RAS 14542

Title:

## **Official Transcript of Proceedings**

## NUCLEAR REGULATORY COMMISSION

Amergen Energy Company **Oyster Creek Evidentiary Hearing** 

Docket Number: 50-0219-LR; ALSBP No. 06-844-01-LR

Location:

Toms River, New Jersey

DOCKETED USNRC



Monday, September 24, 2007

October 26, 2007 (4:07pm) OFFICE OF SECRETARY RULEMAKINGS AND ADJUDICATIONS STAFF

NRC-1780 Work Order No.:

Pages 276-609

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1	UNITED STATES NUCLEAR REGULATORY COMMISSION
2	
3	ATOMIC SAFETY AND LICENSING BOARD
4	
5	EVIDENTIARY HEARING
6	
7	IN THE MATTER OF:
8	AMERGEN ENERGY COMPANY, LLC    Docket No.: 50-0219-LR
9	(License Renewal for Oyster   ASLBP No.: 06-844-01-LR
10	Creek Nuclear Generating
11	Station)
12	
.13	Ocean County Administrative Building
14	Room 119
15	101 Hooper Avenue
16	Toms River, New Jersey 08754
17	
18	Monday, September 24, 2007
19	
20.	The above-entitled matter came on for
21	hearing, pursuant to notice at 9:03 a.m.
22	BEFORE:
23	THE HONORABLE E. ROY HAWKENS, Chairman
24	THE HONORABLE PAUL B. ABRAMSON
25	THE HONORABLE ANTHONY J. BARATTA
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2	On Behalf of the Amergen Energy Company, LLC:	
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4	ALEX POLONSKY, ESQ.	
5	Of: Morgan Lewis & Bockius, LLP	
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12	MITZI YOUNG, ESQ.	
13	US Nuclear Regulatory Commission	
14	Office of the General Counsel	
15	Mail Stop - 0-15 D21	
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17		
18	On Behalf of Citizens:	·
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1	<u>PROCEEDINGS</u>
2	9:03 A.M.
3	CHAIRMAN HAWKENS: Good morning. It's
4	0900, 9 o'clock a.m. We'll proceed.
5	This is a hearing in the case of AmerGen
6	Energy Company, Docket No. 50-0219-LR. AmerGen has
7	applied to renew his operating license at the Oyster
8	Creek Nuclear Generating Plant for a 20-year period.
9	AmerGen's application is opposed by six groups that
10	refer to themselves collectively as Citizens and those
11	groups are one, Nuclear Information and Resource
12	Service; two, Jersey Shore Nuclear Watch,
13	Incorporated; three, Grandmothers, Mothers and More
14	for Energy Safety; four, New Jersey Public Interest
15	Research Group; five, New Jersey Sierra Club; and six,
16	New Jersey Environmental Federation.
17	Citizens argue that AmerGen's commitment
18	to take ultrasonic test measurements of the width of
19	the dry well shell every four years during the renewal
20	period is not adequate to ensure the shell will
21	maintain a sufficient safety margin.
22	At the outset of this hearing, you'll hear
23	opening statements from the parties that will describe
24	the dry well shell, explain its importance and
25	summarize their respective positions on the adequacy
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of AmerGen's UT test program.

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After you hear these opening statements, you'll then hear testimony from the parties' expert witnesses. First, however, I'd like to take a few minutes and introduce this Board, tell you our function in this proceeding, and explain to you how we'll conduct the hearing.

My name is Jay Hawkens. With me are Judge Tony Baratta and Judge Paul Abramson. We're Administrative Judges from the Atomic Safety and Licensing Board Panel. The Panel is the judicial arm of the Nuclear Regulatory Commission. The Judges appointed to the Panel sit on boards like this to adjudicate challenges to nuclear license applications.

In the Atomic Energy Act, Congress provided that in composing licensing boards, the board will consist of one legally-trained Judge who will chair the board, and two technically-trained Judges who have qualifications that are appropriate to adjudicate the technical issues that are presented in that particular case.

In this case, I'm the legally-trained Judge chairing this Board. Both of my colleagues, Judge Baratta and Judge Abramson are the technical Judges having their doctorates in nuclear physics. I

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281 1 should also mention that Judge Abramson, in addition 2 to having a doctorate in nuclear physics, also is legally trained, authorized and licensed to practice 3 4 law. 5 As I mentioned, we are a component of the Nuclear Regulatory Commission, but this Board is 6 7 separate from and insulated from the NRC staff which 8 appears as a party before us today, along with the 9 Applicant, AmerGen, and the challengers or 10 Intervenors, Citizens. After today's hearing in the following 11 12 weeks this Board will issue a written decision 13 resolving the issues that are presented. That 14 decision can be appealed by any party to the 15 administrative appellate body which are the 16 Commissioners on the Nuclear Regulatory Commission. And their decision, in turn, can be challenged by any 17 18 party in the U.S. Court of Appeals. That decision, in 19 turn, the party can seek review in the United States 20 Supreme Court. And that in a nutshell is who we are 21 and what our function is. I'd like now to take a few minutes and 22

I'd like now to take a few minutes and explain how we'll conduct today's hearing. It's called an informal hearing or a subpart (1) hearing. It's called subpart (1) because that's the section in

