q. -- tab 1.
17 A. Okay.
18 Q. So here you've set forth your
19 rheology testing, correct?
20 A. Correct.
21 Q. Or the results of your rheology
22 testing.
23 And what did you find when the
24 retarder concentration was increased? Well,
25 what did your testing show?
00155:01 A. I believe the result was more
02 retarder, the slurry was a little thinner.
03 Q. So the retarder did affect the
04 properties of the slurry, the change in
05 retarder?
06 A. Comparing the two, yes, it
07 appeared that way.
08 Q. And the -- is the -- does the
09 thinness of the slurry affect foam

10 stability -- of the base slurry --

Page 155:12 to 155:15

00155:12 Q. -- affect foam stability?
13 A. Thinness, not necessarily, but
14 sometimes thinness can result in settling or
15 sedimentation.

Page 155:20 to 156:15

00155:20 Q. Okay. Have you ever heard of
21 any advice on how to design a base slurry
22 that will be foamed in terms of rheology and
23 thickness?
24 A. Not so much about rheology.
25 It's more about settling, you know, a stable
00156:01 slurry. You can have slurries that are thin
02 and they're still stable and they don't
03 settle.
04 Q. Okay.
05 A. So it's not so much a function
06 of rheology.
07 Q. Okay.
08 A. But rheology can be an indicator
09 of -- of settling.
10 Q. Okay.
11 A. Or -- or free water, in some
12 cases, yeah.
13 Q. And can rheology also be an
14 indication that the slurry is too thin to be
15 used for foam cement?

Page 156:17 to 157:04

00156:17 A. I don't think you can say it's
18 too thin for foam. If it's stable, you know,
19 and it meets other placement criteria, then
20 there shouldn't be a problem with -- with
21 that particular slurry.
22 Q. But it's something you would
23 have to test?
24 A. That's correct.
25 Q. So you would have to test the --
00157:01 the rheology of the -- of the cement slurry
02 in the -- with the proper concentrations of
03 all the components of what you were -- wanted
04 to pump?

Page 157:06 to 157:06

00157:06 A. Right.

Page 157:09 to 157:12

00157:09 Q. And that is something that the
10 industry expects, is that the cement company
11 will actually test the cement that will be
12 pumped?

Page 157:14 to 157:14

00157:14 A. Yes.

Page 157:18 to 157:21

00157:18 Q. The industry would expect that
19 Halliburton would have tested the stability
20 of the foam using 0.09 gallons per sack of
21 retarder --

Page 157:24 to 157:25

00157:24 Q. -- if that was what's pumped in
25 the well?

Page 158:02 to 158:07

00158:02 A. Yes.
03 Q. You would never test one
04 retarder concentration for foam stability and
05 then recommend to the customer to pump a
06 different retarder concentration into the
07 well?

Page 158:09 to 158:12

00158:09 A. I -- I would want to check them.
10 Q. And that would be good practice,
11 in your opinion?
12 A. Yes.

Page 158:14 to 160:02

00158:14 Q. Now, if you could, flip to
15 page 38.
16 A. 38. Okay. Okay.
17 Q. Now, this page sets out the
18 different foam stability -- page 38 and 39
19 set out the different foam stability tests
20 that you conducted, correct?
21 A. Correct.
22 Q. Now, in these foam stability
23 tests, you varied the concentration of

retarder from, you know, eight gallons per hundred sack to 9 gallons per hundred sack?
A. Okay.
Q. And then you also varied the conditioning time from between one and a half hours and three hours of conditioning before foaming, correct?
A. Correct.
Q. And you also changed the foam quality that you were shooting for from 13 percent to 18 and a half percent, correct?
A. Correct.
Q. Now, did changing the retarder concentration have any effect on stability, as far as you can tell from these test results?
A. No.
Q. And did -- meaning that both 0.08 gallons per sack and 0.09 gallons per sack were both unstable?
A. Yes.
Q. And did changing conditioning time of the base slurry before foaming affect stability, based on your testing?
A. No.
Q. Meaning both the one and a half hour conditioning time and the three-hour conditioning time both resulted in unstable foams?

Page 160:04 to 160:17

A. That's correct.
Q. And did changing the foam quality between 13 percent and 18 percent change any of your test results?
A. No.
Q. Meaning that -- well, what does that mean? That -- that means that both your testing at 13 percent and 18 percent foam quality showed that the foam was unstable?
A. Correct.
Q. Now, are you familiar with sort of designing cement jobs for deepwater wells in the Gulf of Mexico?
A. Some -- some experience, yes.

Page 161:23 to 162:12

Q. And then it says, and as Schlumberger engineer Greg Garrison points out, one of the first requisites to a good cement job, mud displacement, is impossible to accomplish through traditional means in

high pressure, high temperature wells.
Did I read that correctly?
A. Yes.
Q. And then if you read the next two paragraphs, do you agree that you -- you stated in high pressure, high temperature wells, it's difficult -- well, you say impossible to -- to get the slurries moving fast enough to get turbulent flow in the annulus?

Page 162:14 to 162:19

A. Yes. In most HP/HT wells, that's correct.
Q. Okay. And you're familiar that in deepwater wells in the Gulf of Mexico, the operating margins between frac gradient and pore pressure are also very narrow?

Page 162:22 to 162:25

Q. And in your experience, are you able to achieve turbulent flow in your cementing program in deepwater wells in the Gulf of Mexico?

Page 163:02 to 163:19

A. No. Not in my experience, no.
Q. Have you ever studied -- and I know you have.
Have you ever studied the effective channeling and how to displace -- the effective channeling on cement slurries?
A. Not studied it, but we've evaluated it, yes.
Q. Right. And when we say channeling, just so there's no misunderstanding, what's left is mud but it's not -- it's not mobile fluid mud, it's mud cake, correct?
A. Right.
Q. So it's not -- so when you have cement that's channelled and you leave mud there, that mud is not going to all of a sudden magically mix with the cement?

Page 163:21 to 164:02

A. That's -- that's the understanding, yes.
Q. Right. I mean, it may interact

at the interface but it doesn't mix together because you've already pumped a tremendous amount of fluid in front of it to wash all the mobile mud away?

Page 164:06 to 164:10

A. Yes.
Q. And, I mean, would a thousand barrels be -- sort of keep that amount that we're talking about that would flush the mobile amount of mud away?

Page 164:13 to 164:14

A. A thousand barrels?
Q. A thousand barrels.

Page 164:17 to 165:14

A. It depends on the condition of the mud, the spacer, you know, a lot of parameters to consider.
Q. Okay. Have you ever pumped a job where your modeling showed that there was not a hundred percent mud displacement?
A. Yes.
Q. Have you ever pumped a foam job where your modeling showed that there was not a hundred percent mud displacement?
A. On the foam, not that I -- not that I recall, no.
Q. Now, Halliburton advertises itself as a leader in foam cementing?
A. Yes.
Q. And that's how it holds itself out to the industry?
A. Yes.
Q. And the industry understands that they hold themselves out this way as being very experienced in both formulating and designing and executing foam cement jobs?
A. That's correct.

Page 166:19 to 167:01

Q. Okay. So when a cement company is executing one of these cement jobs -- first of all, they're -- they're the ones on the rig executing the cement job, right, the cement company?
A. Correct.
Q. And so they are responsible for

00167:01 executing the cement job?

Page 167:03 to 167:06

00167:03 A. Yes.
04 Q. And after the cement job, they
05 report to the operator what -- how well the
06 job went?

Page 167:08 to 167:12

00167:08 A. Correct.
09 Q. And if there's problems with the
10 cement job, the cement company should
11 identify them to the operator so the operator
12 can take remedial measures, if necessary?

Page 167:14 to 167:21

00167:14 A. And, again, on the job, there's
15 typically a company man as well and along
16 with the service guys. And everyone pretty
17 much knows what's going on at that particular
18 time.
19 Q. That's right. But if the cement
20 company recognizes that there might be a
21 problem, they should raise it?

Page 167:23 to 167:25

00167:23 A. Yes.
24 Q. Either in the design of the
25 cement or in the execution of the cement?

Page 168:02 to 168:06

00168:02 A. In my opinion, yes.
03 Q. And -- and that's one of the
04 reasons that operators hire these expert
05 companies, expert contractors, it's for their
06 expertise in the field of cementing?

Page 168:08 to 168:08

00168:08 A. Yes.

Page 168:22 to 169:01

00168:22 Q. Mr. Garrison, my name is Kate
23 Easterling and I represent Transocean. We
24 met just before we went on the record,

correct?
A. Yes.

Page 169:07 to 169:20

Q. First of all, you testified that if you as a cement service provider were asked by an operator to run the UCA compressive strength tests at the actual bottomhole pressures, that you would do so, correct?
A. Correct.
Q. And if the operator didn't provide an actual bottomhole pressure or make a specific request for you to run the test at that actual bottomhole pressure, you would use the API standard 3,000 psi; is that right?
A. Yes.

