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UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF LOUISIANA

IN RE: OIL SPILL BY THE OIL RIG	*	Docket 10-MD-2179
DEEPWATER HORIZON IN THE	*	
GULF OF MEXICO ON APRIL 20, 2010	*	Section J
	*	
Applies to:	*	New Orleans, Louisiana
	*	
Docket 10-CV-02771,	*	October 18, 2013
IN RE: THE COMPLAINT AND	*	
PETITION OF TRITON ASSET	*	
LEASING GmbH, et al.	*	
	*	
Docket 10-CV-4536,	*	
UNITED STATES OF AMERICA v.	*	
BP EXPLORATION & PRODUCTION,	*	
INC., et al.	*	
	*	
* * * * *		

DAY 12, AFTERNOON SESSION
TRANSCRIPT OF NONJURY TRIAL BEFORE
THE HONORABLE CARL J. BARBIER
UNITED STATES DISTRICT JUDGE

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25 computer-aided transcription software.

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1 AFTERNOON SESSION

2 (October 18, 2013)

3 * * * * *

4 THE DEPUTY CLERK: All rise.

5 THE COURT: All right. Please be seated, everyone.

6 All right, Mr. Cernich.

7 MR. CERNICH: Scott Cernich for the United States.

8 Just a couple of preliminary matters, Your
9 Honor. We have the list of exhibits, call-outs, and
10 demonstratives from Dr. Zaldivar. It's been circulated, and
11 there are no objections.

12 THE COURT: All right. Without objection, those are
13 admitted.

14 MR. CERNICH: And then we also have a list from our
15 cross-examination of Professor Blunt. There are a few
16 objections to some of the demonstratives and some of the
17 call-outs that we haven't been able to resolve. And I want to
18 offer those into evidence. We've met and conferred, and we
19 haven't been able to reach a resolution on this.

20 THE COURT: Which ones are objected to? Do you have
21 them identified or something?

22 MR. CERNICH: Yes, Your Honor. They are -- Don, are
23 we --

24 THE COURT: How many are there?

25 MR. CERNICH: There are three -- three

01:20 1 demonstratives, Your Honor, and then the call-outs are simply a
01:20 2 reproduction of the call-outs we used from the spreadsheets
01:20 3 that we looked at during trial. It's simply a reproduction of
01:21 4 those -- of the cross-examination showing the entries into the
01:21 5 spreadsheet and the resulting -- the results in
01:21 6 Professor Blunt's spreadsheet.

01:21 7 **THE COURT:** What's the basis of the objections?

01:21 8 **MR. BROCK:** Your Honor, these were the items we were
01:21 9 mentioning this morning. There are some objections to exhibits
01:21 10 that are offered by Dr. Blunt, as well as we have some
01:21 11 objections to these.

01:21 12 I don't know if Mr. Cernich was in court this
01:21 13 morning or not when we opened, but these are the ones that I
01:21 14 said, Let us meet and confer and see if we can work this out,
01:21 15 and if we can't, we'll come back and present it to you.

01:21 16 **THE COURT:** Why don't we do this: If you all could
01:21 17 identify the list of the ones that are objected to, and then we
01:21 18 could set those aside temporarily and admit all the others.

01:21 19 **MR. BROCK:** That would be fine with us.

01:21 20 **THE COURT:** So let us know when you've done that.
01:21 21 Okay?

01:21 22 **MR. CERNICH:** Okay.

01:21 23 **THE COURT:** All right. Good.

01:21 24 **MS. HIMMELHOCH:** Your Honor, Sarah Himmelhoch with
01:22 25 one more preliminary matter -- not in my sleep, I promise. But

01:22 1 over the lunch break, we've conferred within the United States,
01:22 2 and we've decided that we will agree to submit the reports in
01:22 3 redacted format, redacting each of the specific redactions
01:22 4 requested by BP in their letter to you. We will make those
01:22 5 redactions and submit the redacted versions to the Court at the
01:22 6 final marshaling conference. That should eliminate any need
01:22 7 for offers of proof or surrebuttals or anything like that.

01:22 8 **MR. BROCK:** We do have an offer of proof of our own
01:22 9 that could be construed in part to be surrebuttal, so from our
01:22 10 perspective, that will stand. Just so it's clear for the
01:22 11 record.

01:22 12 **THE COURT:** Whatever.

01:22 13 **MR. BROCK:** I understand. I know you've offered to
01:22 14 let us make that offer of proof at a time when we you're not
01:22 15 here, so we put that in writing and we submitted it. So I
01:22 16 didn't want that statement to mean that we don't preserve our
01:22 17 right to do that.

01:22 18 **THE COURT:** Very well.

01:22 19 **MS. HIMMELHOCH:** May I ask for a clarification? Are
01:22 20 you referring to the offer of proof already submitted, sir?

01:23 21 **MR. BROCK:** Yes.

01:23 22 **MS. HIMMELHOCH:** Okay. Thank you, Your Honor.

01:23 23 **THE COURT:** Go ahead, Ms. Harvey.

10:32 24 (WHEREUPON, **JEAN-CLAUDE ROEGIERS, PH.D.** , having been
10:32 25 previously duly sworn, testified as follows.)

JEAN-CLAUDE ROEGIERS, PH.D. - CROSS

1 DIRECT EXAMINATION

01:23 2 BY MS. HARVEY:

01:23 3 Q. Dr. Roegiers, I have you again to finish up your direct
01:23 4 examination.

01:23 5 MS. HARVEY: Let me begin by pulling up D-21311.5.

01:23 6 BY MS. HARVEY:

01:23 7 Q. Just before the break we were discussing loading rate.
01:23 8 And we're just going to focus on the practice you list here
01:23 9 with respect to the depletion loading rate of .1 psi per second
01:23 10 as compared to the Macondo samples that were tested at a .5
01:23 11 depletion rate per second.01:23 12 And if you could just explain to the Court what you
01:23 13 mean by the depletion loading rate.01:23 14 A. It's the rate at which you change the pressure either on a
01:23 15 buildup when you reestablish downhole conditions --

01:23 16 (Reporter request.)

01:23 17 THE WITNESS: Okay. I'll try to slow down.

01:23 18 THE COURT: Slow down. We have a new reporter, so
01:23 19 she has to get accustomed to it.

01:24 20 THE WITNESS: So it's a break-in.

01:24 21 THE COURT: Yeah, break -- you have to break her in.
01:24 22 Right. Of course. Okay.01:24 23 THE WITNESS: It's the rate at which the pressure is
01:24 24 increased or decreased. It's versus a buildup rate when we try
01:24 25 to reestablish on the core the stresses encountered

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01:24 1 underground. And the depletion rate is when you start now to
01:24 2 mimic the production of the well in such a way that you will
01:24 3 not rock itself when the formation itself is compacting.

01:24 4 **BY MS. HARVEY:**

01:24 5 **Q.** What is your opinion with respect to the faster depletion
01:24 6 rate with respect to the Macondo samples as compared to your
01:24 7 best practice and what effect that would have on the
01:24 8 Weatherford results?

01:24 9 **A.** The reason we have recommended rate of loading that is
01:24 10 given by the ISRM is to avoid dynamic conditions. And in other
01:25 11 words, what's happening is that if you move too fast, you
01:25 12 stiffen the rock. And that is particularly true in sandstones
01:25 13 and even more so in sandstones of higher porosity.

01:25 14 **MS. HARVEY:** And let's please pull up TREC-11519.

01:25 15 **BY MS. HARVEY:**

01:25 16 **Q.** Dr. Roegiers, in preparing your opinions, did you review
01:25 17 any documents containing loading rate recommendations from
01:25 18 individuals at BP?

01:25 19 **A.** Yes. This document that is showing right now addresses
01:25 20 that issue. This is a document that gives you presentation
01:25 21 made by Stephen Wilson at the SPE workshop. An SPE workshop is
01:25 22 essentially a workshop that gathers a few specialists on a
01:26 23 particular topic. And if you go to one of my slides, it
01:26 24 mentions the rate of loading.

01:26 25 **Q.** And just so that the Court's clear, the topic or subject

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01:26 1 of this particular SPE presentation is entitled "Pore volume
01:26 2 compressibility in weakly-cemented sandstones."

01:26 3 Let's go, please, to page 15. We have a call-out
01:26 4 there.

01:26 5 **MR. FIELDS:** Excuse me, Your Honor. Objection. This
01:26 6 particular document has not been cited in support of
01:26 7 Dr. Roegiers' opinion on loading rate.

01:26 8 **MS. HARVEY:** Yes, if we go to page...

01:26 9 Well, this particular document is cited in terms
01:26 10 of other slides that are presented here on creep, which is a
01:27 11 different issue but related to how you're doing the testing.
01:27 12 And it's, you know, cited several times in his opinion, not
01:27 13 specifically with respect to loading rate, but it is clearly
01:27 14 within the report itself. And it's mentioned several times on
01:27 15 related issues about how you get up to pressure, down to
01:27 16 pressure, and when you're doing the pressure measurements, if
01:27 17 you're holding it at a certain rate.

01:27 18 **THE COURT:** What's the source of this slide? Is this
01:27 19 a BP document?

01:27 20 **MS. HARVEY:** Yes.

01:27 21 **MR. FIELDS:** Your Honor, I would also indicate that
01:27 22 when you look at the particular opinion which is on loading
01:27 23 rate, which is on section 6 on page 19 of his report, he has
01:27 24 specific references to the information about loading rates.
01:27 25 This document, which is in -- the section on loading rates is

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01:27 1 not mentioned at all.

01:27 2 So this is an additional document that he's
01:28 3 trying to use to bolster his opinions. So it's outside the
01:28 4 four corners.

01:28 5 **MS. HARVEY:** This document addresses pore volume
01:28 6 compressibility in sandstones. It covers a lot of topics.
01:28 7 Dr. Roegiers does cite it in his report, specifically with
01:28 8 respect to PVC testing. I think it's appropriate to use it to
01:28 9 talk about loading rate, as an example.

01:28 10 **THE COURT:** Well, but he didn't use it for that
01:28 11 purpose in his report; correct? Right?

01:28 12 **MS. HARVEY:** He does discuss another BP document.
01:28 13 This one is slightly more on point, and in the interest of
01:28 14 moving along, that's why I decided to use this document.

01:28 15 **THE COURT:** Okay. Well, maybe you can get it in in
01:28 16 another way on another topic, but I'll sustain the objection
01:28 17 for now.

01:28 18 **MS. HARVEY:** All right.

01:28 19 **BY MS. HARVEY:**

01:28 20 **Q.** Dr. Roegiers, let's move back to the summary slide of the
01:28 21 opinions.

01:29 22 Dr. Roegiers, this document also mentions creep in
01:29 23 terms of your opinion on what effect creep might have on the
01:29 24 reliability of Weatherford data.

01:29 25 Did you review any documents -- first of all, can you

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01:29 1 explain to the Court what creep is?

01:29 2 A. Creep is a phenomenon that if you apply certain loads,
01:29 3 constant load on a material, it will immediately have some
01:29 4 deformation, which is called instantaneous deformation,
01:29 5 followed up by some additional information that goes over time.
01:29 6 And that's called "creep."

01:29 7 Q. And what effect could -- or with respect to the
01:29 8 Weatherford test, did Weatherford test to determine whether
01:29 9 creep would be -- have an effect on the compressibility
01:29 10 results?

01:29 11 A. They did not consider creep at all; neither did they
01:30 12 attempt to quantify it.

01:30 13 MS. HARVEY: Can we go back, please, to the SPE
01:30 14 presentation we were just referring to, 11519. Can we go to
01:30 15 page 24, please.

01:30 16 BY MS. HARVEY:

01:30 17 Q. Dr. Roegiers, does this document discuss anything related
01:30 18 to creep?

01:30 19 Pull up the second bullet.

01:30 20 A. "Compressibility acting on over reservoir depletion time
01:30 21 scales will include creep and other 'slow deformation'
01:30 22 effects."

01:30 23 What essentially this memo, which is a recommended
01:31 24 procedure by BP, tells you is that you should take or measure
01:31 25 the deformation when you do UPVC by adding two terms. The

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01:31 1 first term, which is, as I said, elastic instantaneous creep
01:31 2 for that, plus the creep itself.

01:31 3 Q. Thank you, Dr. Roegiers.

01:31 4 MS. HARVEY: Let's move back to the summary slide,
01:31 5 please. You can just do the 21311.1, please. .1, please.

01:31 6 BY MS. HARVEY:

01:31 7 Q. We're just going to focus on the last two bullets for
01:31 8 items that you discuss in this chart here, damage to cores and
01:32 9 calibration or lack thereof on the effect of the reliability of
01:32 10 the Weatherford data.

01:32 11 Dr. Roegiers, do you discuss the potential impact of
01:32 12 those issues in your report?

01:32 13 A. Yes. I summarize the damage or the damage on the core,
01:32 14 which exists mostly inside the core by, number one, the search
01:32 15 concentrations existing in that particular area around the
01:32 16 wellbore, which is where you take your core out; and suddenly
01:32 17 the mud weight that they're filtering, the mud weight will be
01:32 18 larger pressure in the wellbore, and it will be in the
01:32 19 reservoir, therefore, there's going to be an inflow of mud into
01:32 20 the core, and that could change dramatically the properties of
01:32 21 the core.

01:32 22 Q. And what is your opinion with respect to the impact that
01:32 23 might have on the test results here?

01:32 24 A. Definitely increase the uncertainty because we don't know,
01:32 25 depending if the mud is just stopped at the boundary, or the

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01:33 1 mud is allowed to penetrate.

01:33 2 I did not review any drilling reports. I cannot
01:33 3 justify one way or another. It could be positive; it could be
01:33 4 negative. So that's why I'm saying I don't want to say it's
01:33 5 underpredict; I said it increases uncertainty at the present
01:33 6 time.

01:33 7 Q. Thank you.

01:33 8 With respect to calibration, did you review any
01:33 9 information that suggested to you that the equipment had been
01:33 10 calibrated as you would recommend?

01:33 11 A. This was a big surprise to me because this project was so
01:33 12 large and so important that I had expect -- would have expected
01:33 13 to have in the reports from Weatherford a calibration curve
01:33 14 that was done right before the project started and another
01:33 15 calibration after the project was finished so it could give you
01:33 16 some idea about the uncertainties and also the error bar that
01:33 17 you could have expected reinterpreting the results.

01:33 18 Q. Thank you. Let's please turn to your opinion regarding
01:34 19 the other two tests relied upon by Dr. Zimmerman to confirm his
01:34 20 UPVC estimate.

01:34 21 MS. HARVEY: Pull up, please, D-21312.