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1	the Code of Federal Regulations that the procedures
2	are located. In the past several months the parties
3	have provided this Board with numerous legal briefs,
4	hundreds of pages of documentary material and last
5	week they submitted over 125 exhibits into evidence
6	upon which they rely and those exhibits include
7	numerous affidavits containing testimony of their
8	expert witnesses. And I should mention the parties
9	select and designated their respective expert
10	witnesses who will be representing them and testifying
11	today.
12	AmerGen and the NRC Staff have several
13	expert witnesses. Citizens have elected to use one
14	for today's proceeding.
15	Under the regulations governing today's
16	hearing, the expert witnesses will be questioned by
17	the Judges. We've been assisted, however, in this
18	task by the parties who have provided us with
19	suggested questions that they think it would be well
20	for us to consider to ask and I should mention that
21	the parties also during the course of this hearing
22	will be given another opportunity to provide us with
23	suggested written questions that we will consider
24	asking.
25	We'll be asking questions of the witnesses

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in topical panels. There are six topics which we'll address during the course of the hearing: one, the physical structure and history of the dry well shell and AmerGen's commitments to ensure the shell maintains an adequate margin; two, the acceptance criteria for the sand bed region; three, the available margin, the current available margin until the shell exceeds the acceptance criteria; four, potential water that could create a corrosive of sources environment; five, the protective epoxy coating that AmerGen has applied to the dry well shell; and six, the possibility and extent of any future corrosion.

After we've questioned the witnesses on give these sixtopics, we'll the parties the opportunity to provide brief closing statements and that would be the end of the hearing. Now the parties have requested that we complete the hearing no later than noon on Wednesday in order to enable the observance of Sukkot. We believe this is a reasonable goal and we readily granted that request. To the extent we determine that we're running late and questioning the witnesses is going longer than we expected, we may start earlier tomorrow and go later tomorrow than otherwise planned, but we'll apprise both the parties and the audience of what our

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anticipated schedule is.

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2 Before going forward, I would like to 3 express on behalf of the Board our gratitude to the Ocean County officials for allowing us to use this 4 hearing facility. We did use it once before, some of 5 you may remember, for our limited appearance session 6 7 several months ago and they were kind enough to let us use it again and we're very grateful for that and 8 9 especially express our gratitude to Donna Flynn who has been extremely helpful to us in setting this up. 10 And finally, we'd like to extend our 11 12 thanks to the Ocean County Sheriff's Department who likewise provided terrific support at the limited 13appearance session and is again providing support 14 today. So thank you to them. 15 That concludes my introductory remarks. 16 Would the parties -- Judge Abramson would like to say 17 something as well. 18 Just for clarification 19 JUDGE ABRAMSON: 20 for those of you who are not familiar with our here, 21 processes what's at issue here is the application by AmerGen. 22 The staff's work is not at 23 issue. And even though the staff is formally a party 24 to our proceeding that's a holdover from our old regulations which have recently been revised. Staff 25 NEAL R. GROSS COURT REPORTERS AND TRANSCRIBERS

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1	is, in fact, here as an amicus to us to help us
2	understand what the staff thought when it reviewed the
3 '	application. Their work is not at issue.
4	What's at issue is only the single
5	question that's been admitted here by Citizens which
6	has to do with the remaining thickness of the dry well
7	and its ability to stand up for another 20 years if
8	their license is extended.
9	Finally, it's important for everybody to
10	understand that what happens under our new regulations
11	is we have extensive technical testimony in front of
12	us. Each of the parties has filed their technical
13	views in depth. Each of the parties has had an
14	opportunity to reply to that technical view with their
15	own technical rebuttal and in many instances we have
16	asked for further technical information, so what
17	you're going to see today is us asking questions to
18	clarify our view of the technical information that's
19	in front of us so that we can make a technical
20	decision on whether or not this question that's been
21	raised by Citizens is something that warrants a change
22	in the frequency of ultrasonic inspection.
23	CHAIRMAN HAWKENS: Thank you. Will the
24	attorneys for the parties please introduce themselves
25	and their associates and their expert witnesses,
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286 1 starting with AmerGen. 2 MR. POLONSKY: My name is Alex Polonsky. 3 I'm with Morgan, Lewis and Bockius, LLP. We are counsel to AmerGen. 4 CHAIRMAN HAWKENS: One interruption. When 5 the individuals do speak, would they please ensure 6 7 they speak directly into the mics to assist our court reporters. Thank you. 8 9 MR. SILVERMAN: My name is Don Silverman 10 and I am also with Morgan Lewis and we are counsel to AmerGen. 11 12 MS. SUTTON: Kathryn Sutton with Morgan, 13 Lewis and Bockius. 14 CHAIRMAN HAWKENS: You want to also 15 identify your expert witnesses, please? 16 MS. SUTTON: Yes. 17 MR. POLONSKY: I believe we have 18 approximately 14 expert witnesses who are here to 19 provide testimony on the various specific technical panels that the Board has asked information about. 20 Julien Abramovici, Mr. Jon Cavallo, 21 Mr. Scott Erickson, Michael Gallagher, Barry Gordon, Dr. David 22 G. Harlow, Gary Harlow, John Hawkins, Edwin Hosterman, 23 24 Martin McAllister, Ahmed Ouaou, John O'Rourke, Fred 25 Polaski, Francis Howie Ray, and Peter Tamburro. And **NEAL R. GROSS** COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. (202) 234-4433 WASHINGTON, D.C. 20005-3701 www.neairgross.com