Page 169:22 to 170:11

Q. The temperature ramp-up schedule that's used in UCA tests, is that something that you would also expect direction from the operator?
A. Yes.
Q. Okay. So if the operator had told you that they wanted you to run the UCA test with the temperature ramp-up schedule that at -- stimulates the actual downhole temperature ramp-up, you would do so as a cement service provider, correct?
A. Correct.
Q. And the test that you ran for the JIT in this case, you used a temperature ramp-up schedule of 16 hours; is that right?

Page 170:13 to 171:11

A. Yes.
Q. And that was because the JIT instructed you to run the UCA test with a 16-hour temperature ramp-up schedule; is that right?
A. Yes.
Q. Are you familiar with the UCA compressive strength tests that were run by Halliburton for BP in the Macondo?
A. No.
Q. Okay. So you're not familiar with the temperature ramp-up schedule that was used in those tests?

00171:01 A. No.
02 Q. Is there a standard temperature
03 ramp-up schedule for UCA tests that the API
04 provides?
05 A. No.
06 Q. Okay. Based on your experience
07 in the industry as a cement service provider,
08 you would select the temperature ramp-up
09 schedule for UCA tests based on instructions
10 and parameters provided to you by the
11 operator, right?

Page 171:13 to 172:06

00171:13 A. Yes.
14 Q. And you would agree that the
15 operator should request that the cement
16 service provider run lab tests on the cement
17 design that as closely as possible simulate
18 the actual downhole conditions, right?
19 A. That's what we strive for, yes.
20 Q. And in your experience in the
21 industry as a cement service provider, it is
22 the operator that sets out the specific
23 design requirements for a cement program; is
24 that right?
25 A. Yes. They have their criteria
00172:01 of what they want, yes.
02 Q. And the operator is supposed to
03 provide the cement service provider with the
04 information about the well and the downhole
05 conditions that the cement program will be
06 exposed to; is that right?

Page 172:08 to 174:04

00172:08 A. You said the -- the operator?
09 Q. Yes.
10 A. Yes.
11 Q. And based on the information,
12 the conditions and the design requirements
13 the operator provides the cement service
14 provider, the cement service provider comes
15 up with a cement program design, correct?
16 A. Correct.
17 Q. There was a conversation during
18 your deposition earlier today about certain
19 additives that were used in this cement
20 slurry. Do you recall those conversations?
21 A. Yes.
22 Q. Okay. Prior to the work that
23 you performed for the JIT, were you aware of
24 a Halliburton additive called D-Air?
25 A. Not specifically that additive,

00173:01 no.
02 Q. Okay. So prior to this work,
03 you -- you didn't know what D-Air was?
04 A. Yes, I knew what it was. I'm
05 just not familiar with the -- with the
06 product itself.
07 Q. Okay. When you say that you
08 knew what it was, what do you mean by that?
09 A. I know its functionality.
10 Q. And what is that functionality?
11 A. It's a -- it's an antifoamer.
12 Q. Okay. And you learned that
13 D-Air, an additive that is made by
14 Halliburton, was an antifoamer based on
15 common industry knowledge, or how did you
16 know that?
17 A. Yes, common industry knowledge
18 and -- and also World Oil does a
19 cross-reference for people in the oil field
20 so you can kind of compare additives and
21 codes. It doesn't tell you anything
22 specifically, but it categorizes service
23 companies' products.
24 Q. Okay. Would an operator have
25 access to that database of information?
00174:01 A. Yes. Everyone has access to it.
02 Q. Okay. And you know that a
03 defoamer can have a negative affect on a foam
04 cement; is that right?

Page 174:06 to 174:12

00174:06 A. Yes, it can.
07 Q. And you didn't need any
08 proprietary information from Halliburton to
09 know that D-Air was a defoamer and that it
10 had a negative effect on foam cement; is that
11 right?
12 A. That's correct.

Page 176:07 to 178:07

00176:07 All right. I want to start out
08 by following up on some things that you
09 discussed with BP's counsel. Just to step
10 back a little bit and understand, the report
11 that you prepared at exhibit 5937, it's my
12 understanding that you used, with one
13 exception, and that exception being the MAC4
14 slurry, that all of the other slurries you
15 used were on samples that did not come from
16 the Macondo rig, correct?
17 A. That's correct.
18 Q. Okay. And the MAC4 sample,

however, was provided as rig sample that had been sequestered by Halliburton and given by subpoena to the U.S. Government and then provided to you, correct?
A. That's correct.
Q. Okay. Now, early -- or prior -- when you were setting up the samples or the testing that you were going to do for the JIT, you had originally contemplated to prepare at least eight Macondo slurry samples, correct?
A. Yes.
Q. Okay. But in the end, you ended up just testing an unset foam stability test with -- with the MAC4 slurry, correct?
A. Yes.
Q. And the other one was there was an attempt to conduct a set foam stability test that got terminated after 48 hours, correct?
A. Yes.
Q. Other than those two tests, none of the other testing that you did and reported in exhibit 5937 were on rig samples from Macondo, correct?
A. Yes, that's correct.
Q. And all the other ones came from lab stack or stock from Halliburton of materials that were labeled the same way but did not actually come from the blend that was sent out to the rig; is that correct?
A. That's correct.
Q. All right. Now, you understand in your industry -- well, let me ask you, are you aware in the industry that there is a practice prior to pumping, for example, a production casing job, of obtaining samples of blend cement from the field in order to conduct the testing onshore?

Page 178:09 to 178:23

A. From -- you're saying -- we're talking about offshore, right?
Q. Offshore.
A. Yes.
Q. Okay. And so the industry, the operators in the industry, for example, incur time and expense to either use a helicopter or a boat every 20 to 30 days to go get a refreshed sample from the rig for purposes of coming back and testing for an operational job; is that right?
A. Yes.
Q. And would you agree with me that

the reason they do that is out of concerns for representativeness of the testing?

Page 179:01 to 179:09

A. Yes.
Q. Okay. And just not to put too fine a point on this, the concern is that if we were going to have a production casing job and we know that there is a blend out on the rig, we would not try to replicate that blend in the lab and test it in the lab and transpose those results to what we expect to happen with the rig blend, would we?

Page 179:12 to 180:07

A. No, we wouldn't.
Q. Okay. During the transportation process from shore out to the rig, that -- a dry blend that's taken offshore out of a bulk plant is going to be blown into a container, correct?
A. Yes.
Q. It's going to be transported, likely on a boat, out to the rig, correct?
A. Yes.
Q. It's then going to be blown again into tanks on the rig, correct?
A. Yes.
Q. And within those tanks, there's potential for contamination of prior blends that had occupied that tank, correct?
A. That's a possibility, yes.
Q. There could be residual cement blend in the blowing transport system, correct?
A. Yes.

Page 180:09 to 180:15

Q. There could be differences, increases or decreases in humidity during the transport process, correct?
A. Yes.
Q. And each of those things has the effect to alter the chemical characteristics of the actual blend itself, correct?

Page 180:17 to 184:17

A. Yes. It -- it can.
Q. Okay. And to guard against

the -- the uncertainty of that, it's one of the reasons the industry actually goes out and refreshes sampling for operational testing from the rig, correct?
A. Yes.
Q. Okay. And each of those things we talked about introduces a potential or the possibility of variability in testing, doesn't it?
A. Yes.
Q. Okay. Now, seeing as you only tested the MAC4 -- and when I say MAC4, we understand that between us to be a -- the only slurry from the Macondo rig sample that you actually tested, right?
A. Correct.
Q. So if I say MAC4, we'll have that understanding?
A. Yes.
Q. Okay. So seeing as you only tested the MAC4 slurry, is there additional rig sample left over in your possession?
A. Yes.
Q. How much? How much dry blend?
A. An actual weight?
Q. A rough estimate based on five-gallon barrels. Half full, what?
A. Out of a five-gallon bucket, it's probably 20, 25 percent.
Q. Okay. So about a quarter of a five-gallon bucket?
A. Roughly, yes.
Q. Okay. Did you ever ask yourself if we're supposed to getting insights into what happened to the Macondo slurry cement, why you only conducted one test with it?
A. Of course in being a -- a cementing guy, you wonder but, I mean, it was all -- it all came from -- directly from the JIT to do the one.
Q. Okay. And so that we're clear, what the JIT requested you to do is actually test and obtain data on -- primarily on cement that was not rig cement?
A. You're talking about the -- the bulk testing --
Q. I'm talking about the totality of testing. You only tested one MAC4 slurry, right?
A. Correct.
Q. And yet there are tens and -- there -- there are multiple tests of slurries -- of testing on slurries from sources other than the Macondo rig sample, right?

A. Correct.
Q. Okay. Now, just to be clear, there was no -- none of the UCA testing or compressive strength testing at all that you did, that you performed and then reported in exhibit 5939 was done on rig sample, was it?
A. No, it was not.
Q. Okay. I wanted to go, if you would -- do you still have a copy of your report? Is that exhibit 5937? Actually, I'm sorry. Before we do that, let's go to exhibit 5939.
MR. HILL: And it's in tab 13, counsel, if you --
MR. O'ROURKE: Which one is that?
MR. HILL: It's the 60 percent foam quality foam stability test that BP proposed.
A. Okay.
Q. Okay. Now, when you -- there was a period of time when you were actually setting up your proposed protocols and there was some communication -- I'm not getting into the contents of the communication with the JIT -- but there was a period of time in which you were actually working on developing the protocols that you would use for testing, right?
A. Correct.
Q. And at anytime during that time did you or the JIT ever propose to do the 60 percent foam quality foam stability testing?
A. No.
Q. And I think you indicated earlier that this is not an API test, is it?
A. The --
Q. 60 percent foam quality test.
A. No, it's not.
Q. There are no protocols in API for it, right?
A. No.
Q. There are no -- API doesn't endorse it as an acceptable industry test, does it?