01:34 22 BY MS. HARVEY:

01:34 23 Q. Starting with the hydrostatic test, why is it your opinion
01:34 24 that this test cannot be used to validate Dr. Zimmerman's UPVC
01:34 25 estimate?

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01:34 1 A. Okay. The hydrostatic test -- essentially, in laymen
01:34 2 terms what this means is you take a piece of rock, you put it
01:34 3 in your container and you increase the pressure around it,
01:34 4 everywhere the same, so that you change or look at the
01:34 5 deformation over a volume -- over the volume. It's an average.

01:34 6 And as Dr. Zimmerman said three days ago, obviously,
01:34 7 if you don't have any anisotropy, you have the 6, 6, 6, you
01:34 8 definitely -- 6 is average. But that can have the same average
01:34 9 by putting 4, 4, 8 or 2, 2, 12.

01:34 10 So that as far as I'm concerned, that's a big flaw.
01:35 11 You have to -- you cannot deduct from there the anisotropy that
01:35 12 you would have in compressibility.

01:35 13 Second thing, the test was done, as I said before,
01:35 14 without reproducing the saturation or the saturant or also the
01:35 15 temperature. God knows what the effect that will give them on
01:35 16 those tests.

01:35 17 Thirdly, as I mentioned earlier in my deposition
01:35 18 today, the hydrostatic tests -- I lost my track here.

01:35 19 Q. How do you convert the hydrostatic to UPVC value?

01:35 20 A. Okay. Okay. Sorry. Thanks a lot.

01:35 21 If you would submit in completing your test that
01:35 22 you're measuring a quantity, another quantity, hoping that you
01:35 23 can transfer back with some known relationships to UPVC.

01:35 24 In the case of the hydrostatic test, what you look
01:35 25 upon is the porosity, and you assume that there is a

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01:36 1 relationship between porosity and compressibility.

01:36 2 Dr. Zimmerman mentioned that he used one standard
01:36 3 relationship that is, to my knowledge, only valid in
01:36 4 consolidated rocks.

01:36 5 If you go into the unconsolidated rocks, I refer to
01:36 6 some diagrams that have been shown, the strain becomes much
01:36 7 larger. There is much more variability of compressibilities of
01:36 8 eventual porosity, so that it's site dependent, and I reject
01:36 9 having -- that is, let's use one relationship that is good to
01:36 10 consolidate it and apply it to as equal reconsolidated
01:36 11 materials.

01:36 12 Q. Let's turn to your opinion regarding the ultrasonic
01:36 13 velocity measurements. Why is it your opinion that that
01:36 14 test -- the results from that test cannot be used to confirm
01:36 15 Dr. Zimmerman's UPVC estimate?

01:37 16 A. Similar problems, first, with saturation temperature. You
01:37 17 know, he done it on dry cores with the room temperature instead
01:37 18 of on wet cores.

01:37 19 Number two, this time this is a little bit different.
01:37 20 Dr. Zimmerman showed a sketch of how to conduct an ultrasonic
01:37 21 test. He said you take a piece of rock, like I had before
01:37 22 here, but this time you put a piece of electric casing on top
01:37 23 and on the bottom, and you propagate a P-wave and an S-wave.
01:37 24 From this P-wave, in the next phase, you calculate the elastic
01:37 25 constants. Young's typical -- Young's modulus, Poisson ratio.

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01:37 1 So he gets those numbers and then from there he
01:37 2 calculates the bulk compressi- -- no, the bulk models. And
01:37 3 then, as he said at his deposition, he takes the inverse of
01:38 4 that to have the compressibility.

01:38 5 May I point out to you that those measurements were
01:38 6 dynamic. Dynamic properties of rocks are quite different than
01:38 7 static. So he needs to -- you need to convert them to static.
01:38 8 And it is site-dependent. You cannot take something in the
01:38 9 literature that tells you this is how we did it, and we apply
01:38 10 the same thing.

01:38 11 Q. Thank you, Dr. Roegiers.

01:38 12 Have you ever used ultrasonic velocity measurements
01:38 13 to estimate UPVC?

01:38 14 A. Definitely -- oh, and for -- no -- ultrasonic
01:38 15 measurements, yes.

01:38 16 Q. But have you used them to measure UPVC?

01:38 17 A. No.

01:38 18 Q. Dr. Roegiers, did you attempt to quantify the impact of
01:38 19 all the problems that you point out in your report and here
01:38 20 today?

01:38 21 A. I wouldn't dare. I just think that I don't want to make
01:38 22 assumption. The assumption made by the Weatherford people is
01:38 23 essentially they quantify it, they say it is not important. I
01:39 24 wouldn't dare do that.

01:39 25 Q. And in your expert opinion, is it appropriate, as

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01:39 1 Dr. Zimmerman did, to take an average of the three UPVC results
01:39 2 he derived from the data to come up with the average that would
01:39 3 be reliable for the reservoir?

01:39 4 A. That was another surprise for me. If you look at the
01:39 5 three cores that were tested for UPVC, he generated three
01:39 6 numbers: 4, 6 and 8.

01:39 7 **MR. FIELDS:** Excuse me, Your Honor. Again, this is
01:39 8 information that is not contained in his report.

01:39 9 **MS. HARVEY:** Dr. Roegiers' report is basically a
01:39 10 discussion of why it is inappropriate to take those three --

01:39 11 **THE COURT:** Okay. Overrule the objection.

01:39 12 **THE WITNESS:** So that if I would have been in this --
01:39 13 you need to realize that between 4 and 8, it's 100 percent
01:39 14 deviation. So that if I would have received such numbers from
01:39 15 a lab and ask me to interpret them, I would say that I cannot.
01:40 16 I wouldn't dare take an average for 100 percent variation.

01:40 17 What I would do is to go back to try to do some
01:40 18 additional core testing, additional core testing which the goal
01:40 19 would be to narrow the spread. That's one thing.

01:40 20 If I would not have any additional cores
01:40 21 available, I would start looking into some wells in the
01:40 22 neighborhood, look through the seismic data or seismic logs and
01:40 23 select one that I would call an analog and then use that number
01:40 24 as the start for it. That's my experience for the field.

01:40 25 **MR. FIELDS:** Your Honor, again, this is well beyond

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01:40 1 the scope of his report. He says nothing about analog wells in
01:40 2 his report.

01:40 3 **THE COURT:** All right. Let's move on.

01:40 4 **MS. HARVEY:** That's my final question. And actually
01:40 5 I will pass the witness.

01:40 6 Thank you very much.

01:40 7 **THE COURT:** All right.

01:41 8 **MR. FIELDS:** May I proceed, Your Honor?

01:41 9 **THE COURT:** Yes.

01:41 10 **MR. FIELDS:** Your Honor, thank you.

01:41 11 **CROSS-EXAMINATION**

01:41 12 **BY MR. FIELDS:**

01:41 13 **Q.** Dr. Roegiers, as you know, my name is Barry Fields and I
01:42 14 am conducting your cross-examination on behalf of both BP and
01:42 15 Anadarko.

01:42 16 **A.** I remember you.

01:42 17 **Q.** Okay.

01:42 18 **A.** And always will.

01:42 19 **Q.** I hope that is a good thing.

01:42 20 **A.** It's called nightmares.

01:42 21 **MR. FIELDS:** Before we start, Your Honor, just a
01:42 22 housekeeping matter. With respect to the last answer, I would
01:42 23 request that Your Honor strike that from the record as being
01:42 24 outside the scope of the record.

01:42 25 **THE COURT:** Which last answer? When he said it was

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01:42 1 nightmares?

01:42 2 **MR. FIELDS:** That's a good question. There have been
01:42 3 a lot of things. His last response.

01:42 4 **THE COURT:** He was referring to you at a deposition,
01:42 5 I guess.

01:42 6 **MR. FIELDS:** No, you can leave that in the record,
01:42 7 Your Honor.

01:42 8 **THE COURT:** Okay.

01:42 9 **MR. FIELDS:** Actually, the last question from counsel
01:42 10 for the United States.

01:42 11 **MS. HARVEY:** Not the entire -- only at the very end
01:42 12 was there a reference to analogs. The entire answer should not
01:42 13 be stricken.

01:42 14 **THE COURT:** All right. I'll sort it out. I'll get
01:42 15 to it. Let's go ahead and complete this testimony, okay?

01:43 16 **MR. FIELDS:** Okay.

01:43 17 **BY MR. FIELDS:**

01:43 18 **Q.** Dr. Roegiers, you're aware that Professor Zimmerman
01:43 19 concludes that 6.35 microsieps is the compressibility of the
01:43 20 Macondo reservoir?

01:43 21 **A.** Yes.

01:43 22 **Q.** And he bases his opinion on the results of three different
01:43 23 types of laboratory tests conducted by Weatherford Labs?

01:43 24 **A.** Correct.

01:43 25 **MR. FIELDS:** If you'll pull up D-23686.

01:43 1 BY MR. FIELDS:

01:43 2 Q. The three types -- the three types of tests that
01:43 3 Dr. Zimmerman reviewed in order to reach his conclusion were
01:43 4 the uniaxial compression test, the hydrostatic stairstep
01:43 5 porosity test, and the ultrasonic velocity or acoustic velocity
01:43 6 test?

01:43 7 A. Correct.

01:43 8 Q. Let's pull up -- well, first of all, I think you mentioned
01:44 9 that you believe the hydrostatic stairstep test analyzed by
01:44 10 Dr. Zimmerman is an indirect method in order to calculate UPVC?

01:44 11 A. Correct.

01:44 12 Q. You believe that this test is not a reliable method of
01:44 13 calculating or estimating UPVC?

01:44 14 A. No. What I said is that in order to go from that
01:44 15 particular geometry of testing to UPVC, you would have to make
01:44 16 a correction. That's what I call indirect. While in the first
01:44 17 test I measure the compressibility directly, without relying on
01:44 18 any other parameter.

01:44 19 Q. But you agree that there are well-established
01:44 20 relationships to convert the porosity measurements from the
01:44 21 hydrostatic stairstep test to a UPVC value?

01:44 22 A. Only for consolidated materials, yes. And still -- there
01:44 23 would still be a different spread, maybe the spread is 5,
01:44 24 10 percent.

01:45 25 Q. Let's take a look at your deposition, page 434, 15 through

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01:45 1 19.

01:45 2 Dr. Roegiers, were you asked this question and did
01:45 3 you give this answer:

01:45 4 "QUESTION: My question is simply: Do you agree that
01:45 5 there are well-established relationships to convert
01:45 6 porosity measurements from hydrostatic compression tests
01:45 7 to a UPVC value?

01:45 8 "ANSWER: --

01:45 9 MS. HARVEY: Objection, improper --

01:45 10 BY MR. FIELDS:

01:45 11 Q. -- "Yes."

01:45 12 THE COURT: Let him finish. Go ahead.

01:45 13 THE WITNESS: Yes, I said yes, but I could never
01:45 14 qualify -- you never let me qualify anything. You stopped me
01:45 15 each time in my tracks.

01:45 16 BY MR. FIELDS:

01:45 17 Q. You also say that Dr. Zimmerman's calculations from the
01:45 18 acoustic velocity tests are unreliable because the acoustic
01:45 19 velocity tests are an indirect method of measuring UPVC?

01:45 20 A. Same problem, yes. But this time it's dynamic versus
01:46 21 static.

01:46 22 Q. And you agree that there are well-accepted equations and
01:46 23 correlations that can be used to convert ultrasonic velocities
01:46 24 to UPVC values?

01:46 25 A. But again, it's site specific. In other words, the

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01:46 1 correlation should be calculated and you can do that in the lab
01:46 2 when doing the same analysis for dynamic and static, take the
01:46 3 ratio and that will be your correction factor.

01:46 4 **MR. FIELDS:** Deposition page 434, 21 through 435, 2.

01:46 5 **BY MR. FIELDS:**

01:46 6 **Q.** At your deposition, were you asked this question and did
01:46 7 you give this answer:

01:46 8 "QUESTION: Okay. Similarly, do you agree,
01:46 9 Dr. Roegiers, that there are accepted equations and
01:46 10 correlations one can use to convert ultrasonic wave
01:46 11 velocity measurements to a UPVC value?

01:46 12 "ANSWER: Yes"?

01:46 13 **A.** But, again, I could not -- you did not let me elaborate on
01:47 14 my "yes."

01:47 15 **Q.** My simple question was: Did I ask you that question and
01:47 16 did you give that answer?

01:47 17 **A.** Yes.

01:47 18 **MR. FIELDS:** If you pull up TREX-009050.9. Just pull
01:47 19 up the heading there.

01:47 20 **BY MR. FIELDS:**

01:47 21 **Q.** This is an excerpt from one of the reports that you
01:47 22 reviewed. Is this a summary of the hydrostatic stairstep
01:47 23 permeability and porosity tests that you reviewed?

01:47 24 **A.** I don't recall, but I've seen so many reports. I don't
01:48 25 recall. I might have seen it.

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01:48 1 Q. Let's talk about the Weatherford test. Now, you would
01:48 2 agree that uniaxial compression testing is a direct method for
01:48 3 measuring UPVC?

01:48 4 A. Yes, uniaxial strain, yes.

01:48 5 Q. But you believe the testing protocol for conducting
01:48 6 uniaxial compression testing on Macondo samples did not follow
01:48 7 industry best practices?

01:48 8 A. That's my experience, yes.

01:48 9 Q. Now, you have published a number of articles in your
01:48 10 career. I think in one of the -- in your direct examination
01:48 11 you indicated that you had published over 200 scientific
01:48 12 papers?

01:48 13 A. Yes.

01:48 14 Q. And you've also, during the course of your career,
01:48 15 published books?

01:48 16 A. No books.

01:48 17 Q. No books. Okay. None of your published articles --

01:48 18 A. Actually, can I correct that?

01:48 19 Q. Sure.

01:48 20 A. One or two chapters in books, yes.

01:49 21 Q. Okay. None of your published articles are on the subject
01:49 22 of UPVC testing, are they?

01:49 23 A. Because I don't believe that they need any research. It's
01:49 24 a well-established test and a well-established protocol.

01:49 25 Q. Sir, my question is simply that none of your published

01:49 1 articles are on the subject of UPVC testing?

01:49 2 A. That is correct.

01:49 3 Q. You have not written any books on performing UPVC testing?

01:49 4 A. No, but I have notes, class notes that I have given in
01:49 5 courses.

01:49 6 Q. You have not published any articles setting forth best
01:49 7 practices or guidelines for performing uniaxial pore volume
01:49 8 compressibility tests?

01:49 9 A. No, nobody likes to publish that. It's established,
01:49 10 counselor.