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1	I'm sorry, we also have Dr. Har Mehta. And I can
2	provide a list of all those spellings to the court
3	reporter at the break.
4	CHAIRMAN HAWKENS: Thank you.
5	MS. BATY: For the NRC staff, my name is
6	Mary Baty, and my co-counsel is Mitzi Young. Also
7	seated at table is Louise Lund. Our witnesses are
8	seated in the audience. We have Mr. Hansraj Ashar,
9	Dr. James Davis, Dr. Mark Hartzman, Timothy O'Hara,
10	and Arthur D. Saloman.
11	MR. WEBSTER: Good morning. I'm Richard
12	Webster. I'm with the Eastern Environmental Law
13	Center and teach at Rutgers Environmental Law Clinic.
14	We're representing the six Citizens groups here today.
15	With me is Julie LeMense, who is also an
16	attorney at Eastern Environmental Law Center and
17	teaches at Rutgers Environmental Law Clinic. We have
18	witness over here, Dr. Rudolf Hausler.
19	CHAIRMAN HAWKENS: All right, thank you
20	very much.
21	Before hearing opening statements from the
22	parties, a few administrative evidentiary items I want
23	to ensure that we've addressed. As I mentioned last
24	week the parties submitted into evidence a number of
25	exhibits. There are some outstanding matters which we
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1	held in abeyance and let me make sure they have been
2	taken care of.
3	First, do we have Citizens replacement
4	Exhibit A?
5	MR. WEBSTER: Yes, Judge.
б	CHAIRMAN HAWKENS: Thank you. And Staff's
7	replacement Exhibit A?
8	MS. BATY: Yes.
9	CHAIRMAN HAWKENS: I believe Citizens also
10	had an Exhibit 34?
11	MR. WEBSTER: That was the exhibit divider
12	that identified Exhibit 34 is actually AmerGen Exhibit
13	3.
14	CHAIRMAN HAWKENS: All right, thank you.
15	There was also an issue about Citizens' Exhibit 63,
16	64, and 65, if you'd like to address that, Mr.
17-	Webster?
18	MR. WEBSTER: Yes. I think Citizens
19	Exhibit 63, it turns out, is the same as AmerGen
20	Exhibit 7 and so we've agreed to refer to it as
21	Citizens Exhibit 63 as AmerGen Exhibit 7. So there
22	isn't any dispute about that.
23	64 and 65, I think there does remain a
24	dispute about I understand the staff are objecting.
25	I think we all agree with the factual situation which
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is that these exhibits were not attached to the email that we sent out with the rest of our exhibits. They were, however, included in the hard copy which was overnighted to both AmerGen and the staff on the same day that the email was sent out.

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б In addition, earlier the same day, I did 7 send out an email to both staff and to AmerGen 8 specifying precisely what the page numbers of these 9 exhibits within discovery, so both parties were fully on notice that these exhibits would be submitted and 10 11 then timely received these exhibits on the Monday morning and then subsequently, neither AmerGen nor 12 staff made an objection to those exhibits in their 13 14 motions in limine.

15 CHAIRMAN HAWKENS: Do you now seek to have 16 them admitted into evidence, Mr. Webster?

MR. WEBSTER: We now offer them inevidence, yes, Judge.

19 CHAIRMAN HAWKENS: Thank you. May I hear 20 from AmerGen, please?

21 MR. SILVERMAN: We have no objection to 22 the admission of those exhibits into evidence, Your 23 Honor.

24CHAIRMAN HAWKENS: NRC staff?25MS. BATY: We obviously with respect to

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1	Exhibit 63, the staff has no objection. The staff
2	maintains that the Exhibit 64 and 65 were not timely.
3	In accordance with Debra Wolf's email following the
4	teleconference on September 5th, she stated that all
5	exhibits must be submitted to the Board and provided
6	to the parties no later than with the surrebuttal
7	testimony due on September 14th.
8	Staff did not, in fact, receive Exhibit 63
9	and 64 I mean 64 and 65, excuse me, until Monday
10	morning and neither of those 64, 65 is referenced in
11	the emails transmitting the Citizens surrebuttal
12	testimony. So the staff maintains that they were not
13	filed in a timely manner and we were not aware of
14	them, of their contents.
15	MR. WEBSTER: May I ask the staff whether
16	they well, maybe I will point out not the Panel
17	that the staff were aware of the contents of those
18	exhibits because I actually emailed to Ms. Young the
19	precise page numbers of those exhibits on the Friday.
20	CHAIRMAN HAWKENS: Thank you, Mr. Webster.
21	The NRC staff is not alleging any actual prejudice, is
22	it, as a result of not receiving it?
23	MS. BATY: No.
24	CHAIRMAN HAWKENS: And the email
25	transmission. The NRC staff's objection is overruled.
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1	The exhibits are admitted into evidence.
2	(The documents, having been
3	marked previously for
4	identification as Citizens
5	Exhibits 64 and 65, were
6	received in evidence.)
7	CHAIRMAN HAWKENS: For clarification, Mr.
8	Webster, 63 being submitted into evidence or is it
9	simply going to be a placeholder for
10	MR. WEBSTER: 63 we'll just put a place
11	holder in that says that 63 has been deliberately
12	omitted because it is AmerGen Exhibit 7.
13	CHAIRMAN HAWKENS: Very well. Thank you.
14	For the record then, let me just review then what we
15	have currently admitted into evidence for Citizens.
16	Exhibits A through D and Exhibits 1 through 65.
17	For the NRC Staff, Exhibits A through D,
18	and Exhibits 1 through 6.
19	For the Applicants, Exhibits A through D,
20	and Exhibits 1 through 61.
21	MS. BATY: Your Honors, does AmerGen have
22	an additional exhibit they want to identify at this
23	time?
24	You said 61?
25	MR. SILVERMAN: Yes. If I may, Your
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1	Honor?
2	CHAIRMAN HAWKENS: Yes, please go ahead.
3	MR. SILVERMAN: This is Mr. Silverman. We
4	have, in accordance with the discussions we had with
5	the parties and the Board last week, we brought with
6	us today a model of a quarter of the dry well shell
7	which we thought might be useful in the discussions
8	and the presentations and we've discussed this with
9	the parties. It's available to all the parties to
10	use. It's a model that we cannot leave with the
11	Board, but what we have done is we have taken
12	photographs. We have a number of sets of very clear
13`	color photographs, five photographs to a set that
14	cover the entire circumference from the top down and
15	give a very clear picture of this particular visual
16	aid.
17	There are two things that we needed to
18	discuss. There is one error, if you will, on this
19	model. The model was designed in accordance with the
20	original facility design and at the appropriate time
21	what we can do is show you that there appears to be a
22	trough, a rectangular trough in the on the floor of
23	the dry well region, the sand bed region of the dry
24	well which was there in the original design, but is
25	not there in the actual as-found condition today