Page 184:19 to 185:06

A. No.
Q. Okay. You didn't propose to do this originally, did you?
A. No.
Q. Okay. Do you know if the JIT proposed it originally?
A. Not in any conversations I had, no.

Q. Now, I heard in your discussion with BP's counsel that one of the things that concerned you about this test was that it wasn't really representative of what happened at the rig, at the injection point, right?

Page 185:08 to 185:15

A. Correct.
Q. All right. Now, I want to make sure that the Court understands why that might be the case. My understanding is even if there is a point at which there is a 60 percent nitrogen content at injection, it happens for a very fraction of a second, correct?

Page 185:17 to 185:24

A. Yes.
Q. And, in fact, it's injected into a -- into a dynamic slurry, correct, not a static slurry?
A. Correct.
Q. The slurry does not become static until it hits bottomhole at 14.5 pounds per gallon, right?

Page 186:01 to 186:05

A. Correct.
Q. All right. So not only is it a -- so essentially this test is attempting to use a static test to model a dynamic condition. Fair?

Page 186:07 to 187:12

A. Yes, in -- in -- in the sense of a word, yes, it is.
Q. Well, and -- and just so that we understand what that sense is, for example, in order to observe the slurry you have to take it out and look at, right? For example, he showed you the picture and asked you does that look like a stable foam slurry when you looked down at the blender. Remember that?
A. Yes.
Q. Do you know how much time it took you to take -- take the lid off the blender and look at it?
A. Approximately 15 seconds.
Q. Okay. And during that time you

could have potential nitrogen breakout, correct?
A. Yes.
Q. And that's an atmospheric condition, right?
A. Yes.
Q. Now, out on the rig in this dynamic slurry, this dynamic slurry is being pumped in a closed system, isn't it?
A. Correct.
Q. And it's being pumped in a closed system that's under pressure, right?
A. Correct.
Q. All right. So this test doesn't model the dynamic condition, nor does it model the closed system, does it?

Page 187:14 to 187:23

A. No, it does not.
Q. And nor does it model the pressure that it would be subjected to after it's been injected, right?
A. That's correct.
Q. Okay. And I think you indicated earlier that you believe that pressure is one of those things that actually helps entrain and keep the nitrogen in the slurry, correct?
A. Yes.

Page 187:25 to 188:08

Q. Okay. Do you think that anything you did in exhibit 5939 is -- and by that I mean the 60 percent foam quality test -- foam stability test report. That's what I'm going to call it, okay?
A. Okay.
Q. Do you think that what you did there is representative of what happened on the rig at Macondo?

Page 188:10 to 189:05

A. Which goes back to why we're doing the -- the foam cement with API. I -- I feel like there's differences, atmosphere under pressure. No, I -- I -- I don't think atmospheric conditions represents what we actually see on a job.
Q. Okay. And just to be clear, the 60 percent foam quality test was done in atmospheric, correct?

A. Yes.
Q. And those three things we talked about, the fact that this is a dynamic slurry was subjected to a static test, the fact that this -- the pressure that the slurry has seen is not present in the -- in this test and the fact that it's in a closed system out in the field but not in this test, those are all -- those are all different points or those are all differences between what was being done in the lab and what was actually occurring out on -- out on the rig, right?

Page 189:07 to 189:11

A. Yes.
Q. Okay. And each of those things could affect the representativeness of any test results that were obtained through this 60 percent foam quality protocol?

Page 189:14 to 189:25

A. Yes.
Q. Do you know who proposed this, this 60 percent foam quality protocol?
A. No. Not specifically, no.
Q. Okay. Would it surprise you to hear that this was requested by BP? Had you heard that?
A. Well, I knew that BP had requested, but specifically who --
Q. Okay. And this was not a test that you had proposed or really wanted to do, right?

Page 190:02 to 193:21

A. No.
Q. So I'm right?
A. You're right.
Q. Thank you.
A. I'm sorry.
Q. All right. Now, if we could, go to your -- I'm going to call it your main test reports, exhibit 5937. That's the JIT Macondo well testing document?
A. Okay.
Q. Now, sir, if you wouldn't mind opening to page 34.
A. 34.
Q. And with some -- a few exceptions, because the only tests in which

you performed that used actual rig slurries were the -- were with respect to the MAC4 slurries. I'm going to focus on those first. Okay?

A. Okay.

Q. So I'm going to look at page 34, if you follow -- follow along with me.

This is the section, section 11, on foam stability, right?

A. Okay.

Q. And actually, let's -- let's turn the page to 38.

A. 38. Okay.

Q. Now, earlier in response to questions that were put to you by the PSC and BP, you very broadly said that none of the tests that you looked at showed indications of stability.

Is that what you testified to previously?

A. Yes.

Q. Okay. With respect to the MAC4 data on page 38, could you tell me specifically what data indicates to you that the MAC4 unset foam stability test showed that the slurry was unstable?

A. Just so we saw -- we saw foam or bubble breakout.

Q. Okay. Do you know how much?

A. Volume-wise, no.

Q. Doesn't volume matter for bubble breakout?

A. Well, yes, it does to some degree. But it's still -- foam stability is also based on foam half-life as well. So it's -- foam half-life is where I have a volume of foam and I lose that over, you know, a period of time.

Q. Well, I think you said earlier that it wasn't so much the bubbles or the appearance of bubbles, it's the matter --

A. It's the volume.

Q. So it's the reduction in volume?

A. Yes.

Q. And you said that you personally observed some reduction in volume in the test specimen, correct?

A. Yes, sir.

Q. All right. Now, that test specimen, you've actually shown in photographic evidence on page 42; is that correct, figure 18?

A. Yes, sir.

Q. Now, do I understand correctly that the picture on the left in figure 18 is

the MAC4 slurry?
A. Yes.
Q. And that is after -- at the conclusion of the foam -- unset foam stability test, meaning after it had been set for a period of two hours and observed, correct?
A. Yes.
Q. Okay. And to the right is the exact same specimen, just a little bit blown up and a little bit closer angle on it, right?
A. Yes.
Q. All right. Can you please point me to where anyone looking at this picture would be able to discern that there is a reduction in volume below the 250-milliliter indicator on this cylinder?
A. Now, you can't see it from there.
Q. Is this the only evidence you have of -- is this the only pictorial evidence or documented evidence that you have that there actually was a reduction in the slurry?

Page 193:23 to 194:01

A. Yes.
Q. When you look at that picture, does it look to you that the slurry actually goes up to the 250-milliliter indicator?

Page 194:03 to 195:12

A. Yes, it does.
Q. Okay. Now, are you familiar with the weigh-up sheets in this case? I'm sorry. Are you familiar with the weigh-up sheets that were generated by OTC when conducting these tests?
A. Yes.
Q. All right. If there was a 5-milliliter reduction, would you expect to be able to see that on this picture?
A. No.
Q. Would you expect to be able to see a 6-milliliter reduction?
A. No.
Q. All right. Just so that we're clear, if I started the 250-milliliter indicator and I was trying to show a 6-milliliter reduction, I would count down, 1, 2, 3, of those -- I don't know. What do

you call them?
A. Graduations.
Q. Graduations?
A. Yes, sir.
Q. Right? And so that would roughly place the bottom of the slurry at 244 milliliters?
A. With 6-mill reduction, yes.
Q. Okay. Do you see anything there that would indicate a 6-milliliter reduction in that picture?
A. No.
Q. Based at -- looking at this picture, you can easily understand why people would conclude that that slurry actually goes up to 250 milliliters, correct?

Page 195:14 to 195:14

A. Yes.

Page 195:16 to 196:16

Q. Let me ask you something. When you tested based on your physical observations of the unset foam stability tests on the MAC4 slurry, did you see any large bubbles?
A. On the unset? We're talking about the --
Q. Right there, unset.
A. Don't recall any large bubbles, no.
Q. And had there been large bubbles, that would have been indicated on the weigh-up sheet, I assume, by the technician performing it?
A. Yes. If you'd saw them by the observation they would probably make.
Q. Did you actually perform this test, or did you have a technician do it?
A. I had technicians doing this.
Q. And your technicians are trained to write indications of instability on the weigh-up sheets when they observe them, right?
A. Yes.
Q. Okay. Did you -- do you see an excessive gap at the top of that specimen?

Page 196:18 to 197:07

A. No.

Q. What is an excessive gap to you?
A. 10, 20 mills --
Q. So six --
A. -- 25. I mean, it all depends.
Q. Okay. So 6 milliliters, you wouldn't classify as excessive?
A. Not excessive, no.
Q. Would you call it minor?
A. Minor, yeah.
Q. Okay. Would it surprise you that your lab technician actually wrote that it was a very minor -- or minor bubble breakout on the weigh-up sheet?
A. No.