01:49 11 Q. My question, sir, is simply: Have you published any
01:49 12 articles setting forth best practices or guidelines for
01:49 13 performing uniaxial pore volume compressibility tests?

01:49 14 A. No.

01:49 15 Q. As part of your work in this case, you created a list of
01:50 16 what you call 16 best practices for conducting such tests?

01:50 17 A. Correct.

01:50 18 Q. And I think you --

01:50 19 **MR. FIELDS:** Can you pull up TREX-011698R.11.

01:50 20 **BY MR. FIELDS:**

01:50 21 Q. This is from Figure 2 in your redacted expert witness
01:50 22 report?

01:50 23 A. Yes.

01:50 24 Q. And I think you said on direct exam that the title of this
01:50 25 particular figure or table is called "Best Practices for

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01:50 1 Uniaxial Strain Compressibility Test Protocol." Do you see
01:50 2 that?

01:50 3 A. Yes.

01:50 4 Q. And I think you said earlier that's sort of the same as a
01:50 5 UPVC test?

01:50 6 A. Yes.

01:50 7 Q. Now, you believe these are best practices for testing
01:50 8 compressibility in a laboratory so as to best simulate
01:50 9 reservoir conditions?

01:51 10 A. This document, as I told you, is a live document. It's a
01:51 11 rough draft that has probably been put together by TerraTek and
01:51 12 it is considered now the first draft for the commission on the
01:51 13 work group. Yes, I am to come up with a final protocol.

01:51 14 Q. Just to be clear, Dr. Roegiers, this is not the ISRM
01:51 15 document that we were talking about earlier. This is
01:51 16 actually --

01:51 17 A. That's --

01:51 18 Q. -- this is the figure that you have in your own expert
01:51 19 report that you say is your list of best practices?

01:51 20 A. Yes.

01:51 21 Q. Are we on the same page now?

01:51 22 A. Yes.

01:51 23 Q. But in any event, you believe these best practices that
01:51 24 you listed in your redacted report are designed to simulate
01:51 25 reservoir conditions?

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01:51 1 A. To obtain a good -- a good number to use with the design
01:51 2 of the signs of compaction on the reservoir, yes.

01:51 3 Q. And you contend that Weatherford's tests deviated from
01:52 4 these lists of so-called best practices in a number of ways?

01:52 5 A. Yes.

01:52 6 Q. And because of the deviations from your list of so-called
01:52 7 best practices, that the reliability of the compressibility
01:52 8 test results are substantially diminished?

01:52 9 A. Definitely.

01:52 10 Q. Now, the list of best practices that we just looked at in
01:52 11 your report are not any type of published industry standard?

01:52 12 A. That's correct.

01:52 13 Q. According to your résumé, you've been involved in 15 or
01:52 14 16 professional associations over the course of your career?

01:52 15 A. Yes.

01:52 16 Q. And to your knowledge, none of the professional
01:52 17 associations have written any types of written guidelines or
01:52 18 best practices for performing pore volume compressibility
01:52 19 tests?

01:52 20 A. No, the ISRM is -- that's why the ISRM has formed a
01:52 21 group -- a work group.

01:52 22 Q. They formed a work group. But just to be clear, with
01:52 23 respect to all the other professional associations that you
01:52 24 have belonged to, none of those have issued any type of written
01:53 25 guidelines for best practices for performing UPVC tests?

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01:53 1 A. To the best of my knowledge, no.

01:53 2 Q. Now, you agree that in testing the Macondo samples,
01:53 3 Weatherford did not violate any published industry standard for
01:53 4 performing uniaxial compressibility tests?

01:53 5 A. No.

01:53 6 Q. And --

01:53 7 A. I'm surprised because usually even if you have a protocol
01:53 8 internally, you still have to follow up what the client wants
01:53 9 you to do.

01:53 10 Q. My question simply, sir, is: You agree that in testing
01:53 11 the Macondo samples, Weatherford did not violate any published
01:53 12 industry standard for performing uniaxial compressibility
01:53 13 tests?

01:53 14 A. That's correct. And you can bet they don't rely on their
01:53 15 own results.

01:53 16 Q. Indeed, there are currently no standards or suggested test
01:53 17 methods for performing uniaxial compressibility tests?

01:54 18 MS. HARVEY: Objection. It's been asked and
01:54 19 answered.

01:54 20 THE COURT: Overrule the objection.

01:54 21 BY MR. FIELDS:

01:54 22 Q. Would you like me to repeat the question.

01:54 23 A. Yeah, yeah.

01:54 24 Q. There are currently no standards or suggested test methods
01:54 25 for uniaxial compressibility measurements?

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01:54 1 A. Well, they might have some internal protocol but by
01:54 2 different companies, that's for sure, but I have not been privy
01:54 3 to see them.

01:54 4 **MR. FIELDS:** Deposition page 405, 16 through 25. 16
01:54 5 through 21, I'm sorry.

01:54 6 **BY MR. FIELDS:**

01:54 7 **Q.** In your deposition were you asked this question and did
01:54 8 you give this answer:

01:54 9 "QUESTION: Do you agree that there are currently no
01:54 10 standards or suggested test methods -- suggested test
01:54 11 methods for uniaxial strain measurements?

01:54 12 "ANSWER: I agree."

01:54 13 **MS. HARVEY:** And I guess I objected to this because
01:54 14 it was a vague question asked at the deposition and it was not
01:55 15 clear what --

01:55 16 **THE COURT:** All right. I'll overrule the deposition
01:55 17 objection. Go ahead, you can read the answer.

01:55 18 **THE WITNESS:** Okay. I agree that I said that because
01:55 19 it refers to standards, which would be something would be
01:55 20 exam -- admitted worldwide or suggested -- or suggested methods
01:55 21 would be a method that comes from the ISRM. No, there are not
01:55 22 presently any standards that might come from the ASTM or
01:55 23 suggested methods from the ISRM.

01:55 24 **BY MR. FIELDS:**

01:55 25 **Q.** Before we get into the specific practices that were listed

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01:55 1 on that table, let's first -- let's first discuss something you
01:55 2 talked about on direct examination, and I think you talked
01:55 3 about it a little earlier here, which is that table that you
01:55 4 have in your report is actually based in part on a table from a
01:55 5 proposal for establishing a working group to develop a -- a
01:55 6 suggested test method?

01:55 7 A. Well, it's also mostly based on my experience.

01:56 8 Q. Okay. But it's based in part on that table from the --

01:56 9 A. In part. Maybe a few percent.

01:56 10 Q. And you indicated earlier with respect to the ISM -- ISRM
01:56 11 working group, that was established earlier this year?

01:56 12 A. Yes. I believe it was something to get -- well, the idea
01:56 13 was more than a year ago that we started to talk to people
01:56 14 about it. But I believe that the official start of this work
01:56 15 group was probably in perhaps February when there was the ARMA
01:56 16 meeting in California.

01:56 17 Q. February of 2013?

01:56 18 A. Yes.

01:56 19 Q. And you anticipate that it will take a couple of years for
01:56 20 this particular group before it issues any type of suggested
01:56 21 method for testing for UPVC?

01:56 22 A. Yes. You need to realize that there's right now, I
01:56 23 believe, something like 15 to 20 members on that. Each of them
01:56 24 is going to provide their own alter input. So it's from my
01:56 25 experience with the suggested method that are existing already,

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01:57 1 it takes about two or three years.

01:57 2 Q. Now, you have not published any of the 16 so-called best
01:57 3 practices in the peer-reviewed literature, have you?

01:57 4 A. No, because it's standard.

01:57 5 Q. You have not given any presentation to your peers about
01:57 6 any of these practices?

01:57 7 A. That's not exactly true. I give from time to time courses
01:57 8 in industry, internal courses, and I might have -- I might have
01:57 9 discussed some of the issues.

01:57 10 Q. Let's go to your deposition, page 87, 19 through 22.

01:57 11 At your deposition were you asked this answer -- were
01:57 12 you asked this question and did you give this answer:

01:58 13 "QUESTION: Have you ever given any presentations in
01:58 14 which you presented some or all of these best practices to
01:58 15 your peers?

01:58 16 "ANSWER: No."

01:58 17 A. Since that time I've been thinking and I said no; I say
01:58 18 might -- might be.

01:58 19 Q. In fact, with respect to these best practices, your hope
01:58 20 is that everyone will eventually agree with you on these
01:58 21 practices?

01:58 22 A. I hope so.

01:58 23 Q. Let's take a look at your -- one of the issues and that
01:58 24 has to do with your best practice where you say the best
01:58 25 practice is to use whole cores versus the use of rotary

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01:58 1 sidewall cores for Macondo. Okay. We're going to talk about
01:58 2 that.

01:58 3 A. Okay.

01:58 4 Q. Now, a whole core is also commonly called a conventional
01:58 5 core?

01:58 6 A. Yes.

01:58 7 Q. And you know that there were no conventional cores
01:59 8 collected from the Macondo reservoir?

01:59 9 A. As far as I know, yes.

01:59 10 Q. And rotary sidewall cores have been available in the
01:59 11 industry for at least the last 20 or so years?

01:59 12 A. Even longer than that, yes.

01:59 13 Q. I just want to focus on rotary sidewall cores.

01:59 14 A. Okay. Okay.

01:59 15 Q. They've been around for at least 20 years?

01:59 16 A. Yes. Around the 1980s, I believe, the first prototype
01:59 17 was -- come up from Schlumberger.

01:59 18 Q. And you believe that testing samples from conventional
01:59 19 cores would provide the most accurate estimate of UPVC?

01:59 20 A. Definitely. Of all properties.

01:59 21 Q. Now, you have not personally performed a uniaxial pore
01:59 22 volume compressibility test on a rotary sidewall core?

01:59 23 A. Can you repeat that question?

01:59 24 Q. Sure. You have personally not performed UPVC testing on a
01:59 25 rotary sidewall core?

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02:00 1 A. No, I don't believe in it.

02:00 2 Q. But you know that service companies in the industry do
02:00 3 perform UPVC testing on rotary sidewall cores?

02:00 4 A. Yes. With the risk of having strange numbers.

02:00 5 Q. And you heard Jaime Loos, Weatherford's 30(b)(6) witness,
02:00 6 testify by video a few days ago, you said. It was up on the TV
02:00 7 screen; right?

02:00 8 A. Yes. She's not a rock mechanics person, by the way.

02:00 9 Q. But you heard her testimony, that's my question.

02:00 10 A. Oh, yeah. Sure.

02:00 11 Q. And you heard that her testimony was that Weatherford
02:00 12 commonly performs UPVC testing on rotary sidewall cores?

02:00 13 A. Yes. But she didn't say how many times she performs on
02:00 14 whole cores.

02:00 15 Q. And you also heard Ms. Loos testify that she believes you
02:00 16 can obtain reliable UPVC measurements on rotary sidewall cores.

02:00 17 A. I don't believe that.

02:00 18 Q. You heard her say that? But you heard her say it?

02:00 19 A. I heard her say it, and I don't believe it.

02:00 20 Q. Now, you're also familiar with another service lab and
02:00 21 it's called TerraTek. You mentioned them on direct
02:01 22 examination?

02:01 23 A. Yes, yes.

02:01 24 Q. And it's your opinion that TerraTek is perhaps the best
02:01 25 commercial rock testing lab in the world?

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02:01 1 A. Right now, yes.

02:01 2 Q. And I think you said on direct examination they were sort
02:01 3 of the gold standard?

02:01 4 A. Yes.

02:01 5 Q. You consider TerraTek as being one of the best commercial
02:01 6 laboratories for performing uniaxial pore volume
02:01 7 compressibility tests?

02:01 8 A. I consider them one of the best lab to do rock mechanics
02:01 9 and geomechanics testing.

02:01 10 Q. Including pore volume --

02:01 11 A. Including. Including, yeah.

02:01 12 Q. Including performing uniaxial pore volume compressibility
02:01 13 tests?

02:01 14 A. Yes.

02:01 15 Q. And you actually believe that TerraTek probably performs
02:01 16 uniaxial compressibility tests on rotary sidewall cores?

02:01 17 A. Maybe very little. I don't know the percentage-wise how
02:01 18 much they do sidewall cores for the UPVC or whole cores.

02:02 19 Q. But you know they do.

02:02 20 A. The only thing I know is that they prefer whole cores, and
02:02 21 this is what was told to me really directly.

02:02 22 Q. Sir, my question was simply: You believe that TerraTek
02:02 23 probably performs UPVC testing on rotary sidewall cores?

02:02 24 A. I believe that TerraTek can do UPVC tests on sidewall
02:02 25 cores.

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02:02 1 Q. You believe they probably do perform them on sidewall
02:02 2 cores?

02:02 3 A. If requested by the customer, yes. They don't have a
02:02 4 choice.

02:02 5 Q. You're not familiar with any article written since rotary
02:02 6 sidewall cores were introduced that says whole cores rather
02:02 7 than rotary sidewall cores should be used for UPVC testing?

02:02 8 A. No, but I'm aware of quite a few articles that actually
02:02 9 were mentioned in my report where it says if you need some very
02:02 10 good geomechanics testing, which includes UPVC in my language,
02:02 11 it should be whole cores and it's 100 percent satisfactory.

02:03 12 Q. My question was simply, sir: You are not familiar with
02:03 13 any article written since rotary sidewall cores were introduced
02:03 14 20-some-odd years ago or even longer saying that whole cores
02:03 15 rather than rotary sidewall cores should be used for UPVC
02:03 16 testing?

02:03 17 A. Off the top of my head, no. I know about internal
02:03 18 reports.

02:03 19 Q. Do you know of any -- you do not know of any published
02:03 20 papers, articles, or books that evaluate the reliability or
02:03 21 accuracy of UPVC measurements on rotary sidewall cores?

02:03 22 MS. HARVEY: Objection. Asked and answered.

02:03 23 MR. FIELDS: It's a different question, Your Honor.

02:03 24 THE COURT: Okay. Overruled.

02:03 25 THE WITNESS: No. But what I have seen very

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02:03 1 clearly -- and it's actually written on some of the reports for
02:04 2 Macondo -- is that the measurements of UPVC from sidewall cores
02:04 3 cannot explain the amount of conduction, which means to me that
02:04 4 you have underevaluated the compressibility.

02:04 5 **BY MR. FIELDS:**

02:04 6 **Q.** Sir, my question is simply --

02:04 7 **A.** My answer is simple, too.

02:04 8 **Q.** No. Sir, I want you to answer my question, please. I'm
02:04 9 not trying to be rude. I just want you to answer my question.

02:04 10 **A.** Okay.

02:04 11 **Q.** You do not know of any published papers, articles, or
02:04 12 books that evaluate the reliability or accuracy of PVC
02:04 13 measurements on rotary sidewall cores?