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293 1 because of the application of epoxy coating to the 2 floor. We have again discussed this with the parties. 3 That floor is essentially flat with a drop down to the drain system. We can show that at the appropriate 4 5 time, but for the record we wanted to stipulate, and I think all the parties have agreed that there is one 6 7 aspect of this model that's not entirely consistent with the as-found condition. 8 9 Because we expect that the parties will be 10 referring to this, we would propose to admit into 11 evidence the five photographs of the model that we brought with us and we propose that it be marked as 12 Applicant's Exhibit 62. 13 14 CHAIRMAN HAWKENS: NRC staff, any 15 objection? The staff has one question. 16 MS. BATY: 17 Would it be better to label the photographs with a letter, 62A through C, D, to be clear about which one, 18 perhaps someone is referring to? 19 MR. SILVERMAN: That would be fine. 20 MR. WEBSTER: If I could just add to the 21 stipulation, I think Mr. Silverman has described the 22 23 current condition of the floor. The previous 24 condition of the floor is that it was never finished 25 in the way the model depicts. It was, in fact, found NEAL R. GROSS COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. WASHINGTON, D.C. 20005-3701

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294 1 to be crated with exposed rebar and so the floor, 2 actually at no time had the shape that's depicted on 3 the model. 4 MR. POLONSKY: I'm not sure that that's 5 entirely accurate. The issue is how it was found as 6 opposed to how it was actually designed and created 7 and whether or not that trough was there in the very beginning is apparently unknown right now, so I don't 8 9 think we need to get into that level of stipulation. 10 CHAIRMAN HAWKENS: This is the design. MR. SILVERMAN: That is correct. 11 12 CHAIRMAN HAWKENS: Not the way it was With that understanding, do you have any 13 found. objection to it? 14 15 MR. WEBSTER: No, Judge, no objection. Thank you. 16 17 CHAIRMAN HAWKENS: Do you want to mark these now so we'll know what you're referring to as 18 you rely upon them? 19 20 MR. SILVERMAN: Yes. I will identify each one for the record, Your Honor, as best I can. 21 Ι think that the description will differentiate between 22 23 the different photographs. The first photograph which we'll mark as 24 Applicant's Exhibit 62A shows very clearly in the 25 NEAL R. GROSS COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. (202) 234-4433 WASHINGTON, D.C. 20005-3701 www.nealrgross.com

295 center top portion of the picture, the words "dry well 1 shell" and the markings at the bottom are as to other 2 3 aspects of the dry well are barely visible. It's the lefthand quadrant. 4 5 The photograph which we propose to be 6 marked as Applicant's Exhibit 62B is also the lefthand 7 quadrant. You do see the marking dry well shell at 8 the top, but very clearly at the bottom you can read 9 the other labels including sand bed region, skirt cylinder, and reactor pedestal. 10 11 Applicant's Exhibit 62C would be the right 12 hand quadrant. In this photograph, on the right hand 13 side, you now see the label that says downcomer vent 14 and you see the other labels that I referred to 15 earlier as well. No, let me be clear. In the top you 16 see dry well shell label and at the bottom you will 17 see the labels drain sump and sand bed drain. 18 Applicant's Exhibit 63D is a rear version, 19 a rear view of the model with three downcomers and 20 there is no label that is visible. 21 And finally, Applicant's Exhibit 62E is 22 also a rear version, it looks like there are two 23 downcomers that are visible. Again, no labels are visible. 24 25 CHAIRMAN HAWKENS: Thank you. Having NEAL R. GROSS COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. (202) 234-4433 WASHINGTON, D.C. 20005-3701 www.nealrgross.com