Page 198:16 to 200:01

Q. All right. I'm going to ask you to please apply this exhibit sticker, exhibit 5940, just above that Bates number, if you don't mind.
(Exhibit Number 5940 marked.)
A. Sure.
Q. Now, can you confirm for me, based on the slurry design line, that this is, in fact, the Macondo cement sample, the MAC4 sample?
A. Yes.
Q. Okay. And so this is the weigh-up sheet that's associated with the unset foam stability testing that you did on the MAC4 slurry, right?
A. Right.
Q. And do you -- there is a comment there and I'm going to read it. You tell me if I read this correctly.
A. Go ahead.
Q. This is a technician comment, correct, in handwritten form?
A. Yes.
Q. It says, no channeling noticed, right?
A. Right.
Q. 6 milliliters void space, bubble breakout, minor?
A. Okay.
Q. Right?
A. Uh-huh.
Q. Does that indicate to you that the technician found that there was -- to the extent there was bubble breakout, that it was minor?
A. Yes.

Page 200:03 to 200:04

00200:03 Q. And it certainly isn't what you
04 would call excessive, right?

Page 200:06 to 203:01

00200:06 A. Correct.
07 Q. Okay. Are you familiar with the
08 guidelines in API for determining the
09 instability of foam slurries, the -- the --
10 or the qualitative observations, for lack of
11 a better word?
12 A. Yes.
13 Q. All right. I'm going to ask you
14 to look at -- yeah, I'm handing you a copy of
15 API 10B-4?
16 A. Okay.
17 Q. And this has been previously
18 marked as exhibit 4569. So we're not going
19 to put it in the record.
20 A. Okay. Okay.
21 Q. Sir, could you please open to
22 page 10? It's section 9.3.4 of API 10B-4?
23 A. Section 10?
24 Q. Right.
25 A. Page 10?
00201:01 Q. Yes, sir.
02 A. Okay.
03 Q. Down there at the bottom, there
04 is a section that says, signs of foam
05 instability, correct?
06 A. Yes, sir.
07 Q. And it lists, it says, more than
08 a trace of free fluid, correct?
09 A. Yes, sir.
10 Q. Now, you indicated on your test
11 results that you saw no free fluid with
12 respect to the -- the MAC4 slurry, right?
13 A. Yeah.
14 Q. Okay.
15 A. That's correct.
16 Q. And it says, bubble breakout
17 noted by large bubbles on the top of the
18 sample, right? That's what API says?
19 A. That's what API says, yes.
20 Q. And you testified earlier that
21 you didn't see any large bubbles, correct?
22 A. Right.
23 Q. It says, excessive gap at the
24 top of the specimen, minor meniscus effects
25 are normal, correct?
00202:01 A. Yes.
02 Q. Now, you indicated that you
03 can't see any gap in figure 18 of your

report?
A. Right.
Q. But that you thought that there was a gap, a minor gap, right?
A. Right.
Q. And you said that it was a gap that you said certainly wasn't an excessive gap, right?
A. Right.
Q. All right. You didn't see any signs of density segregation or settling, did you?
A. No.
Q. Okay. And you didn't see any large variations in density from top to bottom and, of course, that would be set cement? You can't do that here, right?
A. Not in this particular test.
Q. Okay. In fact, none of the indications of instability that are set forth in 10B-4 did you observe with respect to the unset foam stability test and -- of the MAC4 slurry, did you?

Page 203:03 to 203:13

A. Could you repeat that one more time, please?
Q. Yeah. All of these things that we just went through --
A. Yes.
Q. -- these API criteria of what constitutes an unstable foam -- foam -- an unstable foam slurry --
A. Yes.
Q. -- you didn't -- you didn't see any of those, did you?

Page 203:15 to 204:01

A. In the -- in the liquid, yes, this is what we saw.
Q. Excuse me?
A. No, in -- in the -- in the foam stability test.
Q. In the unset?
A. Yeah, in the unset.
Q. Foam stability test?
A. That's correct.
Q. You didn't -- you didn't see any of these indicators of instability, did you?
A. That's correct.

Page 204:03 to 204:06

00204:03 Q. I'm sorry. You did not see any
04 of the indicators of instability set forth in
05 what we just read in API, did you?
06 A. Right. That's correct.

Page 204:09 to 206:24

00204:09 Q. So I go back to my question.
10 Can you please point to me -- well, let's be
11 clear.
12 When you foamed the MAC4 slurry,
13 it was mixable, wasn't it?
14 A. Yes.
15 Q. You saw a vortex, correct?
16 A. Yes.
17 Q. It foamed in under 15 seconds,
18 right?
19 A. Yes.
20 Q. Or you foamed it to 15 seconds,
21 but it generated a foam within 15 seconds,
22 right?
23 A. That's correct.
24 Q. Are you aware when Halliburton
25 foamed, that they got it to foam in eight
00205:01 seconds?
02 A. No, I didn't know that.
03 Q. Okay. Did you have the -- did
04 you have the Halliburton test results given
05 to you by the JIT?
06 A. I've -- I've had the report, but
07 I've not looked at it --
08 Q. Okay.
09 A. -- not -- not in any detail.
10 Q. All right. Well, I'm back on
11 page 38 of your report.
12 A. Okay.
13 Q. So you found it was -- it was
14 mixable?
15 A. Yes.
16 Q. You found that there -- a vortex
17 was created when you blended it?
18 A. Correct.
19 Q. You found that it foamed in 15
20 or less seconds?
21 A. Correct.
22 Q. All right. You found that the
23 density of the slurry after you mixed it
24 was -- or the specific gravity was 1.79,
25 right?
00206:01 A. Correct.
02 Q. And you did your calculation and
03 you found out that the -- the density of that
04 slurry was 14.9 ppg, correct?

A. Uh-huh.
Q. And that's what, .4, from target?
A. Yes.
Q. That's .4 ppg away from the target density of 14.5?
A. Uh-huh.
Q. Right?
A. Right.
Q. You found that there was no settling. You found that there was -- right?
A. Right.
Q. You found that there was no free fluid, right?
A. Right.
Q. And the bubble breakout, even though it just indicated as a yes here, you said was minor and didn't rise to the level of -- of the indications of instability set forth in API 10B-4, right?

Page 207:01 to 207:11

A. Correct.
Q. So I ask you again, can you please tell me why you think that that -- that slurry is unstable?
A. In this -- in the unset -- in the unset, yes. I -- it -- this is not saying with -- with certainty that this one test is saying that it's unstable.
Q. Right. But if we were to look at just this one test, that indicates it's actually stable, right, in the unset form?

Page 207:13 to 210:14

A. Yes, sir.
Q. All right. Now, let's talk about -- let's talk about the set foam stability test that you conducted. And I think -- well, there isn't any data because you didn't finish the test. But I'm looking at page 39 of your report and that's exhibit 5937 still.
Now, my understanding is -- just forget about all the foam stability tests above it. I want to look at the MAC4.
A. Okay.
Q. Foam set -- foam stability test results, you have an NA across, meaning you didn't obtain any data for it, right?
A. Yes, that's correct.
Q. And there's a note at the bottom

that says, the MAC4 Macondo samples did not set hard during 48-hour -- during the 48-hour curing period?
A. Uh-huh.
Q. And, therefore, cannot be tested for this particular part of the testing protocol, right?
A. Correct.
Q. Who told you that the curing period or the setting period was 48 hours or was to be 48 hours?
A. The JIT.
Q. Did the JIT tell you that that was contrary to API testing protocols?
A. No.
Q. Okay. You agree with me that the reason you do a set foam stability test is not to see if something will set up in 48 hours, but rather to see after it sets, whether it's stable in the set form?
A. Yes.
00209:01 Q. And, in fact, if we go to API, which I gave you before, API 10B-4, which was previously marked as exhibit 4569 --
A. What page was that, sir?
Q. I haven't given you a page yet.
A. I'm sorry.
Q. I'm sorry. I'll find it for you. If you look at page 9.
A. Page 9?
Q. And, again, for the record, this is API recommended practice 10B-4. I'd like you to look, sir, at section 9.3.2. It says, stability of set foam cement slurry. Tell me when you're there.
A. I'm there.
Q. Can you read, for the record, the first sentence, please?
A. Check the foam cement slurry stability by curing samples until they are set, and then determine the density gradient throughout the sample.
Q. So this instructs that this test is properly conducted by allowing the -- the cement to set not for a 48-hour period, but rather until it's set, correct?
00210:01 A. Correct.
Q. And, in fact, if you turn the page, the third paragraph in this section says, again, in case you missed it the first time, allow the slurry to cure for 24 hours or until set, correct?
A. Correct.
Q. All right. So if we were following proper API protocol in the set foam

stability test, you would have allowed that Macondo 4 slurry to actually set before you could dissect it, trisect it, whatever you do, and determine whether or not there's uniform density on top and bottom, right?