02:04 14 **THE COURT:** I think the problem here, Mr. Fields, it
02:04 15 seems like, with this back and forth that I'm hearing, is that
02:04 16 the witness is saying no -- he's answering your question, but
02:04 17 then he's trying to say something else to explain, which he's
02:04 18 entitled to do.

02:04 19 So you might move this along, as long as he
02:05 20 answers your question, if he wants to say something else and
02:05 21 explain, he's able to do that. As long as he answers your
02:05 22 question first, which I know that he did in that last one at
02:05 23 least.

02:05 24 **BY MR. FIELDS:**

02:05 25 **Q.** You are not aware of any publically available analysis

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02:05 1 comparing the results of UPVC testing on rotary sidewall cores
02:05 2 from a reservoir versus whole core samples from the same
02:05 3 reservoir?

02:05 4 A. Publically, no; internal, yes.

02:05 5 Q. Let's talk about an issue related to rotary sidewall
02:05 6 cores, and that's orientation. And you talked a little bit
02:05 7 about that on your direct examination.

02:05 8 Now, anisotropy is when parameters or properties of a
02:05 9 rock vary with orientation?

02:05 10 A. Correct.

02:05 11 Q. And you can have different rock -- you can have anisotropy
02:05 12 for different rock properties?

02:05 13 A. Correct.

02:06 14 Q. Now, the fact that a rock is anisotropic or tropic for one
02:06 15 rock property does not necessarily mean that it will be
02:06 16 anisotropic for another rock property?

02:06 17 A. Right. It depends on what you call rock properties. For
02:06 18 example, if you look upon permeability, like we mentioned this
02:06 19 morning, it's a different matter. You can have anisotropic
02:06 20 permeability and not have anisotropic properties. But if you
02:06 21 talk about the properties of the rock itself, if I have an
02:06 22 anisotropy -- for example, in Young's modulus, I would have an
02:06 23 anisotropy in strength, I would have an anisotropy in
02:06 24 compressibility, because they're all related.

02:06 25 Q. And one property that could be anisotropic in a sandstone

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02:06 1 is compressibility?

02:06 2 A. Yes.

02:06 3 Q. And compressibility and anisotropy means that the
02:06 4 compressibility differs in different directions?

02:06 5 A. Correct.

02:06 6 Q. Now, you believe that a rock is anisotropic with regards
02:07 7 to compressibility if a rock is laminated?

02:07 8 A. Yes.

02:07 9 Q. And lamination is just layering of different rock types?

02:07 10 A. Yes, as I explained this morning.

02:07 11 Q. And Weatherford Labs took CT scans of extracted core
02:07 12 sampling, and I think we looked at one of those earlier in your
02:07 13 testimony?

02:07 14 A. Yes.

02:07 15 Q. And you claimed that the presence of light and dark
02:07 16 shading in a CT scan of one of the samples for Macondo
02:07 17 indicates the presence of laminations?

02:07 18 A. Yes, it confirmed it was -- it confirmed what was seen
02:07 19 visually in some of the cores.

02:07 20 Q. And you believe the presence of lamination suggests
02:07 21 compressibility -- compressibility anisotropy?

02:07 22 A. Yes.

02:07 23 Q. Now, there were a number of core samples that were
02:07 24 collected for testing at Macondo?

02:07 25 A. Yes.

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02:07 1 Q. You only looked at a CT scan for a single core?

02:08 2 A. That's correct. Just to confirm what my belief was.

02:08 3 Q. And, indeed, you were only asked to look at one example?

02:08 4 A. No. I actually saw a few other examples. I couldn't tell
02:08 5 you how many, but probably four or five other cores that showed
02:08 6 CT scan and anisotropy.

02:08 7 MR. FIELDS: Deposition page 197, 11 through 14.

02:08 8 BY MR. FIELDS:

02:08 9 Q. At the deposition were you asked this question and did you
02:08 10 give this answer:

02:08 11 "QUESTION: Okay. Did you look at the CT scans of
02:08 12 any sample other than Sample 3-16R?

02:08 13 "ANSWER: No. I just asked for one example -- looked
02:08 14 at one example."

02:08 15 Did I ask you that question and did you give that
02:08 16 answer?

02:08 17 A. Yes, counselor, but since that time, since that
02:08 18 deposition, I looked at some other CT scans.

02:08 19 MR. FIELDS: Your Honor, I'm going to move to strike
02:08 20 that because I'm talking about what happened up until the time
02:08 21 of his deposition.

02:08 22 THE WITNESS: And I didn't lie.

02:08 23 MS. HARVEY: Your Honor, he opened the door --

02:09 24 THE COURT: Well --

02:09 25 MS. HARVEY: -- that answer.

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02:09 1 **THE COURT:** Again, the problem is your original
02:09 2 question didn't specify that. It said: Have you looked at
02:09 3 other examples?

02:09 4 I think the witness apparently said he had. You
02:09 5 didn't specify a time frame. Now he's explained it.

02:09 6 **MR. FIELDS:** Okay.

02:09 7 **THE COURT:** Okay.

02:09 8 **BY MR. FIELDS:**

02:09 9 **Q.** Now, when I ask you for your analysis or -- and I'll try
02:09 10 to remember to remind you -- when I ask you that, I'm actually
02:09 11 talking about any analysis that you performed prior to your
02:09 12 deposition which took place.

02:09 13 **A.** Okay. Then only one here.

02:09 14 **MS. HARVEY:** You should be clear then in your
02:09 15 question.

02:09 16 **THE COURT:** Okay. I think he's going to try to do
02:09 17 that.

02:09 18 **BY MR. FIELDS:**

02:09 19 **Q.** Now, even if some anisotropy -- I keep pronouncing the
02:09 20 word wrong, but everybody knows what I'm talking about --

02:09 21 **A.** That's fine.

02:09 22 **Q.** -- exists in the one sample, you are not able to quantify
02:09 23 the extent of that anisotropy?

02:09 24 **A.** That's correct.

02:09 25 **THE WITNESS:** And I would like to make a reference of

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02:09 1 a comment on this, if you allow me, Your Honor.

02:10 2 **THE COURT:** Go ahead.

02:10 3 **THE WITNESS:** In general, it's difficult to -- from
02:10 4 visual to quantify the level of anisotropy. Usually what is
02:10 5 done when the core arrives in the lab, you do non-destructive
02:10 6 testing, where you put the porosity profile, for example, in
02:10 7 this case, a vertical and horizontal, and that will give you an
02:10 8 idea about the anisotropy.

02:10 9 I do not understand why this was not done,
02:10 10 especially since there were marked laminations.

02:10 11 **BY MR. FIELDS:**

02:10 12 **Q.** Let's move to another topic, which has to do with mud
02:10 13 invasion. You talked about the fact that if there's mud
02:10 14 invasion, it could potentially -- it could potentially affect
02:10 15 the reliability of the testing?

02:10 16 **A.** Correct.

02:10 17 **Q.** And by mud invasion, you mean that sometimes drilling mud
02:10 18 can enter into the pore spaces of the sample?

02:11 19 **A.** Correct.

02:11 20 **Q.** And you say that there is evidence that indicates that a
02:11 21 drilling mud was found in some of the core samples?

02:11 22 **A.** Yes. There was a comment made by -- upon visual that they
02:11 23 had to scrape off the mud from the core.

02:11 24 **Q.** But you know the core samples were clean before they were
02:11 25 tested for uniaxial compression testing?

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02:11 1 A. Yes.

02:11 2 Q. And as part of the -- part of your work in this case, you
02:11 3 reviewed the depositions of Jaime Loos?

02:11 4 A. Yes.

02:11 5 Q. And don't you recall Ms. Loos indicating that the samples
02:11 6 that were tested by Weatherford were clean and dried?

02:11 7 A. Yes. But she did not mention how it was cleaned, and I
02:11 8 couldn't comment on that because I'm not a drilling engineer.
02:11 9 I didn't know, the private joke was, what kind of mud had been
02:11 10 used. Of course, it's very much dependent on the mud and the
02:11 11 size of the molecules.

02:12 12 Q. Well, you could not point to any document that says that
02:12 13 the cores that were tested for UPVC by Weatherford still
02:12 14 contained mud when they were tested?

02:12 15 A. That's correct. Neither, I cannot, from the information I
02:12 16 have.

02:12 17 Q. Let's talk about core damage, and I think one of the
02:12 18 things that you believe is that sometimes these -- these
02:12 19 samples come from something called the "stress cage"?

02:12 20 A. Yes.

02:12 21 Q. And that that's the area around the borehole that goes
02:12 22 in -- I believe you said several inches around --

02:12 23 A. Something actually like 3 to 5 diameters, yes.

02:12 24 Q. And you believe that potential damage caused by the coring
02:12 25 operation itself can affect the reliability of the sidewall

02:12 1 core sample?

02:12 2 A. It's definitely an inference, and it might explain why we
02:12 3 have such poor pore/core recovery due to the very high stress
02:13 4 concentrations.

02:13 5 Q. Now, you cannot determine what effect, if any, potential
02:13 6 damage from coring had on the uniaxial compression test here?

02:13 7 A. No. But since that time, I've looked at it more in
02:13 8 detail, upon the stresses that bind this reservoir. They were
02:13 9 not measured, okay, so you have to take my comments here with a
02:13 10 grain of salt.

02:13 11 The vertical stress is the overburden. It can be
02:13 12 calculated. This is the density of the material. The
02:13 13 horizontal stress, they assumed -- and I have no idea from
02:13 14 where it came -- that it's 13,300 psi, and then they assumed
02:13 15 that the two horizontal stresses are the same. I have no idea
02:13 16 from where that comes.

02:13 17 But if you look at all that, stress concentration
02:13 18 would be twice. So if you have a stress concentration of
02:13 19 26,600 psi at the borehole with a strength of the rock of the
02:13 20 other one of about 8,000 psi.

02:14 21 Now, you can understand very quickly that under under
02:14 22 induced stress conditions, the material was broken up. That's
02:14 23 why we have poor core recovery.

02:14 24 Q. My question is simply: You do not determine what effect,
02:14 25 if any, potential damage from coring had on the uniaxial

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02:14 1 compression test?

02:14 2 A. No, but I can just do the same calculation I gave you.
02:14 3 I'd anticipate.

02:14 4 Q. In our case, you cannot even tell us whether there is
02:14 5 actually any damage induced by the coring?

02:14 6 A. Not by the coring, by the drilling.

02:14 7 Q. Now, let's discuss the stress cage. As a general rule,
02:14 8 any rotary sidewall core obtained from a wellbore would come
02:14 9 from the stress cage?

02:14 10 A. Correct.

02:14 11 Q. And the Macondo samples that were tested for pore volume
02:15 12 compressibility would have been taken from the so-called stress
02:15 13 cage?

02:15 14 A. Within the stress cage, yes.

02:15 15 Q. But you're not able to determine what impact this has on
02:15 16 the UPVC value?

02:15 17 A. Well, you know what's going to happen. As I explained
02:15 18 this morning, is that if it is broken up, that means the only
02:15 19 test that's left is what's testing is through the medium, which
02:15 20 means you underestimate compressibility.

02:15 21 Q. Deposition page 217, line 19, to 218, 2.

02:15 22 It starts: "These various cores were" -- and I asked
02:15 23 you -- I need a little set up here.

02:15 24 First of all, in the prior question, you see, I
02:15 25 asked:

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02:15 1 "QUESTION: These various cores were tested from --
02:15 2 for UPVC were taken, in your view, from the stress cage
02:16 3 area?

02:16 4 "ANSWER: Correct.

02:16 5 "QUESTION: Are you able to determine what impact
02:16 6 this has on the UPVC value?

02:16 7 "ANSWER: No, because it was not measured in both
02:16 8 directions."

02:16 9 Were you asked those questions and did you give those
10 answers?

02:16 11 A. Yes, and I stand by my response.

02:16 12 Q. Let's turn to another criticism that you had of the
02:16 13 Weatherford testing procedures. You've indicated that you
02:16 14 couldn't find any evidence that Weatherford testing equipment
02:16 15 was properly calibrated?

02:16 16 A. Correct.

02:16 17 Q. And as part of your work for this case, you indicated
02:16 18 earlier you reviewed the deposition transcript of Jaime Loos?

02:16 19 A. Can you repeat, please?

02:16 20 Q. Yes. As part of your work in this case, you reviewed the
02:16 21 deposition of Ms. Loos?

02:16 22 A. Yes.

02:16 23 Q. If we take a look at -- the demonstrative is depo
02:17 24 338.1.61.2, which is actually the page 160 of her deposition.

02:17 25 Were you aware that Ms. Loos testified that, with

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02:17 1 respect to Weatherford's equipment, calibration is heavily
02:17 2 evaluated and monitored by Weatherford?

02:17 3 A. Yes, but I repeat: I never saw any documentation that
02:17 4 this was done. Neither could I evaluate the error bar with the
02:17 5 measurements.

02:17 6 Q. And were you aware that Ms. Loos also testified that
02:17 7 Weatherford has standard operating procedures for its test,
02:17 8 including calibration?

02:17 9 A. She did not explain to me what standard procedure there
02:17 10 was. Was that twice a year? Once every two years? One every
02:17 11 five years?

02:17 12 Q. Right. But you know that she said they had standard
02:17 13 operating procedures for testing, including calibration?

02:17 14 A. Yes, but she didn't explain what she did.

02:17 15 Q. And you're aware that she testified that those standard
02:18 16 operating procedures were followed with respect to the Macondo
02:18 17 testing?

02:18 18 A. Same answer.

02:18 19 Q. Which is: That's what she testified?

02:18 20 A. Uh-huh.

02:18 21 Q. Is that a yes?

02:18 22 A. That's a uh-huh.

02:18 23 Q. Okay. Let's move to saturate.

02:18 24 When Weatherford tested the three core samples for
02:18 25 UPVC, it filled the pores of these samples with fluid?

02:18 1 A. In the field, in the reservoir.

02:18 2 Q. No. What I'm asking is: They're getting ready to do the
02:18 3 testing, and so when Weatherford was testing the three core
02:18 4 samples for UPVC, it filled the pores of those samples with a
02:18 5 fluid?

02:18 6 A. Yeah, and they cleaned it out.

02:18 7 Q. And the fluid is called a "saturant" or "saturating"
02:18 8 fluid?

02:18 9 A. Yes.

02:18 10 Q. And you believe the type of pore fluid or saturant used in
02:19 11 the uniaxial compressibility test affects UPVC measurements?

02:19 12 A. Correct.