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1	heard no objections, Applicant's Exhibit 62 consisting
2	of five photographs of the model is admitted into
3	evidence.
4	(The photographs, having been
5	marked previously for
6	identification as Applicant's
7	Exhibit 62A, 62B, 62C, 62D, and
8	62E, were received in
9	Is there any other evidentiary matters,
10	administrative matters the parties wish to raise
11	before going to opening statements?
12	MR. WEBSTER: Just one other matter,
13	Judge, could we just set up the overhead projector
14	before we start the opening statements?
15	MR. SILVERMAN: And Your Honor, if I may,
16	there is one other matter just to be absolutely clear
17	on the record. And this relates to the objections
18	that Applicant has made and the staff has made in
19	prior motions in limine. Just to be clear, we
20	understand that the Board has stated for the record
21	that the objections that we have made previously are
22	preserved for appeal and there is no need to repeat
23	those during the course of this hearing.
24	MR. WEBSTER: That is correct.
25,	MR. SILVERMAN: Our understanding is we've
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been admonished to exercise restraint in proffering 1 2 objections and we will do so. We would like to be clear that to the extent that there is some issue 3 which is not encompassed within the scope of the 4 5 motions that we have previously filed, perhaps, goes 6 to different subject matter than the subject matter 7 which we raised in those motions that we would be free 8 to raise concern, express concern, file an objection. 9 CHAIRMAN HAWKENS: That's correct, Mr. Silverman. 10 11 MR. SILVERMAN: Thank you. 12 CHAIRMAN HAWKENS: While we're waiting for 13 the overhead project to be set up, I'll mention that 14 in trials, hearings, you typically hear first an 15 opening statement who has the burden of proof and in 16 this case, the license applicant AmerGen has the 17 burden of proof, which is to say the burden is on them to demonstrate by a preponderance of the evidence that 18 19 the challenges presented to us do not have merit. So 20 AmerGen will first, in providing its opening 21 statement, they will have 15 minutes. 22 The staff has NRC been qiven the 23 opportunity to present an opening statement. They 24 declined. after AmerGen, we will hear So from Citizens. 25 NEAL R. GROSS COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W.

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1	(Pause.)
2	MR. WEBSTER: Judge, there a couple of
3	technical problems with the overhead projector, so
. 4	perhaps I could suggest if we have AmerGen's opening
5	statement and then take a short break while we figure
6	it out would be perhaps the most appropriate way?
7	CHAIRMAN HAWKENS: You still have problems
8	with the projector, you say?
9	MR. WEBSTER: We do.
10	CHAIRMAN HAWKENS: All right, we will. Do
11	you have any objection to proceeding that way, Mr.
12	Silverman? Hearing from you and taking a short recess
13	while we correct technical problems?
14	MR. SILVERMAN: No objection.
15	CHAIRMAN HAWKENS: All right. Let's hear
16	from AmerGen, please. We are going to ask Mr.
17	Polonsky to speak.
18	OPENING STATEMENT OF ALEX POLONSKY, ESQ.
19	ON BEHALF OF AMERGEN
20	MR. POLONSKY: Thank you. Good morning,
21	Honor, Judge Abramson, Judge Baratta. Over the next
22	two and a half days, this Atomic Safety and Licensing
23	Board will be hearing testimony regarding potential
24	future corrosion of the liner or shell that forms the
25,	Oyster Creek Nuclear Generating Station's dry well.
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Inside the dry well is the nuclear reactor and other 1 2 equipment. The dry well shell is made of carbon steel 3 plates that are welded together in the shape of an 4 inverted lightbulb, and it is a large inverted light It is over a hundred feet tall. 5 bulb. But the only part that is the subject of 6 7 this proceeding is a three foot vertical section near 8 the bottom of the shell known as the sand bed region. 9 The region got its name from the sand that used to be on the outside of the dry well shell. It is no secret 10 that many years ago there was corrosion in the sand 11 bed region, significant corrosion in some areas. 12 13 Millions of dollars were spent at that time to identify the causes and to prevent future occurrence. 14 But the corrosion stopped in 1992. 15 That 16 year, the sand was removed. The exterior dry well shell surface was cleaned and the clean surface was 17 18 protected with a three-layer epoxy coating system. The epoxy coating system applied then is in excellent 19 condition today. It has the same shiny reflective 20 surface that it had when it was applied 15 years ago 21 22 and in addition, AmerGen, the owner and operator of the plant, will be performing ultrasonic testing, also 23 24 known as UT, thickness measurements of the dry well 25 shell. every four years to further confirm that the

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1	shell is not corroding.
2	AmerGen has concluded that this along with
3	a host of other commitments is more than enough to
4	monitor and manage the potential for future corrosion
5	of the dry well shell, and thereby continue to fully
6	protect the public health and safety.
7	And AmerGen is not alone. The U.S.
8	Nuclear Regulatory Commission's technical staff have
9	reviewed AmerGen's plans to monitor the dry well shell
10	throughout the period of extended operation. Staff
11	has spent more than a year reviewing, auditing, and
12	investigating AmerGen's aging management plans for
13	Oyster Creek, which include the dry well shell. Their
14	conclusion is that AmerGen has met the regulatory
15	requirement to demonstrate with reasonable assurance
16	that the aging management plan will adequately manage
17	the effects of aging of the dry well shell, such that
18	it is intended function will be maintained consistent
19	with the plant's current licensing basis throughout
20	the period of extended operation.
21	And the NRC staff is not alone. There's
22	an independent group, as you know, known as the
23	Advisory Committee on Reactor Safeguards, or ACRS.
24	The ACRS is made up of professors and scientists
25	outside of the NRC and during three separate
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proceedings, the ACRS scrutinized AmerGen's aging management plan for the dry well shell. It too recommended that the plant be allowed to operate for an additional 20 years. So why are we here if the technical

experts at the NRC and in academia have concluded that the aging management program for the dry well shell is adequate? Because six anti-nuclear groups who have banded together and now call themselves Stop the Relicensing of Oyster Creek speculate that a significant amount of corrosion might possibly, if the stars align and reality is suspended, might occur and not be detected.

Included in their conjecture are the following: the dry well shell is not thick enough today. In other words, its bounding available margin is at or below zero.