Page 210:16 to 211:09

A. That's correct.
Q. Okay. But that is not the protocol the JIT asked you to follow here, right?
A. That's correct.
Q. Okay. You could have done it, right?
A. Yes, sir.
Q. Okay. And if we didn't arbitrarily cut it off at 48 hours, we would have had another indication of whether or not the actual Macondo 4 slurry was stable, correct?
A. That's correct.
Q. Using the set foam stability test method?
A. Yes, sir.
Q. As dictated by API, right?
A. Yes.

Page 211:12 to 212:04

Q. So just circling back, there were only two tests performed on the unset -- or on the Macondo slurry, the unset foam stability test, which you say actually indicates that the unset foam was -- was stable, right? --
A. Yes.
Q. -- and then the set foam stability test, which wasn't run in accordance with API and never actually was allowed to finish as API would have specified, right?
A. Yes.
Q. And so we don't have a stability result -- or we don't have a -- we don't have any data about the stability of the set foam cement because the test was actually prematurely terminated as per API?

Page 212:07 to 212:16

Q. Is that fair?
A. That's fair.

Q. Okay. I'm just curious, do you have any other pictures of the unset -- not that it matters 'cause I know we indicated to the extent there's a gap. It's not excessive, but do you have any other pictures of the MAC4 unset foam stability test?
A. I think that's -- that's -- those are it right there.

Page 217:03 to 217:22

Q. Foam -- I know you've already verified for us that none of the compressive strength tests that were run were done on Macondo rig sample, right?
A. Right.
Q. Are you familiar in the industry that when you run a UCA compressive -- well, obviously, when you run UCA compressive strength, you're running it on the base slurry, right?
A. Right.
Q. And when you run a crush compressive, you're running it on a foam slurry, but one that's not under -- not under pressure, right?
A. That's correct.
Q. All right. And I think you indicated -- by the way, do you agree with me that pressure's actually a significant driver of compressive strength development?

Page 217:24 to 218:02

A. Yes. It can be, yes.
Q. Okay. It's recognized as being a significant driver of compressive strength development in the industry, right?

Page 218:04 to 218:12

A. That's correct.
Q. Okay. So the -- and that kind of informs us, when we do laboratory testing, why we want to take pressure into account. Because to the extent a slurry sees pressure downhole, we want to try to understand the performance of the -- the slurry under the conditions it's actually going to see, pressure being one of them, right?

Page 218:15 to 219:13

00218:15 Q. I'm sorry?
16 A. That's correct.
17 Q. Okay. On page 31, this is where
18 you set forth your compressive strength test
19 results.
20 Do I understand correctly that
21 that top chart is for non-foamed, meaning
22 you --
23 A. The top one?
24 Q. Yeah.
25 A. Yes.
00219:01 Q. And the bottom compressive
02 strength test results are for foam slurries,
03 correct?
04 A. Correct.
05 Q. Have you -- do you have any
06 understanding of the -- the general industry
07 guidance or rule of thumb, for lack of a
08 better word, that says that your -- the --
09 the compressive strength of your non-foam
10 slurry is going to be about three times
11 your -- the compressive strength of your foam
12 slurry, meaning there's a rough one-third
13 correlation between the two?

Page 219:17 to 219:19

00219:17 A. Yes, I'm -- I'm aware of the --
18 some of the correlations that are out there,
19 yes.

Page 220:07 to 221:10

00220:07 Q. Okay. So even with respect to
08 the non-Macondo slurries that you tested,
09 some of the Halliburton blends that you put
10 together in the lab and tested, this, to me,
11 looks like that you were obtaining average
12 compressive strength of about -- well, let's
13 just -- if we compare ACS2, which is the
14 9-gallon slurry -- which was a 9-gallon
15 slurry on non-Macondo rig sample --
16 A. Okay.
17 Q. -- that obtained a compressive
18 strength of about 4,355 average compressive
19 strength or average psi, right?
20 A. On the -- yeah, on the ACS2.
21 Q. And if you correlate that to
22 ACS3, which is on the 9-gallon foamed sample,
23 that obtained a compressive strength of about
24 1150, right?
25 A. Yes, sir.
00221:01 Q. And so that's roughly the
02 relationship, somewhere in the neighborhood

of one-third, right?
A. Yes, sir.
Q. All right. So just so the Court understands this, when you obtained a UCA compressive strength time to 500 psi and let's say, for example, it's eight hours and 40 minutes, all right? --
A. Okay.

Page 221:14 to 221:18

If you obtained a -- if you obtained a 4,355 compressive strength at 48 hours, over that same 48 hours, you could expect that slurry in its foamed variant to reach roughly 1,000, 1100 psi --

Page 221:20 to 222:04

Q. -- right?
A. Yes.
Q. Over the same 48-hour period, correct?
A. Yes.
Q. And so compressive strength development of a foam slurry lags behind the compressive strength development of a base slurry that's not foamed, right?
A. Yes.

Page 222:06 to 222:14

Q. So this goes back to the discussion you were having with BP, which is, when an operator receives a UCA compressive strength time to 500 psi, do -- would you expect an operator to know that you don't look at that if you're trying to assess when a foam job reaches 500 psi? You can't translate that UCA time to 500 psa [sic] and develop a weight on -- weight on cement time?

Page 222:16 to 222:16

Q. A direct weight on cement time?

Page 222:18 to 223:14

A. Correct. Not a direct, no.
Q. Okay. And, in fact, when you actually use -- conduct a UCA compressive strength test in the lab, it's under somewhat

pristine conditions, right?
A. Oh, yes.
Q. It's only subjected to the -- the conditions -- the parameters that you set up in the testing, right?
A. Yes.
Q. It doesn't take into account wellbore conditions, does it?
A. No.
Q. It doesn't take into account potential contamination that's experienced due to the lack of mud removal, right?
A. Correct.
Q. Okay. And all of these things are additional things that could affect the -- the development of compressive strength over time over and above any time indicated by a lab test, right?

Page 223:16 to 223:20

A. Yes.
Q. Would you expect a sophisticated operator like BP who's been drilling holes in the Gulf of Mexico, to understand that basic principle?

Page 223:22 to 223:22

A. Yes.

Page 225:02 to 226:21

Q. Okay. Well, you were testing -- you knew you were doing some type of confirmation, for lack of a better word? It may not be strictly confirmation, but some type of testing to corroborate or assess the testing that Halliburton did prior to the Macondo well incident, right?
A. Yes.
Q. Okay. And during that time, no one ever gave you the data or the test results of the -- of the tests that you were basically trying to replicate or second-guess or whatever?
A. That's correct.
Q. Okay. So did you ever see any data from Halliburton where the testing pressure was 14,458 psi for UCA?
A. No.
Q. All right. And I think you indicated before, you just use a standard API

3,000 psi, right?
A. That's correct.
Q. Now, you're on the API committees and you understand that that 3,000 psi pressure was not really developed with deepwater in mind, was it?
A. No, it was not.
Q. And, in fact, the industry has kind of moved beyond API in this area and in this effort, as you say, to try to best replicate downhole conditions in its testing? It actually tries to obtain the downhole pressure and use it in testing, right?
A. Yes.
Q. And, in fact, if you actually do use that downhole pressure, the actual downhole pressure, you would expect that to have an effect on your compressive strength development, right?
A. Yes.
Q. All right. And so it does not surprise you if somebody was comparing Halliburton's tests with your tests and there's a difference in the time to 500 psi, right?

Page 226:23 to 227:03

A. Correct.
Q. And it wouldn't -- it wouldn't surprise you if somebody was looking at the 12-hour compressive strength development and whereas you got a zero, Halliburton may have gotten something different, right?

Page 227:05 to 228:24

A. Yes.
Q. And that's because you used a different -- different temperature ramp, correct?
A. Yes.
Q. And that temperature ramp heated the -- the sample up over a 16-hour period?
A. Yes.
Q. Right? And you used a lower pressure, right?
A. Yes.
Q. Okay. The lower or the -- the longer heat-up and the lower pressure, both of them are going to have the tendency to increase the time of compressive strength development, isn't it?
A. Yes, it can.

Q. Okay. Have you ever -- are you doing business for BP right now?
A. Yes, sir.
Q. What are you doing for them?
A. Confirmation testing.
Q. Okay. Have you ever met with Erick Cunningham?
A. Yes.
Q. Okay. Is he your primary contact for purposes of your business relationships with BP?
A. No.
Q. Who is?
A. Aaron Dondale. He's one of the main ones. Matt Goodine is another engineer.
Q. What type of engineer is he?
A. They're both cementing engineers, drilling engineers.
Q. Both or which one? Those are different things, right?
A. Well, okay. So those -- those guys -- both of those guys are former Schlumberger.
Q. Okay.
A. So they've got a lot of experience in cementing and now they're doing more stuff, you know, in drilling and completions.

Page 229:05 to 230:24

Q. I'm going to hand you a document that's entitled BP wells organization outline of cementing laboratory capability options. And it starts on -- with a Bates number of BP-HZN-2179MDL04197039. Correct?
A. Correct.
Q. And it ends with the same Bates range, but ending in 7049.
A. Yes.
Q. Have you ever seen this document before?
A. No, I have not.
Q. All right. Well, based -- we'll represent to you that this was produced by BP, as indicated by the Bates number at the bottom.
A. Okay.
Q. And it's a BP document with an issue date of November 2010. The author of it is Erick Cunningham.
Have you ever met Erick Cunningham?
A. Yes, sir.
Q. Have you ever met with him?