02:19 13 Q. You believe the type of saturant used can affect the rock
02:19 14 samples' stiffness and deformability?

02:19 15 A. Yes.

02:19 16 Q. Weatherford used lab oil as a saturant, kerosene?

02:19 17 A. Yes.

02:19 18 Q. You believe that the use of kerosene as a saturant is
02:19 19 inconsistent with your so-called list of best practices?

02:19 20 A. Well, what is missing is the brine phase. The brine phase
02:19 21 is something that is existing in almost every reservoir that I
02:19 22 know of and can affect because it's -- it's essentially is
02:19 23 hydrophilic to the grains. Setting bounds on the grains, you
02:19 24 can never get rid completely of this grain.

02:19 25 Q. So in your view, using kerosene only as a saturating fluid

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02:19 1 is inconsistent with your list of best practices?

02:19 2 A. Yes.

02:19 3 Q. You have never used kerosene as a saturant for pores?

02:20 4 A. When I was a young kid, yes, I did use it.

02:20 5 Q. But you know of others besides Weatherford that have used
02:20 6 kerosene to saturate rock samples?

02:20 7 A. Very few examples --

02:20 8 Q. That you know of.

02:20 9 A. -- that I know of. Some of them have done it. Those
02:20 10 other ones haven't talked to me.

02:20 11 Q. Now, you're not aware of any literature discussing the
02:20 12 effect of using kerosene versus another saturating fluid on
02:20 13 UPVC testing?

02:20 14 A. Can you repeat again? I want to make sure I catch --

02:20 15 Q. Sure. As of the time of your deposition, you were not
02:20 16 aware of any literature discussing the effect of using kerosene
02:20 17 versus another saturating fluid on UPVC testing?

02:20 18 A. No. I was even surprised they're still using kerosene.

02:20 19 Q. In fact, as of the time of your deposition, there is
02:20 20 nothing -- you were not aware of anything in the literature
02:20 21 supporting your view that kerosene is a less appropriate
02:21 22 saturant than, say, brine for purposes of UPVC testing?

02:21 23 A. My point, counselor, is that you're missing the phase that
02:21 24 is the brine. That plays a very important role.

02:21 25 Q. Deposition page 261, lines 19 through 23.

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02:21 1 At the deposition, were you asked this question and
02:21 2 did you give this answer:

02:21 3 "QUESTION: Is there anything in the literature
02:21 4 supporting your view that kerosene is a less appropriate
02:21 5 saturant than brine for purposes of testing UPVC?

02:21 6 "ANSWER: For testing UPVC, no."

02:21 7 Were you asked that question and did you give that
02:21 8 answer?

02:21 9 A. I still stand by that.

02:21 10 Q. Up until the time of your deposition, you had not tried to
02:21 11 determine whether there are any laboratories that still use
02:22 12 kerosene as a saturant when performing uniaxial compression
02:22 13 testing?

02:22 14 A. I didn't think that there was anyone even using that
02:22 15 anymore. I was surprised.

02:22 16 And, actually, I need to make a comment here, if you
02:22 17 look at the tests that were performed on the two other wells by
02:22 18 Weatherford, they were brine saturated.

02:22 19 **MR. FIELDS:** Your Honor, I move to strike that answer
02:22 20 as nonresponsive.

02:22 21 **THE COURT:** Well, I think it's responsive to your
02:22 22 question. Go ahead.

02:22 23 **BY MR. FIELDS:**

02:22 24 Q. Deposition line [verbatim] 248, 25 through 249, 5.

02:22 25 At your deposition, were you asked this question and

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02:22 1 did you give this answer?

02:22 2 "QUESTION: As part of your work in this case, did
02:22 3 you try to determine whether there are any laboratories
02:22 4 that would use -- that use kerosene as a saturant on cores
02:22 5 being tested for uniaxial pore value compressability?

02:23 6 "ANSWER: No."

02:23 7 Were you asked that question and did you give that
02:23 8 answer?

02:23 9 A. That's correct.

02:23 10 Q. And as of the time of the deposition, you had not
02:23 11 performed any research to determine whether the use of kerosene
02:23 12 had had any affect on the reliability of the results from a
02:23 13 UPVC test?

02:23 14 A. No, because I believe that we have to saturate with the
02:23 15 same fluids that -- or very close to what you get in the
02:23 16 reservoir, since I've never used kerosene.

02:23 17 Q. Deposition line -- page 262, lines 20 through 24.

02:23 18 THE COURT: Well, he agreed with you. He said no.
02:23 19 He said no. So you're constantly doing this, Mr. Fields, and
02:23 20 we're taking twice as much time as this examination should take
02:23 21 if you're going to ask the same question over again once you
02:23 22 get an answer.

02:23 23 MR. FIELDS: Understood, Your Honor.

02:23 24 THE COURT: Okay.

25

02:23 1 BY MR. FIELDS:

02:23 2 Q. You were also critical of Weatherford's testing procedures
02:24 3 because of the temperature at which the test was conducted?

02:24 4 A. Correct.

02:24 5 Q. The Macondo reservoir was estimated to be around
02:24 6 243 degrees Fahrenheit?

02:24 7 A. Correct.

02:24 8 Q. And you believe that Weatherford tested the rock samples
02:24 9 at ambient or room temperature?

02:24 10 A. They did, yes.

02:24 11 Q. And you believe that testing at room temperature rather
02:24 12 than reservoir temperature would have an effect on
02:24 13 compressibility?

02:24 14 A. Definitely.

02:24 15 Q. And you, yourself, have performed the uniaxial compression
02:24 16 test at ambient temperatures?

02:24 17 A. Yes.

02:24 18 Q. As of the time of the deposition, you hadn't reviewed any
02:24 19 literature or any other information that tells you that service
02:24 20 laboratories always perform uniaxial compression tests at
02:24 21 reservoir temperature?

02:24 22 A. You need to reestablish the downhole conditions.
02:24 23 Temperature, you need to get -- it can very important or it can
02:24 24 be negative or you don't know at different times. I don't want
02:24 25 to make the opinion to start with, but I can give some examples

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02:25 1 on my recent work that a change in temperature of the mud by
02:25 2 about 50 degrees C gives you a pore pressure change by
02:25 3 7,000-psi. We changed completely the stress conditions in the
02:25 4 UPVC test.

02:25 5 **MR. FIELDS:** Your Honor, that is nonresponsive. I
02:25 6 move to strike that.

02:25 7 **MS. HARVEY:** He said "any other information." I
02:25 8 think it is responsive.

02:25 9 **MR. FIELDS:** I'll move on, Your Honor.

02:25 10 **THE COURT:** Yeah. Just move on. Your question was
02:25 11 so broad, I don't know how I can say it's not responsive, or
02:25 12 any other information. Go ahead.

02:25 13 **BY MR. FIELDS:**

02:25 14 **Q.** You do not know how often uniaxial compression tests are
02:25 15 performed at reservoir temperatures versus at ambient
02:25 16 temperatures?

02:26 17 **A.** No, I have no idea.

02:26 18 **Q.** As of the time of your deposition, you had not performed
02:26 19 any analysis to determine the quantitative effect that
02:26 20 Weatherford had performed the uniaxial compression test at
02:26 21 reservoir temperatures instead of at ambient temperatures?

02:26 22 **A.** I don't even know if they have the capabilities to run
02:26 23 testing for temperature. That could be a limitation, or time
02:26 24 could be a limitation because testing temperature would take
02:26 25 easily five days compared to one day.

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02:26 1 Q. Let's jump forward to loading rate and briefly talk about
02:26 2 that. You talked about this in your direct examination.

02:26 3 It's your view that the samples -- that Weatherford
02:26 4 loaded the samples too rapidly?

02:26 5 A. Correct.

02:26 6 Q. And you contend that, as a best practice, the buildup
02:26 7 loading rate should be less than 1 psi per second?

02:26 8 A. Yes, that's a standard that we use usually in rock
02:27 9 mechanics.

02:27 10 Q. And for Weatherford, they performed the loading or the
02:27 11 buildup rate at four times that, at about 4.2 psi per second?

02:27 12 A. Yes, on the loading rate. On general rating, it went much
02:27 13 faster.

02:27 14 Q. And as of the time of the deposition, you did not know how
02:27 15 much of a difference a loading rate greater than 1 psi per
02:27 16 second would make to UPVC test results?

02:27 17 A. That is correct.

02:27 18 Q. And you had no idea at the time of your deposition by what
02:27 19 amount the measured UPVC values would change if Weatherford's
02:27 20 loading rate had been less than 1 psi per second instead of
02:27 21 4.2 psi per second?

02:27 22 A. No. They did not determine how much changes in designated
02:27 23 properties. This number for 1 psi per second comes in because
02:27 24 you want to avoid any dynamic loading conditions.

02:27 25 Q. Let's move to the topic of creep, and you mentioned creep

02:27 1 a little bit earlier in your direct examination.

02:28 2 "Creep" is a type of inelastic deformation?

02:28 3 A. No. You have two kinds of creep. On the deposition, you
02:28 4 talked only about inelastic, but there's also elastic creep.

02:28 5 Okay. So that you have creep that could start virtually in the
02:28 6 inelastic regime and can go so into the elastic regime.

02:28 7 In the elastic regime, what would happen is that the
02:28 8 creep would be accelerating. It's called tertiary creep.

02:28 9 Q. Not all reservoir rocks experience creep, do they?

02:28 10 A. Many do.

02:28 11 Q. And if rocks experience creep, then this can have an
02:28 12 affect on compressibility?

02:28 13 A. Correct. You have to add this term to the elastic
02:28 14 instantaneous creep that you measure.

02:28 15 Q. For creep to affect UPVC, creep has to first be initiated
02:28 16 in the reservoir?

02:28 17 A. Yes.

02:28 18 Q. And once creep has been initiated, the magnitude of creep
02:29 19 could have an affect on UPVC over time?

02:29 20 A. Correct.

02:29 21 Q. Now, to the best of your knowledge, there were no tests
02:29 22 performed on the Macondo rock samples to determine whether
02:29 23 creep would occur in the reservoir?

02:29 24 A. Yes. And I'm surprised about that because it's usually
02:29 25 BP's protocol to look at creep.

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02:29 1 Q. Now, the amount of stress will affect whether creep will
02:29 2 be initiated?

02:29 3 A. Correct.

02:29 4 Q. Okay. And you believe it is effective stresses that
02:29 5 important to determining whether creep will be initiated in the
02:29 6 reservoir?

02:29 7 A. Well, yes. But the -- okay. Go ahead.

02:29 8 Q. Go ahead. I didn't mean do cut you off.

02:29 9 A. No, go ahead.

02:29 10 Q. All right. Effective stress is essentially the total
02:29 11 confining stress minus pore pressure?

02:29 12 A. In the simplified analysis, yes.

02:29 13 Q. Now, the initial pore pressure of the Macondo reservoir
02:29 14 was about 11,800 psi?

02:29 15 A. Pore pressure, yes.

02:29 16 Q. And the final reservoir pressure, I think you estimate it,
02:30 17 it might be around 10,300 psi?

02:30 18 A. Yes.

02:30 19 Q. As of the time of the deposition, you had no idea -- you
02:30 20 had no data showing that creep was initiated at the Macondo
02:30 21 reservoir when the pressure dropped from 11,800 to
02:30 22 approximately 10,300 psi?

02:30 23 A. Correct.

02:30 24 Q. You cannot tell us at what level of effective stress creep
02:30 25 would have initiated at the Macondo reservoir?

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02:30 1 A. No, because I didn't try it.

02:30 2 MR. FIELDS: That's all the questions I have, Your
02:30 3 Honor.

02:30 4 THE COURT: All right. Any redirect?

02:30 5 MS. HARVEY: No redirect, Your Honor.

02:31 6 THE COURT: You're done, sir. Thank you.

02:31 7 THE WITNESS: I'm through?

02:31 8 THE COURT: You're through.

02:31 9 THE WITNESS: Okay. Thanks.

02:31 10 THE COURT: Was that a nightmare?

02:31 11 THE WITNESS: I'll have a dream about you.

02:31 12 THE COURT: About me? Or about Mr. Fields, huh?

02:31 13 Okay.

02:31 14 MR. FIELDS: Did someone say something bad about me?

02:31 15 THE COURT: He did not. He was talking about me.

02:31 16 Okay. Do you have another witness?

02:31 17 MR. GLADSTEIN: Yes, Your Honor. The United States
02:31 18 would call Dr. Alan Huffman.

02:31 19 THE COURT: All right.

02:31 20 MR. BROCK: Your Honor, could I be heard on this for
02:31 21 one minute?

02:31 22 THE COURT: Sure.

02:31 23 MR. BROCK: Mike Brock on behalf of BP and Anadarko.

02:31 24 We believe that Dr. Huffman's testimony is
02:32 25 completely duplicative of issues that have already been

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02:32 1 presented to the Court. As Your Honor is aware, a great
02:32 2 portion of Dr. Huffman's report has been struck. I think his
02:32 3 initial report was around 75 pages; 67 pages of that report
02:32 4 have been struck. A few of those are partial restrictions --
02:32 5 or partial pages that are struck, but almost all of them are
02:32 6 complete pages.

02:32 7 So what's left of his opinions, from our point
02:32 8 of view, is the opinion that BP's permeability value was too
02:32 9 low and that has been covered today by Dr. Larsen. And the
02:32 10 other issue that is left is his criticism of the Weatherford
02:32 11 test and the samples, and that has been covered in full by
02:33 12 Dr. Roegiers, who you have just heard from.

02:33 13 There is a third opinion which is related --
02:33 14 related to the issue of permeability, and that is his
02:33 15 discussion about the stairstep compression test, but
02:33 16 Dr. Roegiers has covered that issue.

02:33 17 So we believe that anything that he has to say
02:33 18 that's left in his report is duplicative of what has already
02:33 19 been presented during this trial and we object to it.

02:33 20 **MR. GLADSTEIN:** May I be heard on this, Your Honor?

02:33 21 **THE COURT:** Yes.

02:33 22 **MR. GLADSTEIN:** Your Honor, Dr. Huffman is
02:33 23 approaching these issues --

02:33 24 **THE COURT:** State your name for the record.

02:33 25 **MR. GLADSTEIN:** Richard Gladstein, may it please the

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02:33 1 court, Your Honor.

02:33 2 Dr. Huffman is approaching these issues from the
02:33 3 standpoint of a rock physicist. His testimony will be short,
02:33 4 Your Honor.

02:33 5 **THE COURT:** I'm looking at the report. I mean,
02:34 6 Mr. Brock is right, a large -- large portions were struck for
02:34 7 the reasons that we discussed yesterday afternoon.