Two, the three layer epoxy coating will fail and it will do so in the very location of the bounding available margin, and over a large enough area to be of concern from a buckling perspective.

Three, water will come into contact with the exact spot on the dry well shell which has the remaining available margin all the time and AmerGen won't detect that water, despite a water monitoring

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program, and therefore won't take any corrective actions. And finally, the rate of corrosion will be fifty mils per year, which is higher than the worst rate that was encountered prior to 1992 when saturated sand held the water against the exterior dry well shell surface.

But cutting through all this baseless hypothesizing, it is important to remember that the only question at issue is the frequency of future UT thickness measurements. The locations where AmerGen will be taking these measurements it not at issue nor are the other parts, and there are many of them, of AmerGen's aging management plan for the dry well shell. Rather, the only thing at issue is whether testing every four years is frequent enough. AmerGen believes it is. The staff and ACRS have concluded it is. Only Citizens think it is not.

18 So what are the technical details? 19 Corrosion requires three basic things: oxygen, water, 20 and bare metal. Hopefully, you will hear our experts refer to those in much more technical terms. Needless 21 22 to say, there is oxygen in the ambient air. The 23 exterior sand bed region, even though it is sheltered and protected from the elements, by being located deep 24 25 inside a large concrete reactor building, it is

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303 1 exposed to ambient air that is circulated through the 2 building. So there is oxygen in there. As for water, there is no water on the 3 4 exterior dry well shell during normal operations. Water flowing over the exterior dry well shell while 5 the plant is operating has never been documented in 6 the 38 years that the plant has been operating. And 7 condensation? Physically impossible because the metal 8 hotter than the ambient air 9 shell is during So without water, there is no corrosion 10 operations. during corrosion during normal operation. 11 Now the plant does shut down every two 12 13 years to refuel for an average period of around 30 But that is 30 days every two years. 14 days. During those times, the reactor cavity, which is located on 15 the top of the dry well is filled with water and it 16 17 was this reactor cavity that historically was the source of the water that flowed into the exterior sand 18 bed region. But each time this cavity is filled with 19 water, prior to that time, it is protected by a 20 strippable coating and other means to prevent water 21 from reaching the sand bed region. 22 During the last refueling outage this past 23 fall, for example, AmerGen and the NRC staff entered 24 25 the sand bed region and did not identify any water NEAL R. GROSS

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there. But even if water were to come into contact with the exterior dry well shell, AmerGen's experts have demonstrated in their prefiled testimony that it would be of no consequence because, and this brings us to our third requirement for corrosion, there is no bare metal for the water to come into contact with.

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7 The exterior shell was coated with three 8 layers of epoxy in 1992. AmerGen and the NRC 9 inspected the coating during the last refueling outage in 2006. It is in great shape. 10 It is in its 11 sheltered and benign environment. It can continue to protect the exterior dry well shell through the period 12 of extended operation. And the coating's top coat is 13 a grayish white, purposefully so that if any corrosion 14 were to bleed through the coating it would clearly be 15 visible on the surface. 16

AmerGen will be monitoring, monitoring the coating for any signs of such degradation throughout the period of extended operation.

How much metal remains before safety margin in the sand bed region are exceeded is also an issue in the hearing. The welded metal plates that make up the dry well shell in the sand bed region can be 736 mils thick, which is 736 thousands of an inch and still meet the acceptance criteria that are a part

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1	of the plant's current licensing basis.
2	For perspective, the acceptance criteria
3	are based on the ASME code, which includes a safety
4	factor of two. This means that the dry well shell
5	could have a uniform thickness of 736 mils and still
6	be more than 100 percent away from buckling. So there
7	is no danger of the dry well collapsing if the metal
8	gradually corrodes below the acceptance criteria.
9	The sand bed region is divided into ten
10	odd number bays. The vast majority of the bays are
11	significantly thicker than 736 mils. In fact, some
12	bays have experienced little or no loss of metal.
13	AmerGen averages the internal UT data to identify the
14	available margin. If there are 49 points in an
15	internal UT measurement grid, then those 49 points are
16	averaged to arrive at an average thickness in that
17	grid area. Based on this straightforward process,
18	AmerGen has determined that the bay with the least
19	amount of margin is bay 19. And at the finished
20	location within that bay, an area of six inches by six
21	inches square has 64 mils of margin.
22	That 64 mils hasn't changed since
23	measurements were taken in 1992. AmerGen has
24	demonstrated in its prefiled testimony that taking UT
25	measurement every four years is enough to identify any
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future corrosion before arriving at the minimum uniform thickness of 736 mils. From all these facts, it is rather queer that performing routine measurements every four years is more than adequate.

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5 Citizens and their expert Dr. Hausler, instead of using the average of the internal UT data, 6 7 which is the important component that we need to look from buckling perspective, statistically 8 at а manipulates single data points so that they evaluate 9 only the thinnest points and then assume that the 10 shell between these points is equally as thin. 11 By analogy, if you were trying to calculate the average 12 13 weight of people who live in Ocean County, you would make inference that if you weighed enough people in 14 15 the county, randomly, that their weights would be 16 representative of all the people in the county. You wouldn't want to select only ten people. That's too 17 18 few. And you certainly wouldn't want to bias the sample population by singling out and picking the 19 thinnest people or the people who look the thinnest. 20 But what Citizens have done is exactly 21

that. It is statistically inappropriate to select too few people and only those that look thin when you're trying to figure the average. Using our analogy, such statistics would lead to the absurd and incorrect