A. Yes.
Q. When was the last time you met with him?
A. Couple months ago.
Q. What was that about?
A. About some confirmation testing on some P&A work.
Q. Do you remember when that was?
A. No, not -- not the exact date, no, sir.
Q. I'm going to ask you, sir, if you wouldn't mind opening to page -- page 7 of this document.
A. Okay.
Q. And if you want to take the time to review the document, you're more than welcome, but I will tell you that this is basically BP's post-incident effort to lay out what options they have with redoing some of the cementing expertise within their own company.

Page 231:01 to 233:17

Q. Okay?
A. Okay.
Q. Where Mr. Cunningham lays out some options.
I'm going to focus on the paragraph above where it says option Three A. Do you see that?
A. Option Three A. Okay.
Q. You tell me if I read this correctly. It says: Oilfield Testing & Consulting, Houston, Texas.
A. Okay.
Q. That's your outfit, right?
A. Yes, sir.
Q. And that's the outfit that the JIT hired to do testing for it in this case, right?
A. Yes.
Q. Okay. It says, this company is an upcoming market entry into independent lab testing for cementing and stimulation services, targeted to be operational in early Q1 2011.
Correct?
A. Yes.
Q. Meeting with the director of this new company (Greg Garrison) -- is that you?
A. Yes.
Q. -- was held November 2nd, 2010.
A. Okay.

Q. It says, they were receptive to alignment with BP and also receptive to a timeshare relationship for qualification and confirmation testing if we wanted to pursue this. Also receptive to an embedded BP resource in its facility.
Did I read that correctly?
A. Yes.
Q. Okay. Is this an accurate representation of what you discussed in your meeting several months ago with Mr. Cunningham?
A. Yes.
Q. Okay. And so at that meeting you discussed where BP was looking to align itself with a third-party lab and you were one of the candidates, right?
A. Yes.
Q. All right. I want you to turn
00233:01 to page 11.
A. Okay.
Q. And in this document -- there are several bullet points on this page. I'm reading the paragraph under the third bullet point.
A. Okay.
Q. Okay. It says, with respect to third-party labs that are discussed above, it says, Houston is covered with third-party and I would say we could manage most of the western hemisphere confirmation testing requirement from here with CSI and with an upcoming entry into the market next year.
We understand you've been identified as the upcoming market entry, right?

Page 233:19 to 233:19

00233:19 A. Yes, sir.

Page 234:03 to 235:12

00234:03 Q. Okay. You have had conversations about aligning yourselves with BP and potentially embedding BP personnel in your lab, right?
A. Yes.
Q. Okay. Were these conversations going on at the time that you were contracted by the JIT to conduct the testing that you did?
A. No.
Q. Okay. Is this an effort that's

still going forward? Are you still trying to obtain business from BP?
A. We're still doing business with BP, yes.
Q. Are they your biggest client?
A. No.
Q. Who is?
A. Lafarge.
Q. Lafarge?
A. Yes.
Q. Okay. What percentage, if you know, of your revenue for OTC is generated from BP work?
A. Less than ten percent.
Q. Okay. It's a big client, isn't it?
A. For a startup company, yes, it's a good client, yes, sir.
Q. And getting a major operator is a pretty good haul for a new market entry, right?
A. Yes.
Q. I imagine you expect to expand that relationship in the future, right?

Page 235:14 to 235:14

A. Yes.

Page 236:10 to 237:02

Q. We talked earlier about the photographic evidence that you put in your report at page 43 -- I'm sorry, no.
MR. HILL: Strike that.
Q. At page 42.
A. Okay.
Q. Showing the results after two hours of observations of the unset foam stability test, right?
A. Okay.
Q. On the Macondo 4 slurry.
And we were talking about whether or not -- whether or not a void would be visible, right?
A. Right.
Q. And we agreed that you can't see it in figure 18 if, in fact, it exists, right?

Page 237:04 to 237:21

A. Correct.

Q. Now, did I state that correctly?
A. Yes.
Q. Okay. I have -- I have a picture here that was produced by the government that has a Bates label at the bottom that says, DJIT004-001086. And I'm going to hand it to you to confirm, but it looks to be like there -- it's a photograph of a -- a slurry in a 250-milliliter graduated cylinder, correct?
A. Yes.
Q. And for the record, this one reads .8 -- or .08 gps 13 percent foam, 180 minutes after two hours. Right?
A. Okay.
Q. So what I'd like you to do, sir, is if you would please look at --

Page 238:05 to 239:02

00238:05 Q. Now, that, for example -- now, we understand that that is not a picture of the Macondo 4 slurry that I've been principally asking you about, right?
A. Right.
Q. That's an example of another non-rig sample slurry that you conducted an unset foam stability test on, right?
A. Correct.
Q. And in that one you can see a clear gap at the top below the -- between the top of the slurry and the 250-milliliter marker, right?
A. Yes.
Q. Okay. So that's an instance where it's very clear based on visual observations that there is a gap, maybe even an excessive gap, at the top, right?
A. Right.
Q. You will agree with me that that same gap doesn't exist in the picture
00239:01 depicted on page 42 in figure 18, does it?
A. Does not, no.

Page 239:07 to 239:18

00239:07 Q. Okay. One of the things I wanted to ask you about also was, did any of your testing use rig water that was provided to the government?
A. No.
Q. Okay. So even the Macondo 4 slurry samples did not use rig water?
A. That's correct.

Q. And it's your understanding that Halliburton had turned rig water over to the government for its use, right?
A. Yes.

Page 240:02 to 240:22

MR. HILL: For the record, I am going to mark the picture that we just discussed as exhibit 5941.
(Exhibit Number 5941 marked).
A. Uh-huh.
Q. And, again, that's the eight -- .08 gps 13 percent foam, 180-minute after two hours picture of a non-rig foam stability test, right?
A. Yes.
Q. And this is the one that actually shows a -- how you can observe visually that there's a void at the top of a slurry, right?
A. Yes.
Q. Indicating bubble breakout and thus slurry volume reduction, right?
A. Yes.
Q. And we agreed that this is not what we see when we look at figure 18 of your report on page 42, right?

Page 240:24 to 240:24

A. Yes.

Page 241:16 to 242:24

MR. HILL: I'm going to mark that as exhibit 5942.
(Exhibit Number 5942 marked).
Q. You can go ahead and look at it.
A. Okay.
Q. And for the record, this is -- this is a picture of a five-gallon bucket labeled field fresh water. It has a sample ID on it and there is writing on the bucket, it says 74569. Right?
A. Yes.
Q. Okay. It says rig Transocean on it, right?
A. Yes.
Q. Okay. I'll represent to you that this is a picture of a bucket that contains actual rig water.
A. Okay.

Q. Had you known that it was available to you in this volume, would you have used it for testing?
A. It could have been used, yes. I guess so, yes.
Q. Well, differences in water, mix water --
A. Yes.
Q. -- actually introduce another layer of potential variability in test results, doesn't it?
A. It sure can.
Q. Okay. And in this case, when you did your water analysis that's in your report at page 4 --
A. Yes.

Page 243:02 to 243:18

Q. When you look on at page 4, you did a water analysis where you compared fresh water samples from the City of Houston and Fourchon city, right?
A. Yes.
Q. And distilled water?
A. Yes.
Q. But none of these -- as part of this water analysis, you never did any analysis comparing any of these sources of mix water with the actual mix water that was used at Macondo, right?
A. Not the actual water, no, sir.
Q. Even though, as depicted in exhibit 5942, we know that was at least available to the U.S. government to give to you, right?

Page 243:20 to 245:23

A. I guess it was.
Q. Well, you understood that everything you tested that was labeled as being sourced from the rig, whether it's dry blend, water, or what have you, was provided by Halliburton to the government and then you got that from the government, right?
A. I got dry samples from the government.
Q. Okay. They never gave you any water?
A. I didn't get water, no.
Q. Okay. Thank you.
And so it could not have been included in your analysis on page 4 of the

different waters?
A. That's correct.
Q. All right. Now, BP's counsel also asked you a whole bunch of questions about operations on a rig and about what the respective roles of cement contractors and operators are. Do you remember those questions? There were so many of them I can't tell you all of them.
A. Yes, sir.
Q. Do you have any experience out on a rig operationally?
A. Very little.
Q. How many times have you been on a deepwater rig?
A. Twice.
00245:01 Q. Do you know who -- who those jobs were for, who owned the wells that those rigs were drilling?
A. I can't remember who I was with at the time, no.
Q. Do you know --
A. Schlumberger days.
Q. Schlumberger days?
A. Yes, sir.
Q. Okay. So you have some familiarity -- is it fair to say you have some familiarity of operations on a rig, but perhaps not expert in it?
A. Oh, by no means an expert, no, no.
Q. Let's talk about general rules, okay. Because I imagine that whether you're on the rig or onshore, there are certain rules that most people working in the cement industry kind of understand, right?
A. Yes, sir.
Q. Is that fair?
A. Yes.