02:34 8 **MR. BROCK:** There's actually more that will come out
02:34 9 based on the agreement today in addition to that.

02:34 10 **THE COURT:** And, you know, for Dr. Huffman's sake,
02:34 11 since he's sitting right here listening to this, this is really
02:34 12 not directed to your qualifications or anything like that.

02:34 13 **THE WITNESS:** I understand, Your Honor.

02:34 14 **THE COURT:** It's what's relevant at this point in
02:34 15 this case -- in this trial, I mean.

02:34 16 But it does look like he's criticizing the
02:34 17 Weatherford core test, along -- it seems like along the same
02:34 18 lines that Dr. Roegiers was and --

02:34 19 **MR. GLADSTEIN:** What he's talking about, Your Honor,
02:34 20 is how the well logs give him insight into whether or not these
02:35 21 core samples are representative. What he's talking about is
02:35 22 the question of what they're harping on is the scientific
02:35 23 basis.

02:35 24 What you will hear from Dr. Huffman is that
02:35 25 there's another scientific basis. Those are the well logs, and

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02:35 1 that scientific basis, he will testify, shows that those core
02:35 2 samples are not representative of the reservoir. That is his
02:35 3 first opinion.

02:35 4 His second opinion that you will hear today, if
02:35 5 you are willing, Your Honor, is on anisotropy. Dr. Zimmerman
02:35 6 testified as to the importance of anisotropy. Dr. Huffman will
02:35 7 not testify as to what Dr. Roegiers testified to. He will
02:35 8 testify to as to BP's own assessment that the resistivity logs
02:35 9 and the CT scanner logs show anisotropy. This is uniquely
10 within Dr. Huffman's area of expertise.

02:35 11 The last area he will testify on is a specific
02:36 12 rebuttal to Dr. Blunt, which was not struck from his report,
02:36 13 related to permeability. This can probably be done in
02:36 14 approximately 15 minutes, Your Honor.

02:36 15 **MR. BROCK:** Your Honor, permeability has been covered
02:36 16 in full. The last issue that he covered just before that has
02:36 17 been struck from the report. And anisotropy -- I can't say it
02:36 18 either -- has been --

02:36 19 **THE COURT:** How about you spell it? Can you spell
02:36 20 it?

02:36 21 **MR. BROCK:** I can't. I was a business major, too,
02:36 22 and that term is way over any head.

02:36 23 But these topics have been covered. They're
02:36 24 talking about other topics that aren't in the report --

02:36 25 **THE COURT:** Well, I agree. As long as we keep it

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02:36 1 short and we don't go beyond what was just said, I'm going to
02:36 2 allow him to testify. We've had some overlap along the way
02:36 3 throughout these last couple of weeks with different experts
02:36 4 opining on similar or same subjects.

02:36 5 But I don't want it just to turn out to be -- if
02:37 6 it seems like it's going to be a rehash or a repeat of what
02:37 7 Dr. Roegiers just testified about, we're going to have to cut
02:37 8 it off, okay.

02:37 9 **MR. GLADSTEIN:** Your Honor, I will be very responsive
02:37 10 to whatever you say on this.

02:37 11 **THE COURT:** Okay.

02:37 12 **MR. BROCK:** One point -- just so when we stand up,
02:37 13 you will know what we're doing -- there is no reference or
02:37 14 analysis of the well log in this report. So the only reference
02:37 15 that is in here is well log and pressure data in the Macondo
02:37 16 well from Phase One of this trial. But there is no reference
02:37 17 to that, there many no analysis of that, there's no
02:37 18 presentation on that issue.

02:37 19 So when we get do that, we'll have an objection.

02:37 20 **MR. GLADSTEIN:** Your Honor, this is not true. There
02:37 21 is an opinion --

02:37 22 **THE COURT:** Let's just start the examination and
02:37 23 we'll see where it goes.

02:37 24 **MR. GLADSTEIN:** Thank you, Your Honor. Let's see if
02:37 25 we can get through this in 15 minutes.

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02:37 1 THE COURT: Okay. You're on the clock. We've
02:37 2 started a new time clock here.

02:37 3 MR. GLADSTEIN: New time clock, 20 to 3:00.

02:37 4 THE COURT: Okay.

02:37 5 (WHEREUPON, ALAN R. HUFFMAN, PH.D., having been duly
02:37 6 sworn, testified as follows:)

02:37 7 THE DEPUTY CLERK: Please state your full name and
02:37 8 correct spelling for the record.

02:38 9 THE WITNESS: My name is Dr. Alan R. Huffman.
02:38 10 A-L-A-N. Middle initial R, last name Huffman, H-U-F-F-M-A-N.

02:38 11 DIRECT EXAMINATION

02:38 12 BY MR. GLADSTEIN:

02:38 13 Q. Dr. Huffman, please briefly summarize your education to
02:38 14 the Court.

02:38 15 MR. GLADSTEIN: Putting up D-21400.1.

02:38 16 THE COURT: Has it changed since Phase One?

02:38 17 MR. GLADSTEIN: I has not changed. We'll skip it.

02:38 18 THE COURT: Okay.

02:38 19 BY MR. GLADSTEIN:

02:38 20 Q. I think we can also stip to your employment.

02:38 21 MR. GLADSTEIN: If that's okay, Your Honor?

02:38 22 THE COURT: Okay.

02:38 23 BY MR. GLADSTEIN:

02:38 24 Q. In terms of your area of expertise, what is your area of
02:38 25 expertise?

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02:38 1 A. My area of expertise is theoretical and experimental rock
02:38 2 mechanics and rock physics and the application of those
02:38 3 disciplines to the integration of seismic well log and core
02:38 4 data for use in the oil and gas exploration and production
02:38 5 business.

02:38 6 Q. Do you know about the geology and rock properties
02:38 7 development?

02:38 8 A. Yes, sir. I have been actively involved in the
02:39 9 interpretation of seismic log and core data from rocks in the
02:39 10 Gulf of Mexico for 30 years starting at my time at Texas A&M
02:39 11 and in my heavy involvement in my years at Exxon and Conoco.
02:39 12 Continued into my current role at Fusion Geophysical.

02:39 13 Q. Were you qualified and did you testify as an expert in
02:39 14 Phase One of this case?

02:39 15 A. Yes, I did.

02:39 16 **MR. GLADSTEIN:** Your Honor, at this time, we tender
02:39 17 Dr. Huffman as an expert in rock physics, rock mechanics,
02:39 18 geology, and geophysics of the deepwater Gulf of Mexico.

02:39 19 **THE COURT:** All right. I'll accept him in that
02:39 20 field.

02:39 21 **BY MR. GLADSTEIN:**

02:39 22 Q. Please identify TREX-11515R.

02:39 23 A. This is any rebuttal report of Phase Two of this
02:39 24 proceeding, and I believe it's the as-redacted version?

02:39 25 Q. Do you adopt this report as your testimony today?

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02:39 1 A. Yes, I do.

02:39 2 MR. GLADSTEIN: Your Honor, this is subject to the
02:39 3 additional redactions that we agreed to.

02:39 4 THE COURT: Okay.

02:39 5 MR. GLADSTEIN: We move Dr. Huffman's report into
02:39 6 evidence.

02:39 7 THE COURT: All right. With the understandings that,
02:40 8 whatever further redactions will be made, I'll admit it.

02:40 9 MR. GLADSTEIN: Please pull up D-21400.5.

02:40 10 BY MR. GLADSTEIN:

02:40 11 Q. Dr. Huffman, can you please summarize the opinions you
02:40 12 formed in this phase of the case?

02:40 13 A. Yes, sir. The first opinion, Your Honor, is that the
02:40 14 Weatherford test results relied on by both Drs. Zimmerman and
02:40 15 Blunt are not reliable and a substatement to that is that the
02:40 16 value of 6 microsips is much too low in my view.

02:40 17 Within that opinion, I would note that my analysis of
02:40 18 the well logs, which was done in Phase One of the trial and was
02:40 19 cited in my Phase Two report and discussed in the Phase Two
02:40 20 report, showed that the tested cores are not representative of
02:40 21 the average overall reservoir properties.

02:40 22 The well logs also show anisotropy, which is an issue
02:40 23 of doing rocks mechanics testing. And they also failed to
02:40 24 replicate the in situ conditions of temperature, saturation,
02:41 25 and correct loading.

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02:41 1 My second opinion is the reservoir permeability,
02:41 2 volume, and connectivity of the Macondo reservoir are greater
02:41 3 than the values relied on by Dr. Blunt in his analysis.

02:41 4 Q. Is the Weatherford sidewall core data the only scientific
02:41 5 data available related to rock compressibility?

02:41 6 A. No, we had a database of well logs and other information
02:41 7 that were collected during the drilling and the preservation of
02:41 8 the wellbore that are over and above the cores that
02:41 9 Dr. Zimmerman evaluated.

02:41 10 Q. Did you hear Dr. Zimmerman testify?

02:41 11 A. Yes.

02:41 12 Q. Did you hear him say he did not analyze the well log data?

02:41 13 A. That is correct; he did not analyze it.

02:41 14 Q. Did you always hear him say that he is not an expert in
02:41 15 logs?

02:41 16 A. He did say that, yes.

02:41 17 MR. FIELDS: Your Honor, we're getting into an area
02:41 18 that is clearly outside the four corners of the report.

02:41 19 MR. GLADSTEIN: Your Honor, this is completely not
02:41 20 true. They brought this up before Judge Shushan and
02:41 21 she explicitly ruled that this stayed in. This is the first
02:41 22 full paragraph on page 39 of his report.

02:42 23 MR. FIELDS: What the issue is -- what she's saying
02:42 24 also is that we can clearly reserve the right to invoke the
02:42 25 four corners rule to any effort to go beyond his report.

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02:42 1 **THE COURT:** Wait a minute. I'm looking at his
02:42 2 report. What page?

02:42 3 **MR. GLADSTEIN:** Page 30 -- I apologize. It is
02:42 4 page 37. It's the first -- it's the second paragraph, "A
02:42 5 careful study of the data," and he's comparing the porosities
02:42 6 from the cores to the porosities from the logs. They asked
02:42 7 that this be taken out. Judge Shushan said on September 10th:
02:42 8 "The criticism found on page 37 regarding the sidewall core
02:42 9 data is valid rebuttal."

02:42 10 **THE COURT:** Okay. I've looked at it. I overrule the
02:42 11 objection.

02:42 12 **MR. GLADSTEIN:** Thank you, Your Honor.

02:42 13 **MR. FIELDS:** Say it one more time.

02:42 14 **MR. GLADSTEIN:** Please bring up TREX-11512.

02:42 15 **THE COURT:** Wait, wait.

02:42 16 **MR. FIELDS:** Your Honor, the issue really is -- on
02:42 17 this particular issue on the well logs, that is in there, but
02:43 18 he has no opinion in this report that the well logs basically
02:43 19 deal with the anisotropy issue, and that's where we have an
02:43 20 issue.

02:43 21 **MR. GLADSTEIN:** I'm not talking about anisotropy.
02:43 22 That's a separate question, Your Honor. This is the question
02:43 23 of representativeness, whether or not those three uniaxial
02:43 24 cores represent the 90 feet thickness.

02:43 25 **THE COURT:** Okay. Ask your question.

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02:43 1 **MR. GLADSTEIN:** Thank you, Your Honor. Again, trying
02:43 2 to get through this.

02:43 3 TREX-11512.0001.

02:43 4 **BY MR. GLADSTEIN:**

02:43 5 **Q.** Can you identify that document, please.

02:43 6 **A.** Yes, sir. This is the -- a portion of my Phase One
02:43 7 rebuttal report, Appendix 1, Well Log Display, that was
02:43 8 discussed in Phase One of the trial. And it is the lower
02:43 9 right-hand corner of that display in the M56D and E reservoir
10 interval.

02:43 11 **Q.** Is it standard industry practice to match core and log
12 data?

02:43 13 **A.** Yes, it is.

02:43 14 **Q.** What does this exhibit show you with respect to log
15 porosity data?

02:43 16 **A.** If you look at the display --

02:44 17 **THE WITNESS:** I'll describe briefly, Your Honor, what
18 it includes. The left-hand track is the logged porosities. So
19 these are the porosity measurements from the well log tool
20 going through the wellbore, measuring the entire reservoir.

02:44 21 On the right side -- if you could actually blow
22 it back out for a second.

02:44 23 On the far right side are the two reservoirs,
24 labeled M56D and E, and the colors there represent shale in
25 brown, sand in yellow, and the red represents the hydrocarbon

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02:44 1 fluids in the two reservoirs. So that's the rocks and fluids.

02:44 2 To the left of the colored section on the right
02:44 3 is the depth track. And I've also in that track posted the
02:44 4 actual measurements of the core, measured porosities from
02:44 5 Weatherford.

02:44 6 Now, they are color-coded by the eight tests
02:44 7 that Dr. Zimmerman discussed. In the lower right-hand corner
02:44 8 there is a legend. The yellow three lines are the depths of
02:44 9 the three UPVC cores. And I'll circle those here if I can.
02:44 10 There's the first one, the second one, and the third one is the
02:45 11 red color right there. So these are the three UPVC core
02:45 12 values. Okay.

02:45 13 You can zoom out again. That's okay.

02:45 14 And on the left-hand track I have -- from the
02:45 15 well log data, I have posted a well log value at the same depth
02:45 16 from the porosity neutron log to show the comparison between
02:45 17 the core property and the log property.

02:45 18 Now, this is important because when you're doing
02:45 19 the process of trying to determine the average UPVC or porosity
02:45 20 or any other measurement that we're talking about, the core,
02:45 21 being just a one-inch sample, doesn't give you the perspective
02:45 22 of the whole reservoir.

02:45 23 The log is measured through the entire interval.
02:45 24 So I can correlate these two properties and identify whether
02:45 25 the core is representative of the entire interval that I'm

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02:45 1 trying to model in any of the work that's being discussed here
02:45 2 by our engineering colleagues.

02:45 3 **BY MR. GLADSTEIN:**

02:45 4 **Q.** What do you conclude from the two sets of numbers?

02:45 5 **A.** What I concluded is that the cores, if you look at the
02:45 6 three UPVC values, are not representative at the same depths of
02:45 7 measurement in the porosity logs, and they underestimate the
02:46 8 porosities.

02:46 9 **THE WITNESS:** And I would note here that the logs,
02:46 10 Your Honor, are in situ, so they are measured in the ground.
02:46 11 So the porosities we're seeing here in the log data are under
02:46 12 the correct confining and loading conditions at the wellbore \wedge ,
02:46 13 because in the ground.