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307 conclusion that only thin people live here in Ocean 1 County. Moreover, AmerGen has also demonstrated that 2 corrosion of the interior surface of the dry well 3 4 shell, which is embedded in concrete, is essentially 5 zero and of no engineering concern. б The standard that applies here before the 7 Board is not what petitioners want or desire, but rather what the governing codes and regulations 8 9 require. AmerGen has demonstrated that it will meet these codes and regulations throughout the license 10 renewal period. The Licensing Board has many paths to 11 12 rule that a four year UT frequency is adequate for purposes of license renewal. 13 One, the Board can rule that 64 mils is 14 the bounding average for any of the bays. 15 Two, even if the Board found that the 16 bounding average was thinner, it could find that the 17 epoxy coating won't fail. 18 Three, even if the Board found that the 19 20 epoxy coating would fail, it could find that it would not fail in the area in bay 19 which has the bounding 21 average margin, because of all of the other locations 22 have more metal and therefore more margin. 23 Four, even if the Board found that the 24 25 epoxy coating would fail in the area of the bounding **NEAL R. GROSS** COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. (202) 234-4433 WASHINGTON, D.C. 20005-3701 www.nealrgross.com

308 margin, it could find that the coating failure would 1 2 not be over a large enough area to be of concern from a buckling perspective. 3 Five, even if the Board found that the 4 5 coating failed over such a large enough area that happened to coincide with the area in bay 19 of the 6 7 bounding available margin, it could find that there would not be any water present to cause corrosion. 8 9 Six, even if the Board found there would be water present in that exact location, it could find 10 11 that the water would be limited to outages when the reactor cavity is filled with water, thereby limiting 12 13 corrosion to brief periods of time. Seven, even if the Board found that water 14 15 was present all the time, it could find that AmerGen 16 would detect the water. After all, AmerGen is checking the sand bed drains for water every three 17 months and AmerGen would take corrective action as 18 19 committed in its aging management program. 20 Eight, and finally, even if the Board found that AmerGen wouldn't detect the water and 21 therefore wouldn't take corrective actions, it could 22 find that the corrosion rate would be so low that a 23 24 four year UT frequency would be adequate. 25 To conclude, AmerGen has demonstrated that NEAL R. GROSS

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309 1 it will adequately manage the effects of aging on the 2 dry well shell such that its intended functions will 3 be maintained consistent with the current licensing 4 basis throughout the period of extended operation. The NRC staff, the ACRS, have concurred. We believe 5 б that the testimony already submitted and the testimony 7 that will be given over the next two and a half days 8 will provide this Board with the information it needs to reach the same conclusion. Thank you, and that 9 concludes our remarks. 10 11 CHAIRMAN HAWKENS: Thank you, Mr. 12 Polonsky. 13 Mr. Webster, how much time would you guess you may need to make that technical correction? 14 15 MR. WEBSTER: I'm hoping five minutes but perhaps ten minutes would be safest. 16 17 Why don't we do ten CHAIRMAN HAWKENS: minutes to ensure that it is done so you won't have to 18 19 have any problems. 20 Thanks very much, Judge. MR. WEBSTER: 21 CHAIRMAN HAWKENS: Ten minute recess. 22 Thank you. (Off the record.) 23 24 CHAIRMAN HAWKENS: If we could please seated, we will resume. 25 **NEAL R. GROSS** COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. (202) 234-4433 WASHINGTON, D.C. 20005-3701 / www.nealrgross.com

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1	I'm advised the technical difficulties
2	have been corrected. Mr. Webster, are you ready to
3	provide your opening statement?
4	MR. WEBSTER: Indeed. Thank you, Judge.
5	As we've heard, AmerGen here bears the
6	burden of proof to show that the drywell shell would
7	meet all of the safety requirements if the primary
8	(phonetic) license starts on day one, the primary
9	license, and they would continue to do so for an
10	extended period of operation.
11	The ultimate issue here as we've heard is
12	what is the required frequency of monitoring of the
13	thickness of the sandbed region of the drywell shell.
14	The Board I think appropriately has broken
15	up the issue into three parts. The first is what is
16	the margin above the acceptance criteria. The second
17	is what is the potential range of corrosion, and then
18	finally, from those two parameters we can calculate
19	the appropriate monitoring frequency.
20	One of the big things we're going to hear
21	about in the next couple of days is uncertainty. Here
22	is a huge amount of uncertainty because as we've
23	heard, the number of measurements taken is quite
24	small, and the sampling of those measurements is
25	somewhat unusual.
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1.	Now, this isn't a situation created by
2	citizens. This is a situation created by AmerGen. We
3	are given the sample that we're given. All we can do
4	is make the best analysis that we can of the sample
5	that we've got.
6	Overall both the federal courts and
7	scientists require each scientific fact to be proven
8	to 95 percent confidence. NRC staff purported to hold
9	the previous reactor operator GPU to the same 95
10	percent confidence standard.
11	Now, why do we need this standard? It's
12	because the errors compound when you work with
13	multiple parameters, and because each nuclear plant
14	has multiple parameters to meet, and so as an example,
15	if there are 40 parameters to meet and each parameter
16	is met with 95 percent confidence, then statistically
17	we would expect one of those parameters to be out of
18	compliance.
19	So to require anything less than 95
20	percent confidence really would be reasonable
21	assurance of noncompliance, not reasonable assurance
22	of compliance.
23	With regard to the acceptance criterion,
24	there is one fundamental requirement, that the shell
25	as we've heard from AmerGen should meet the ASME code,
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1 and in particular, the most critical issue is whether 2 during refueling there is a factor of safety of two. 3 Through modeling this fundamental 4 requirement ha been translated into two acceptance criteria. One is a criterion that concerns the mean 5 6 thickness. The other concerns the local area 7 thickness. In addition, the very small areas have to 8 9 be thick enough so that during the post accident 10 condition the shell doesn't just blow out under the pressure of the steam that would be generated during 11 12 an accident. 13 There's no dispute about the mean 14 thickness criterion. That's .736 inches. There's no 15 dispute about a very small area criteria which applies to areas that are two inches or less in diameter. 16 17 That's .49 inches. There is a dispute about the local area 18 acceptance criterion. This is based on some GE 19 20 Now, as you can see, this is AmerGen modeling. Exhibit 39, Figure 1(a). That modeling in each bay 21 placed an area that was three feet by one and a half 22 feet on the edge of the bay. As has been clarified by 23 Dr. Hausman's (phonetic) testimony, that means that 24 25 effectively there was a nine square foot area **NEAL R. GROSS** COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W.