Page 246:18 to 248:05

00246:18 MR. HILL: Let's go ahead and mark that as exhibit 5943.
(Exhibit Number 5943 marked).
Q. And you can place that down at the bottom, if you don't mind, sir.
A. Yes, sir.
Q. In a way that doesn't obscure the Bates label at the bottom.
00247:01 There you go. Thank you.
MR. HILL: And we marked it as what?
THE REPORTER: 5943.
Q. Do you need a minute to familiarize yourself with it, or --

A. No, no, I remember this, yes.
Q. All right. Now, this is a -- this is a paper that you co-authored, or --
A. Yes.
Q. There were several authors, but you're one of those. It says there, Greg Garrison on behalf of Schlumberger, right?
A. That's correct.
Q. And it is entitled cementing deepwater, low temperature Gulf of Mexico formations prone to shallow flows, right?
A. Yes.
Q. And this one was published by IADC/SPE 87161, correct?
A. Correct.
Q. Okay. Now, I don't know if I need to go through and point out everything in here, but if this refreshes your recollection, do you recall -- do you recall expressing opinions in here, or adopting opinions in here by your co-authorship that the preparation of a wellbore, and particularly mud removal, is important for purposes -- it's critical to actually getting an effective primary cement job?

Page 248:07 to 249:01

A. Don't remember exact quotes, but yes.
Q. Regardless of whether you wrote about it, will you agree with that?
A. Yes.
Q. Okay.
A. Absolutely.
Q. In fact, there are -- just so that we're clear, I know BP's counsel tried to tell you that -- you know, tried to have you agree that the only thing you're really worried about is mud cake but, in fact, bottoms-up circulation, or circulated ahead of a cement job, is intended to increase a -- or to make the viscosity of the mud throughout the annulus of a uniform viscosity, right?
A. One of the purposes, yes.
Q. And you want to break gel strengths of the mud, right?

Page 249:03 to 249:10

A. That's correct.
Q. So if a well has been sitting for three days, you can expect that at

various places, based on different temperatures and other conditions in the well, that different areas are going to have a higher gelled mud, or a more gelled mud, right?

Page 249:12 to 249:17

A. Yes.
Q. And you want to be able to circulate in order to create a uniform viscosity so that that mud can be effectively moved or displaced out of way by the cement. Fair?

Page 249:19 to 253:18

A. The spacer.
Q. The spacer, yes. With the cement following, right?
A. Yes.
Q. To the extent that you don't have -- you haven't circulated sufficiently, you can actually leave mud left behind, correct?
A. Yes.
Q. And as spacer goes by and the spacer doesn't remove it, you could actually have cement come in contact with that mud that's left behind, correct?
A. Yes.
Q. And it's a potential method of contaminating cement, right?
A. Yes.
Q. And so that's what you mean when it's critical to actually effectively remove mud prior to a cement job, right?
A. Yes.
Q. All right. And one of the other things that's important for effective radially cementing, in order to achieve radial cement, is adequate centralization, right?
A. Yes.
Q. Now, have you actually run CemCADE when you were at Schlumberger and designed a centralizer program --
A. Yes.
Q. -- to optimize a cement job?
A. Yes.
Q. Okay. As a cement contractor, you make certain recommendations about how you can achieve good radial cement through the use of centralizations, right?

A. Yes.
Q. In your experience, did the operator follow your recommendations?
A. Sometimes.
Q. Okay. And when they don't, you've effectively communicated, here's how we recommend getting good radial cement and alleviating channeling and other things, but it's ultimately up to the operator whether they follow that recommendation, right?
A. Yes, sir.
Q. Now, can you recall the time that they didn't follow your recommendation?
A. The specific outcome or, you know, the evaluation, no, I can't.
Q. Okay. Well, do you recall in that event if -- did you tell them an effect of not centralizing properly was potential channeling?
A. Oh, yes, we -- we would lay out the pros and cons of the decisions that were being made.
Q. And whether you told them or not, would you expect an operator to actually know that lack of centralization increases the chance of channeling?
A. If you have some -- some cementing experience, yes.
Q. Okay. Well, in fact, you don't even have to rely on that. You can give them a report, right? I assume CemCADE spits out a report just like OptiCem does that says if you use X number of centralizers you're going to have channeling; if you use Y number of centralizers, you're not. And you present that to your operator, right, or your customer?
A. Yes.
Q. All right. In those instances where the operator did not follow your recommendation, did you exercise stop work authority and say I'm not going to pump the cement job?
A. No.
Q. Why?
A. Because we didn't view, you know, centralization in those cases to be a -- a hazard or a work hazard for Schlumberger.
Q. And you don't believe it to be a safety incident, do you, when the cement you pump is predicted to channel?
A. No.
Q. And, in fact, channeling, by definition, is a lack of zonal isolation,

right?
A. Yes.
Q. All right. And so isn't it true that a lack of zonal isolation doesn't necessarily rise to a safety issue because you always presuppose that the operator's going to maintain well control?
A. Yes.

Page 253:20 to 254:16

Q. And isn't it true that the remedy for actually remediating a channeled cement job, or a cement job for whatever reason doesn't isolate the objective, doesn't isolate hydrocarbon zones, that the -- that the remedy for that is a remedial squeeze job?
A. Yes.
Q. Okay. And Schlumberger performs them all the time, right?
A. That's correct.
Q. Halliburton performs them all the time, right?
A. That's correct.
Q. It's a standard industry operation, right?
A. To fix the problem, yes.
Q. To fix the problem.
It is not -- a lack of zonal isolation does not lead to a blowout unless the rig crew fails to maintain well control, isn't that true?

Page 254:18 to 255:04

A. Yes. It's an issue of hydrostatics, absolutely.
Q. And so you wouldn't expect a cement contractor who tells an operator, hey, you're not going to isolate hydrocarbons if you pump the cement job the way you've designed it with these centralizers, you wouldn't expect them to exercise stop work authority or walk off the job because suddenly that raises some big red flag about a safety incident that's on the HORIZON, would you?

Page 255:06 to 255:16

A. No.
Q. Okay. You indicated that you

noticed that there was D-Air in the slurry --
A. Yes.
Q. -- that Halliburton used to design the Macondo production casing job, right?
A. Yes.
Q. All right. Would you agree with me that D-Air, the purpose of D-Air is, at the mixing phase, to take entrained air out?

Page 255:18 to 256:08

A. Yes.
Q. And understanding that it may potentially have destabilizing effects on foam, would you agree with me as a cement -- you call yourself a cement contractor, or a cement tester?
A. Cement tester.
Q. Okay. As a cement tester, you would agree with me that there are additives that can counteract the presence of D-Air, right?
A. Yes.
Q. And, in fact, if you put enough foaming agent in a slurry you can counteract the effects of D-Air, can't you?
A. Yes, you can.

Page 256:10 to 256:24

Q. The mere presence of D-Air in a slurry intended to be foamed for a production casing job does not automatically say this is an inappropriate slurry for foaming, does it?
A. No.
Q. Okay. And in fact, what matters is the ability to test it to verify that you have enough surfactant or foaming agent in it to counteract the effects of D-Air, correct?
A. Correct.
Q. In preparing a cement job -- or to -- to pump a production casing cement job, do you know what is the general industry guidance on how much you're supposed to circulate the mud ahead of the cement job?

Page 257:02 to 257:17

Q. Do you know?
A. Not a -- not an industry guideline, no.
Q. Okay.

A. I mean, the one thing you hear is try to at least get one bottoms-up.
Q. At least one bottoms-up, right?
A. Yes. I mean, that's kind of a -- something that everyone tries to shoot for.
Q. Okay.
A. And sometimes it's not possible.
Q. Okay. One of the things -- what do you mean not possible? Why wouldn't it be possible?
A. Sometimes --

Page 257:19 to 258:04

Q. Go ahead.
A. -- lost circulation issues become an issue and operators decide not to try to get bottoms-up, just to try to get cement in place.
Q. Okay. If there's a decision not to circulate full bottoms-up, you would expect the operator to understand the risks associated with that is improper -- or insufficient mud removal, something that they may have to go back and remediate, right?

Page 258:06 to 258:11

A. It's -- it's something that my days at Schlumberger, we would lay that out and say here's the possible scenarios that you're facing.
Q. It's a known consequence for operators, isn't it?

Page 258:13 to 260:04

A. Yes.
Q. Okay. And just -- just to finish this up. When you were designing -- were you actually designing cement jobs when you were at Schlumberger, for customers?
A. Yes.
Q. And you used CemCADE -- did I say that right?
A. Yes. CemCADE, yes.
Q. That's Schlumberger's version of software similar to what OptiCem is to Halliburton, right?
A. That's correct.
Q. Okay. And when you said that you were aware also of Schlumberger having

embedded engineers, cement engineers at major operators, right?
A. Correct.
Q. And that's to facilitate the type of conveyance of information that a cement contractor might need in order to effectively do his job, right?
A. Yes.
Q. And in that -- that's an instance where the -- or the contractor's actually going into the operator's offices to help facilitate communication, correct?
A. Yes. They actually have a desk in the office, you know, in their facility.
Q. And, in fact, this highly specialized and proprietary software called OptiCem that BP's counsel was talking to you about is actually on the computers in BP's offices or, in your case, CemCADE was on your employee's computer in the operator's office, right?
A. Yes.
Q. And they sit there and they work with the drilling engineers, collecting inputs that they need to properly design cement and they -- it's a give and -- a give and take of information, right?