02:46 14 The cores, the three cores for UPVC are,
02:46 15 in situ, confining stress that Dr. Zimmerman reported in his
02:46 16 report before they began depletion for the UPVC. So they're
02:46 17 the roughly equivalent stress state for the two porosity
02:46 18 measurements.

02:46 19 **Q.** In terms of compressibility, are these differences between
02:46 20 the log and pore porosity significant?

02:46 21 **A.** Yes, they are. If you compare the values, the value at
02:46 22 M56D, the core is 21.7 percent, the log value is 22.3. So
02:46 23 that's only about .6-porosity units difference. That's not a
02:46 24 large difference.

02:46 25 If you look in the upper and lower lobes of the E --

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02:46 1 **THE WITNESS:** And, Your Honor, I'm just dividing the
02:47 2 lobes, as we heard earlier, to break the upper and lower there
02:47 3 with that blue line.

02:47 4 The core value at initial reservoir conditions
02:47 5 is 20.6 percent. The log value at that same depth on the left
02:47 6 is 23.5. So that's three porosity units, almost a 15 percent
02:47 7 change. That's pretty large.

02:47 8 The lower, the M56E lower lobe, the core value
02:47 9 is 21.4 percent, and the log value is 23.9. So that is about
02:47 10 2.5 porosity units difference, again, a significant difference.

02:47 11 **BY MR. GLADSTEIN:**

02:47 12 **Q.** Does this have a direct impact on Dr. Zimmerman's
02:47 13 assertion that he can take the average of the three UPVC cores
02:47 14 and scale them up for the entire reservoir?

02:47 15 **MR. FIELDS:** Objection, Your Honor. I don't think
02:47 16 that's covered by the four corners of the report.

02:47 17 **MR. GLADSTEIN:** Your Honor, it is -- he says in
02:47 18 page 37: "This bias in the cores is toward the middle to the
02:47 19 lower end of the porosity range of the M56 sand." It's right
02:47 20 in here, Your Honor.

02:47 21 **THE COURT:** Okay. I'll allow it. Overruled.

02:47 22 Go ahead.

02:47 23 **MR. GLADSTEIN:** Thank you, sir.

02:47 24 **THE WITNESS:** Yes, it does impact Dr. Zimmerman's
02:48 25 assertion. In fact, you can't, in my view, take three 1-inch

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02:48 1 unrepresentative cores from a 90-plus-foot-thick reservoir and
02:48 2 claim that those three unrepresentative cores are
02:48 3 representative of the entire reservoir. That is not
02:48 4 scientifically appropriate to do.

02:48 5 **MR. GLADSTEIN:** Let's look at the next exhibit,
02:48 6 please. This is 11512.0002.

02:48 7 **BY MR. GLADSTEIN:**

02:48 8 **Q.** What does this show?

02:48 9 **THE WITNESS:** This shows on -- the data in the
02:48 10 right-hand side is the same, Your Honor. On the left-hand
02:48 11 track, now, what I have done is I have taken my log analysis
02:48 12 for the three zones. So I've got the D here -- the D and the
02:48 13 upper and the lower E, those three intervals, and I have taken
02:48 14 the average of the porosity for the entire interval.

02:48 15 So I've come up with my average porosity for the
02:48 16 entire thickness of each of the three sublayers we're talking
02:48 17 about. And I'm now able to compare the average of the D, M56D,
02:49 18 at 21.6 percent, to the UPVC core here at 21.7. It turns out
02:49 19 that one's pretty much the same. So you could make that
02:49 20 argument that that core would be roughly representative of the
02:49 21 whole layer's average value.

02:49 22 If you look at the upper lobe again of the E,
02:49 23 dividing it in half, the upper lobe is 23.6 percent average,
02:49 24 and the core was 20.6. So again a 15 percent difference,
02:49 25 3 porosity units out of 23.

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02:49 1 The lower zone is 23.7 percent for the average
02:49 2 of the whole interval, and the core was 21.4 percent. That's
02:49 3 the red value there. So again we have a significant
02:49 4 difference.

02:49 5 And there is a fundamental principle that we use
02:49 6 in the work that I do and others that do this kind of analysis
02:49 7 where we go from the core scaled up to the log, scale up to the
02:49 8 whole reservoir.

02:49 9 So we're trying to get from an individual
02:49 10 measurement that may not be representative to a representative
02:49 11 average value that I can then apply a reservoir simulation and
02:50 12 modeling and the other practices that we've talked about during
02:50 13 this trial.

02:50 14 **BY MR. GLADSTEIN:**

02:50 15 **Q.** So can you summarize the basis of your opinion that the
02:50 16 Weatherford test results are not reliable based upon the logs?

02:50 17 **A.** Yes. The well log data clearly shows that the average
02:50 18 values of the reservoir are different, are higher than the
02:50 19 three UPVC cores that Dr. Zimmerman relied on for his average.
02:50 20 And to reiterate what's been said earlier, taking the average
02:50 21 of those three values is also wrong.

02:50 22 **Q.** Okay. Let's turn to the subject of anisotropy briefly.

02:50 23 **MR. GLADSTEIN:** We're begging the Court's indulgence
02:50 24 here with another five minutes or so.

25

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02:50 1 **BY MR. GLADSTEIN:**

02:50 2 **Q.** Are the Macondo reservoirs anisotropic, in your opinion?

02:50 3 **A.** Yes, they are.

02:50 4 **Q.** What is the basis for your opinion that the Macondo
02:50 5 reservoirs are anisotropic?

02:50 6 **THE COURT:** I know we had this earlier, but remind me
02:51 7 again, what is "anisotropy"?

02:51 8 **THE WITNESS:** Anisotropy, Your Honor, is when I have
02:51 9 a measurement in a rock, a volume of rock, and I measure it
02:51 10 vertically, for example, and then I measure it by east, west,
02:51 11 north, south. If the values are different for that same
02:51 12 measurement, the rock is called anisotropic. If they're all
02:51 13 the same in every orientation, it's called isotropic. The same
02:51 14 everywhere.

02:51 15 **THE COURT:** Okay. Thank you.

02:51 16 **BY MR. GLADSTEIN:**

02:51 17 **Q.** What is the basis for your opinion that the Macondo
02:51 18 reservoir is anisotropic?

02:51 19 **A.** Again, my basis for this is the well log data. In my
02:51 20 analysis of the well, it was clearly identified that the RT
02:51 21 scanner, which is tensile resistivity tools, and the continuous
02:51 22 magnetic resonance, or CMR, tools showed significant anisotropy
02:51 23 in parts of the M56 reservoirs.

02:51 24 **MR. GLADSTEIN:** Could we please bring up TREX --

02:51 25 **THE COURT:** Wait a minute. We have an objection.

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02:51 1 **MR. FIELDS:** Your Honor, this is clearly beyond the
02:51 2 four corners of the document. If you look at pages 37 and 38
02:51 3 of the report, there is no reference to using these well logs
02:52 4 to suggest there's anisotropy.

02:52 5 **MR. GLADSTEIN:** Your Honor, in response to that, the
02:52 6 second sentence under core orientation says: "It is well
02:52 7 documented that the orientation of cores can significantly
02:52 8 impact the results of rock mechanics testing, especially in the
02:52 9 case of highly anisotropic materials, such as shales and
02:52 10 channelized deposits, when they're involved."

02:52 11 **THE COURT:** Okay. Overrule the objection.

02:52 12 **MR. GLADSTEIN:** Thank you, Your Honor.

02:52 13 Please bring up TREX-3533.1.1.US.

02:52 14 **BY MR. GLADSTEIN:**

02:52 15 **Q.** This is the post-well technical memorandum that we saw
02:52 16 earlier today.

02:52 17 **MR. GLADSTEIN:** Can we please go to
02:52 18 TREX-3533.13.2.US.

02:52 19 **BY MR. GLADSTEIN:**

02:52 20 **Q.** Could you please read that for the Court.

02:52 21 **A.** Yes, sir.

02:52 22 **MR. FIELDS:** Your Honor, I apologize. But, again,
02:53 23 this is not referenced and relied upon by this witness in
02:53 24 supporting his opinions on core orientation bias.

02:53 25 **MR. GLADSTEIN:** Again, Your Honor, he states in his

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02:53 1 report -- it is well documented, this is within his area of
02:53 2 expertise, log interpretation. He's merely stating that BP in
02:53 3 its own analysis --

02:53 4 **THE COURT:** Okay. I'm going to allow it. Overrule
02:53 5 the objection.

02:53 6 Let's move on. Come on.

02:53 7 **BY MR. GLADSTEIN:**

02:53 8 **Q.** Quickly.

02:53 9 **A.** Yes, sir. The quote from the post-well memorandum states:
02:53 10 "Nuclear magnetic resonance, or CMR" -- which is continuous
02:53 11 magnetic resonance -- "and RT" -- reservoir tensor -- "scanner
02:53 12 logs response also show higher rock anisotropy of the M56D
02:53 13 lobe."

02:53 14 **MR. GLADSTEIN:** Please turn to TREX 3533.34.1.US.

02:53 15 **BY MR. GLADSTEIN:**

02:53 16 **Q.** Please read for the Court the excerpt.

02:53 17 **A.** It reads: "Rock Type 2 in the M56D unit may be associated
02:53 18 with some thin-bedded pay, as evidenced by increased anisotropy
02:54 19 from the tensor resistivity data and the CMR bin porosity
02:54 20 distribution."

02:54 21 **Q.** Based on your understanding of these log properties, do
02:54 22 you believe that BP can make this assessment from looking at
02:54 23 these log properties?

02:54 24 **A.** Yes, sir. And I look at them in similar ways in other
02:54 25 wells that I've worked.

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02:54 1 Q. Last series of questions, and then we'll be finished,
02:54 2 Dr. Huffman.

02:54 3 Dr. Blunt used a permeability of 329 millidarcys in
02:54 4 his work. Do you disagree with that value?

02:54 5 A. Yes, I do.

02:54 6 Q. What is the basis of your opinion as to the overall
02:54 7 permeability of the Macondo reservoir?

02:54 8 **THE WITNESS:** I used the same upscaling principles,
02:54 9 Your Honor, to look at the -- in my case, the log relationships
02:54 10 as opposed to the MDTs and other things that we've heard about.
02:54 11 So again, I come at this from my expertise in logs.

02:54 12 In doing the upscaling, with the same porosity
02:54 13 approach that I just discussed, and comparing the
02:54 14 permeabilities of the average porosity of the reservoir, I come
02:54 15 up with a permeability in the 400-to-500-millidarcy range, as
02:54 16 cited in my report.

02:55 17 Now, in saying that, as has been said by other
02:55 18 experts in the case, there's a range of porosities and
02:55 19 permeabilities. Some zones will have lower, some will have
02:55 20 higher. But my estimate for the average is 4- to
02:55 21 500 millidarcys.

02:55 22 **MR. FIELDS:** Your Honor, excuse me, but this is one
02:55 23 issue that is clearly dealt with by Judge Shushan where she is
02:55 24 saying you cannot use log analysis to support his conclusion
02:55 25 about permeability relationships. This is an issue that has

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02:55 1 been stricken.

02:55 2 **MR. GLADSTEIN:** Your Honor, again, I don't --
02:55 3 maybe -- I just don't know what he's referring to. Because if
02:55 4 you look at page -- and, again, I'm finished, Your Honor. It's
02:55 5 page 42. He says: "Based on all the data that I have seen, it
02:55 6 is my expert opinion that the most reasonable values for
02:55 7 permeability to use for the M56D and E sands are in the
02:55 8 400-to-500-millidarcy range, which agrees with Dr. Blunt's mean
02:55 9 value of 442 millidarcys," et cetera, et cetera, et cetera.

02:55 10 There's one sentence out of two paragraphs on
02:56 11 permeability that Judge Shushan struck, and that's what now
02:56 12 he's referring to.

02:56 13 **MR. FIELDS:** Judge --

02:56 14 **THE COURT:** All right. All right. Well, we can look
02:56 15 at Judge Shushan's -- I mean, I don't know. I haven't seen
02:56 16 every order that Judge Shushan has issued. If she said that,
02:56 17 I'll look at it. But I obviously make the final call as to
02:56 18 what's admissible at trial.

02:56 19 So if you're right, you can argue that later.

02:56 20 Okay. Your examination's over?

02:56 21 **MR. GLADSTEIN:** Thank you, Your Honor.

02:56 22 **THE COURT:** Good. Cross-examination.

02:56 23 You got an extra five minutes, by the way.

02:56 24 **MR. GLADSTEIN:** Maybe on redirect, but hopefully no
02:56 25 redirect.

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02:56 1 THE COURT: About how long do you think you'll be
02:56 2 with this witness?

02:56 3 MR. FIELDS: About five or ten minutes, Your Honor.

02:56 4 THE COURT: Okay.

5 CROSS-EXAMINATION

02:57 6 BY MR. FIELDS:

02:57 7 Q. Good afternoon, Dr. Huffman. I'm Barry Fields. I will be
02:57 8 conducting your cross-examination on behalf of BP and Anadarko.

02:57 9 A. Good afternoon.

02:57 10 Q. Now, one of the issues in this case is the UPVC at the
02:57 11 Macondo reservoir?

02:57 12 A. Correct.

02:57 13 Q. And Weatherford performed testing for UPVC on cores in the
02:57 14 Macondo reservoir?

02:57 15 A. That's correct.

02:57 16 Q. And you had opinions about the quality of the UPVC
02:57 17 testing?

02:57 18 A. That's correct.

02:57 19 Q. But you have no experience performing UPVC tests?

02:57 20 A. That is correct. I have never done a UPVC test myself.
02:57 21 My experience is with other triaxial and other measurements
02:57 22 that are in the same genre that Dr. Roegiers talked about
02:57 23 earlier, but no UPVC.

02:58 24 Q. You have never been responsible for evaluating the
02:58 25 compressibility of a rock core based on results of UPVC tests?

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02:58 1 A. Not from UPVC, no.

02:58 2 Q. And this case is the first time that you've been involved
02:58 3 in reviewing UPVC test procedures?

02:58 4 A. For procedures, that's correct. But, again, I would note,
02:58 5 as was stated earlier, that in the general class of triaxial
02:58 6 testing, I've done quite a bit of work, and the procedures are
02:58 7 all very similar.

02:58 8 Q. You've not taught any classes or published any articles on
02:58 9 UPVC testing?

02:58 10 A. That's correct.

02:58 11 Q. And you haven't done any research on UPVC testing?

02:58 12 A. That is correct.

02:58 13 Q. You talked a little bit earlier about core orientation.
02:58 14 You're not aware of any standard industry procedure that
02:58 15 specifies the orientation of the cores that should be used for
02:59 16 purposes of UPVC testing?

02:59 17 A. I think, as a general principle, in all the work that I've
02:59 18 done where I've selected cores for wells that we were drilling
02:59 19 at Exxon or Conoco or when I work with my current clients, I
02:59 20 always recommend the conventional core because it gives us the
02:59 21 option to test in any direction.

02:59 22 So the rotary sidewall obviously has its limits by
02:59 23 the way it's oriented.

02:59 24 Q. But you're not aware of any industry procedure or standard
02:59 25 that specifies the orientation of the cores that should be used

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02:59 1 for purposes of UPVC testing?

02:59 2 A. No.

02:59 3 Q. And in your report, you didn't quantify the effect of pore
02:59 4 orientation or anisotropy on Weatherford's UPVC test results?

02:59 5 A. I didn't quantify them, that's correct.

02:59 6 Q. You testified -- you testified about your log analysis and
03:00 7 the porosity measurements that you were able to obtain from the
03:00 8 log analysis?

03:00 9 A. Yes.

03:00 10 Q. And you were able to determine or estimate porosities in
03:00 11 different lobes or sand layers?

03:00 12 A. Correct.

03:00 13 Q. And you came up with an average porosity value for the
03:00 14 reservoir?

03:00 15 A. For each of the individual zones, correct.

03:00 16 Q. And in your report, I believe you say the -- just one
03:00 17 second -- you then come up with -- what is your overall value
03:00 18 of porosity for those three layers combined?

03:00 19 A. Well, I don't normally combine them because they're
03:00 20 different lobes of sand. So I treated them independently. But
03:00 21 as a general number, from the exhibit we looked at earlier, the
03:01 22 M56D was about 21.7 percent -- or 21.6, I believe, on the
03:01 23 average; and the average for the M56E for both lobes was about
03:01 24 23.6 or 23.7.

03:01 25 Q. There are --

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03:01 1 A. Percent, that is.

03:01 2 Q. There are several experts for the United States, and
03:01 3 you're familiar with those experts?

03:01 4 A. Which ones are you referring to? I haven't read them all.

03:01 5 Q. There's a lot of them. But Dr. Kelkar, are you familiar
03:01 6 with Dr. Kelkar?

03:01 7 A. Yes.

03:01 8 Q. Are you familiar with Dr. Pooladi-Darvish?

03:01 9 A. Yes, I am.

03:01 10 Q. Are any of those experts relying on your porosity value
03:01 11 for purposes of their analysis?

03:01 12 A. I don't believe they are.

03:01 13 MR. FIELDS: No further questions, Your Honor.

03:01 14 THE COURT: Any redirect?

03:01 15 MR. GLADSTEIN: No, Your Honor. Thank you.

03:01 16 THE COURT: All right. Thank you, Dr. Huffman.

03:01 17 THE WITNESS: Thank you, Your Honor. Have a great
03:01 18 weekend.

03:02 19 THE COURT: Okay. United States? Anything else?

03:02 20 MS. HIMMELHOCH: No further rebuttal, Your Honor.

03:02 21 THE COURT: All right. We've come to the end of this
03:02 22 trial a week early. I haven't calculated the time today, but
03:02 23 obviously we have many hours left. So I appreciate counsel's
03:02 24 help in moving this matter along.

03:02 25 I have a memo from Mr. Langan, I believe it is,

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03:02 1 about post-trial briefing.

03:02 2 **MR. LANGAN:** Yes, Your Honor.

03:02 3 **THE COURT:** Do you want to speak about that briefly?

03:02 4 **MR. LANGAN:** Yes, Your Honor. Andy Langan for BP.

03:02 5 I can give you some thoughts from our
03:02 6 perspective. I think we have an agreement. But in terms of
03:02 7 what our thinking was, at least for BP, we wanted to have
03:02 8 similar timing from the close of the evidence that we did in
03:02 9 Phase One to file opening briefs.

03:03 10 Second, we wanted to have a similar structure
03:03 11 where it would be opening briefs by both sides and then
03:03 12 simultaneous replies some period later. So that was our second
03:03 13 principle.

03:03 14 And third, we thought that it made sense to do
03:03 15 source control and quantification on the same schedule. That's
03:03 16 not the best for BP, but probably for the overall picture it
03:03 17 makes sense.

03:03 18 **THE COURT:** Separate briefs but on the same time
03:03 19 schedule.

03:03 20 **MR. LANGAN:** Correct, Your Honor.

03:03 21 We thought that we would file, for BP at least,
03:03 22 one set of proposed findings and conclusions, joined by
03:03 23 Anadarko for the quantification side, since there is some
03:03 24 foundational overlap to some of it.

03:03 25 And then the page limits were a negotiated

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03:03 1 number. 40 for opening briefs, 25 for replies.

03:03 2 I do want to note that the aligned parties are
03:03 3 going to file separate briefs, the PSC and the states on one
03:03 4 side, and Transocean and the Halliburton on the other. But the
03:03 5 page limit is 40 for that side, full, not pages each.

03:04 6 So anyway, that was our thinking. It's all
03:04 7 subject to the Court's review, but that's sort of how we got to
03:04 8 where we are.

03:04 9 **THE COURT:** I looked at your suggestion. Ben gave me
03:04 10 the memo that you forwarded by e-mail. It appears to be
03:04 11 reasonable to me.

03:04 12 Let me hear from the government or the aligned
03:04 13 parties. Does anybody have any comments?

03:04 14 **MS. HIMMELHOCH:** We're fine with it, Your Honor.

03:04 15 **MR. BARR:** Your Honor, the aligned parties are fine
03:04 16 with it, too.

03:04 17 **THE COURT:** Great. All right. What I'll do, I'll
03:04 18 take a closer look at this between now and probably Monday or
03:04 19 so, and I'll go ahead and issue a formal order with a briefing
03:04 20 schedule set forth in it like we did the last time.

03:04 21 **MR. LANGAN:** Very good, Your Honor.

03:04 22 **THE COURT:** I'm not sure everybody did this the first
03:04 23 time around, but when you all submit your proposed findings and
03:04 24 conclusions, it is helpful to me -- I like to get those in
03:04 25 separately numbered paragraphs. I think that's helpful.

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03:05 1 If I think of anything else, I'll include it in
03:05 2 there, any specific instruction that I think I should give you
03:05 3 all.

03:05 4 **MR. LANGAN:** We have a Word version of our proposal.

03:05 5 **THE COURT:** Why don't you send that to me.

03:05 6 **MR. LANGAN:** I'll send it to Ben.

03:05 7 **THE COURT:** Thank you.

03:05 8 **MR. LANGAN:** Thank you.

03:05 9 **THE COURT:** Anybody have anything else for the good
03:05 10 of the order?

03:05 11 Everybody have a good day, a good evening. And
03:05 12 we'll -- I'm not sure what -- in terms of the overall case,
03:05 13 when we'll get together again. I'm sure I'll schedule some
03:05 14 sort of status conference at some point in the not-too-distant
03:05 15 future. We'll see what else is on the calendar in terms of any
03:05 16 motions that we need to clear out or any other issues we need
03:05 17 to deal with.

03:05 18 I think -- now, we don't have a date for the
03:05 19 penalty phase yet, right, Mr. Langan?

03:06 20 **MR. LANGAN:** We do not, Your Honor. We've been
03:06 21 talking to Judge Shushan about that, and we need to talk to the
03:06 22 United States to try to figure the path forward out on that.

03:06 23 **THE COURT:** Sure.

03:06 24 **MR. LANGAN:** With Anadarko as well.

03:06 25 **THE COURT:** Right.

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03:06 1 I'm trying to see what we actually have
03:06 2 scheduled in way of a trial -- I think there's a trial
03:06 3 scheduled that wouldn't involve most of you. I think there's a
03:06 4 trial scheduled in the insurance cases.

03:06 5 Am I right about that, Ben?

03:06 6 **MR. ALLUMS:** Sorry?

03:06 7 **THE COURT:** Don't we have a trial scheduled with --
03:06 8 and probably no one here is involved in that -- well, BP would
03:06 9 be involved.

03:06 10 No, no. It's the Cameron/Liberty Mutual case
03:06 11 I'm thinking of.

03:06 12 **MR. ALLUMS:** Correct. It is, Your Honor.

03:06 13 We have something scheduled, but I think they
03:06 14 moved to amend their scheduling order. I think Judge Shushan
03:06 15 perhaps suspended the trial date.

03:06 16 **THE COURT:** We'll have to look at that. We'll look
03:06 17 at the calendar. I think what we should do is probably regroup
03:07 18 to kind of look forward on the entire MDL and figure out what
03:07 19 makes sense to tackle next, you know.

03:07 20 I know we have something going on with the
03:07 21 discovery with Alabama. With Alabama; right? Mr. Maze, what's
03:07 22 the status of this?

03:07 23 **MR. MAZE:** Corey Maze for the State of Alabama. Yes,
03:07 24 Your Honor.

03:07 25 We have met with Mr. Langan once, and I've asked

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03:07 1 him whenever the next time we can meet again. But Alabama
03:07 2 stands ready to start the discovery process as soon as we can
03:07 3 get both parties on the same page and Judge Shushan available
03:07 4 as well. But we're ready to go forward with discovery.

03:07 5 **THE COURT:** Well, I told her to go ahead and do that,
03:07 6 not that she doesn't have other things on her plate.

03:07 7 **MR. MAZE:** We are presently meeting with BP to start
03:07 8 the process.

03:07 9 **THE COURT:** Okay. And I think that there's a lot --
03:07 10 what I envision is, in terms of legal issues that arise in the
03:08 11 context of your case starting to be a test case, because I
03:08 12 think it will apply to the other states, too, in a lot of
03:08 13 respects.

03:08 14 **MR. MAZE:** Yes, sir. I agree. And Mr. Langan and I,
03:08 15 at our last meeting we talked about what some of those issues
03:08 16 might be and sort of teeing some of those up for briefing if we
03:08 17 don't come to agreement on all of them ahead of time.

03:08 18 **MS. HIMMELHOCH:** Your Honor, we have one final
03:08 19 matter. You asked us to clean up the list of exhibits to be
03:08 20 admitted, to remove the objected ones so we could get the
03:08 21 nonobjected ones into evidence. And my colleague, Ms. Pencak,
03:08 22 would like to do that.

03:08 23 **MR. LANGAN:** Mr. Brock may have something similar.

03:08 24 **MS. PENCAK:** Good afternoon, Your Honor. I'll make
03:08 25 it quick. Erica Pencak for the United States.

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03:08 1 I have here the list of exhibits that were used
03:08 2 by the United States during its examination of Dr. Nestic that
03:08 3 have not been objected to. BP objected to two documents on the
03:09 4 list. We've removed them. We'll meet and confer with BP about
03:09 5 those before the final marshaling conference. So now I simply
03:09 6 offer the list of unobjected-to.

03:09 7 **THE COURT:** The amended list or revised list.

03:09 8 **MS. PENCAK:** Yes.

03:09 9 **THE COURT:** There's no remaining objection to this
03:09 10 list; right?

03:09 11 **MR. BROCK:** To this list, I accept that
03:09 12 representation.

03:09 13 **THE COURT:** Without objection, that's admitted.

03:09 14 **MS. PENCAK:** Thank you, Your Honor.

03:09 15 **MR. BROCK:** Likewise, Your Honor, since the lunch
03:09 16 break, we have gone back, and for those witnesses where there
03:09 17 are a few objections, we've taken those exhibits out and now
03:09 18 have a list of exhibits that we would offer for Mr. Adams,
03:09 19 Dr. Blunt, Dr. Gringarten, and Dr. Nestic. So these are the
03:09 20 unobjected-to exhibits that were used in those examinations.

03:09 21 **THE COURT:** When you said Mr. Adams, did that
03:09 22 encompass the issues we spoke about late yesterday with
03:09 23 Mr. Doyen?

03:09 24 **MR. BROCK:** As far as I know.

03:09 25 **THE COURT:** You've worked that out?

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03:10 1 MS. KARIS: We have not. That was the only
03:10 2 outstanding issue. We were waiting for guidance from the
03:10 3 Court.

03:10 4 THE COURT: Have you all submitted something to Ben?

03:10 5 MS. KARIS: We did.

03:10 6 THE COURT: I haven't had a chance to see it.

03:10 7 MR. BROCK: Those exhibits are not on this list.

03:10 8 MS. KARIS: That's correct.

03:10 9 MR. BROCK: So those are our exhibits, excluding the
03:10 10 ones where -- there are just a few where there are some
03:10 11 issues --

03:10 12 THE COURT: Without objection, those are admitted.

03:10 13 And to the extent there's anything that
03:10 14 obviously can't be worked out between now and the marshaling
03:10 15 conference on November -- what was the date we said?

03:10 16 MR. BROCK: 30th.

03:10 17 UNIDENTIFIED SPEAKER: 7th.

03:10 18 THE COURT: December 7th -- on November 7th, it can
03:10 19 be worked out at that time.

03:10 20 MS. KARIS: Your Honor, I was going to say for the
03:10 21 benefit of the Court and hopefully for the record, I will make
03:10 22 another attempt to see if we can resolve our differences with
03:10 23 Transocean with respect to those Adams exhibits as well. I
03:10 24 know Mr. Doyen was pressed for time yesterday, so we'll see
03:11 25 what we can do.

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03:11 1 THE COURT: All right.

03:11 2 MS. KARIS: Thank you.

03:11 3 THE COURT: Thank you.

03:11 4 You see, Ben, you did check it, it looks like,
03:11 5 on the Liberty Mutual case. Right?

03:11 6 MR. ALLUMS: I'm sorry?

03:11 7 THE COURT: I got a message from you -- you checked
03:11 8 on the -- we don't have a trial date for Liberty Mutual.

03:11 9 MR. ALLUMS: No. The pretrial conference and trial
03:11 10 date are to be determined by you.

03:11 11 THE COURT: All right. Very well.

03:11 12 Unless someone has anything else, court's
03:11 13 adjourned. Have a good evening.

03:11 14 THE DEPUTY CLERK: All rise.

03:11 15 (WHEREUPON, the proceedings were concluded.)

03:11 16 *****

03:11 17 CERTIFICATE

03:11 18 I, Jodi Simcox, RMR, FCRR, Official Court Reporter
03:11 19 for the United States District Court, Eastern District of
03:11 20 Louisiana, do hereby certify that the foregoing is a true and
03:11 21 correct transcript, to the best of my ability and
03:11 22 understanding, from the record of the proceedings in the
03:11 23 above-entitled and numbered matter.

03:11 24 *s/Jodi Simcox, RMR, FCRR*
03:11 25 Jodi Simcox, RMR, FCRR
Official Court Reporter

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