Page 260:06 to 260:15

A. Absolutely.
Q. Now, is it fair for me to say that based on your experience at Schlumberger that the design of the cement job is a iterative process that takes into account the inputs of the operator?
A. Yes.
Q. Okay. And have you ever seen an operator say, no, I don't want that additive, I want this additive?

Page 260:17 to 261:19

A. Yes.
Q. Have you ever seen an operator say, I don't want that concentration of -- of retarder, I want this concentration of retarder to get to a different pump time?
A. No.
Q. You've never seen that?
A. Not in a -- well, not to dictate concentrations.
Q. Okay. Well, to dictate pump times?

A. Yes.
Q. When the consequence of that is changing retarder concentrations --
A. Yes.
Q. -- to achieve it, right?
A. Yes.
Q. All right. And you -- you've seen them, hey, I don't want that number of centralizers, I want this number of centralizers, right?
A. True.
Q. Okay. The operator's involved in these processes, right?
A. Yes.
Q. Particularly when you have a -- a cement engineer is embedded in their offices?

Page 261:21 to 262:01

A. You would hope so, yes.
Q. Okay. You -- you said earlier that in your experiences an operator doesn't leave the decision as to what test to run to the -- to the cement contractor. Do you still -- do you still stick by that?

Page 262:03 to 262:14

A. Yes.
Q. Okay. And, in fact, it would be your understanding that a cement contractor is going to understand what data the operator wants before they actually pump the job, right?
A. Yes.
Q. And ultimately a cement contractor doesn't pump a job until the operator gives them the green light and says go ahead, right?
A. Yes.

Page 263:10 to 263:20

When -- when did you first get involved -- or when were you first contacted by the JIT to work on this -- to conduct this testing?
A. The -- in February.
Q. February of 2011?
A. Yes.
Q. Okay. Prior to February 11th of -- February of 2011, had you had any

involvement in the Macondo well whatsoever?
A. No direct involvement, no.

Page 264:20 to 264:25

Q. Okay. And your work and opinions in this case, do they have anything to do with anything other than the cement quality used on Macondo?
A. No. It's strictly about the -- the cement and the testing.

Page 265:12 to 267:03

Q. How are you doing, Mr. Garrison? My name is Sean Brennan and I'm an attorney with MI-SWACO. I wanted to follow up on something Mr. Chen and Mr. Hill touched on very briefly when we were talking about the heavy pad mud going in the hole, into the rathole before the cement job.
A. Okay.
Q. Can you take a look at this for me? I represent to you that this is a document that's been previously marked as exhibit 1026 and this is a -- the drilling fluids program for the Macondo.
A. Okay.
Q. When you were talking about your time at Schlumberger, you said that you would discuss things if there were problems or, like, heavy cement and make a recommendation, things like that, depending on, you know, density, mud weights before possibly pumping a spacer down?
A. Yes.
Q. Are you aware that MI made a recommendation to pump 16.5 pound per gallon spacer into the hole before the cement job?
A. No.
Q. Okay. Can you look at the second page?
A. Yes.
Q. And read that first bullet point for me.
A. Right at the very top?
Q. Right underneath interval discussion and procedures.
A. Okay. If casing is going to set at TD, pump the spot heavy pad mud 16.5 pound per gallon on the bottom prior to tripping out of the wellbore.
Q. Okay. So that is MI-SWACO making a recommendation in their drilling

fluids program to spot heavy mud into the rathole prior to the cement job, correct?

Page 267:06 to 267:06

A. As it appears here, yes.

Page 268:02 to 269:06

Q. And I'd like to talk about the foam stability test.
A. Okay.
Q. And so I like to refer you to exhibit -- 5937 and refer you to page 38.
A. Okay.
Q. You were asked some questions by Mr. Hill about the unset foam cement slurry and specifically asked questions relative to the weigh-up sheet which he marked here today, I think, as exhibit 25 -- 5940. I'm going to leave that in front of you, too.
A. Yes.
Q. And it was specific to the rig sample, which is MAC4?
A. Correct.
Q. Now, earlier today in -- in response to questions I asked you and also in response to questions from the attorneys for BP, you testified that with respect to all of the samples that you -- your lab tested for the unset foam cement slurry, none of those samples were stable, correct?
A. That's correct.
Q. Okay. Why would you have said that, sir, about MAC4?
A. Well, in -- in our -- in our opinion and in what we viewed, it's not a -- a slurry that we would consider stable or recommend --

Page 269:08 to 270:07

A. -- as being stable.
Q. Okay. Well, I know you went through the API, which has previously been marked as -- specific, it's 10B-4 -- been marked as exhibit 4569 in this case. And Mr. Hill went through a number of different signs of stability to try to get you to agree, see whether or not you saw those different conditions with respect to the unset foam slurry test of the MAC4. Do you recall that?

A. Yes.
Q. Okay. Even in light of those questions, sir, taking a step back, you were present in the lab when MAC4 was tested, correct?
A. Correct.
Q. And you were present when the unset foam cement slurry of MAC4 was tested, correct?
A. Correct.
Q. Do you still stand by your opinion today, sir, that with respect to the unset foam cement slurry test of the MAC4, that that was not stable?

Page 270:09 to 271:03

A. In -- from what we saw, yes.
Q. Okay. And why is that?
A. The -- on the graduated cylinder in this particular case, we had -- you know, there's minor bubble breakout and all the other slurries that were evaluated had the -- had the same kind of conditions.
But apart from that, the -- the API sets out a -- a guideline and it's not a tell-all, it's not you do this, this and this and this and this is what you get. A lot of what you see as foam stability is -- is an objective view as well.
Q. Okay. And based on your experience, sir, in the industry as you've talked about at length today, it's still your opinion that the test performed at your lab of the MAC4 for the unset foam cement slurry indicated that that slurry was not stable, correct?

Page 271:12 to 271:14

Q. As a cement tester, sir, you would not recommend that an operator pump cement like that downhole, would you?

Page 271:16 to 271:20

A. I would try to improve the stability.
Q. Okay. You would not say that this is an acceptable slurry to pump downhole, correct?

Page 271:22 to 273:25

A. Not to say that you couldn't, but if -- if you're asking me to pump this, I would say, let's -- let's redesign, let's try to add more foam or let's do something to improve stability.
Q. Why would you want to do that, sir?
A. Well, again, you don't want to have, you know, nitrogen breakout. You don't want a -- you don't want to pump an unstable slurry into a wellbore.
Q. And the consequences of that are what you talked about with Mr. Chen earlier today on behalf of BP, which is you could have flow come through the permeability within the foam cement if it has bubble breakout, correct?
A. Yes. It can.
Q. And then you would not achieve zonal isolation, correct, sir?
A. That can be a -- that can be a result of this, yes.
Q. Okay. I'd also like to talk to you, sir, about the set foam cement slurry test that you talked about at length today --
A. Okay.
Q. -- also with Mr. Hill, only specifically as to MAC number 4.
Remember we talked -- Mr. Hill talked with you about, again, the API saying, specifically under section -- I think it's on page -- I'll pass it.
A. Yes, I remember.
Q. Page 9 at 9.32. It says, check the foam cement slurry stability by curing samples until they are set. And Mr. Hill carried you through over to page 10 and said allow the slurry to cure for 24 hours or until set?
A. Yes.
Q. Now, I think you testified earlier today, sir, that you allowed the MAC4, the rig sample to cure -- to set for 48 hours, correct?
A. Yes.
Q. And that was pursuant to the JIT protocol, correct?
A. Yes.
Q. In your experience as a cement tester who now has a cement lab as you've talked about here today, are you supposed to just wait to -- to infinity for the cement to test -- set, or what's the time frame you normally operate within, sir?

Page 274:02 to 274:12

00274:02 A. Well, we typically operate, you
03 know, in a -- a roughly 24 hours.
04 Q. Okay. And in this case, you
05 allowed for double that amount of time
06 pursuant to the JIT protocol, correct?
07 A. That's correct.
08 Q. And what does it indicate to
09 you, sir, with all your experiences you've
10 talked about here today, that the MAC4 sample
11 for the set foam cement slurry was not set
12 after 48 hours?

Page 274:14 to 274:24

00274:14 A. So under these conditions that
15 were set forth by the JIT, the heat-up
16 schedule, the conditions and -- and 48 hours,
17 it's saying that the -- the cement was
18 overretarded.
19 Q. Okay. What does that mean?
20 A. It just means that the cement
21 had not set. The retarder didn't burn off
22 and we still have -- in this case, we didn't
23 have a liquid, we had more of a, if you will,
24 a gel set.

Page 275:23 to 276:04

00275:23 Q. But would you agree that based
24 upon the sample that you tested in your lab
25 for the set foam cement slurry, the fact that
00276:01 it was not set after 48 hours because it was
02 overretarded would be an indication that it
03 would take longer for that sample to set
04 downhole due to that retarder concentration?

Page 276:06 to 276:06

00276:06 A. Yes. That's an indication.