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1	straddling two bays. So it was every alternate bay.
2	Now, AmerGen has alleged that this model
3	was incorporated into the CLB. If true, that means
4	that at most one could only accept an area that was
5	less than .736, thinner than .736, that was four and
6	a half square feet in area.
7	Now, we have tried to determine the
8	margins above each of these acceptance criteria.
9	turning first to the local area acceptance criteria,
10	Dr. Hausler has provided some contour plots that
11	provide the best visualization of the data that we
12	have. This is the visualization of the external data
13	because the external data was designed precisely to be
14	compared with the local area acceptance criterion.
15	Now, it's impossible obviously from the
16	few measurements that we have to be exactly certain
17	about what the state of the drywell is. As I said,
18	the theme of this hearing is going to be uncertainty,
19	not certainty. But this is the best visualization
20	that we can produce.
21	What it shows is a very large area, that
22	area on the upper left, which is cross-hatched in red.
23	That, I believe, is less than the .625 inches, and the
24	area that's not quite blue, the green area is an area
25	that's .725 inches.
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314 So our visualization of this data, what this data is telling us is that the most likely scenario for the drywell is that there is a large area much larger than four and a half square feet that covers the whole bay, which is less than .736 inches. Thus, we believe that we are way beyond the local area acceptance criterion. Now, AmerGen has done its own analysis to assess this issue, and we've compared our analysis, Dr. Hausler's analysis, with AmerGen's that is, this is a oval A of Bay 1. This is Exhibit analysis. 61, Figure 1, Citizens Exhibit 61. Broadly, the two are in agreement. They make the same assumptions.

Mr. Polonsky complains that we make the assumption that the drywell in between is linearly interpolated.

In fact, AmerGen has done precisely the 16 same thing with its analysis because that's really the 17 only reasonable approximation you can make. And so 18 AmerGen's analysis was done not from thousands of 19 computer calculations that carefully look at all of 20 the data to get the best interpolation. It was done 21 manually moving a few rectilinear areas around and 22 taking some averages.

24 Somewhat surprisingly what you end up with 25 I call the Etch-a-Sketch version of the is what

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1	Citizens analysis. It's very simplistic, crude plots,
2	but nonetheless, you can see that they're broadly
3	coincident with those produced by Dr. Hausler.
4	Now, for the mean thickness, there's an
5	issue about whether the internal measurements are
6	appropriate or the external measurements are
7	appropriate. Of course, from Citizens' perspective,
8	since we're in a data sparse situation, we believe
9	that we must look at all of the measurements. There
10	are certain bays where the internal measurements are
11	admittedly located above the areas of worst corrosion.
12	In particular, Bay 1 is the most obvious.
13	It's impossible, and I think AmerGen has
14	admitted in its filings that it's impossible from the
15	Bay 1 internal measurements to estimate the thickness
16	of the severely corroded area in Bay 1. Using
17	AmerGen's analogy, if we just measured all of the fat
18	people in Ocean County and took the average of their
19	weight, we would find that on average Ocean County is
20	a pretty fat county, and obviously we don't think
21	that's true, but that is effectively what AmerGen is
22	doing here.
23	Now, the other interesting thing oh,
24	and then for the small areas, again, the issue here is
25	has AmerGen measured the thinnest areas. They say
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316 that they've taken a good look at this drywell and 1 2 they can figure out where the thin areas are, but they also say there's lots of general corrosion, and it's 3 very hard to spot the thin areas. 4 5 And what we're saying is that the statistics suggest -- the extreme value statistics 6 7 suggest that, in fact, there are going to be areas 8 that are thinner than the very small area criterion. Now, strangely, AmerGen has actually come 9 along with this pleading and said it cannot find the 10 11 margin above the local area acceptance criteria. It said it knows it's met, but it's not sure what it is. 12 This is kind of like your doctor saying, "I think your 13 14 cholesterol is fine, but I can't tell you what your cholesterol is." 15 Even if it's true, which we find unlikely, 16 that AmerGen actually can tell whether it meets the 17 criterion or not with an appropriate degree of 18 certainty, that's still inadequate. At best the 19 20 margin above the local area acceptance criterion is tiny. We, therefore, have to know this margin as the 21 Board has found in order to calculate the frequency. 22 23 If this margin is not known, then we can't calculate the frequency, and AmerGen cannot meet its 24 25 burden. NEAL R. GROSS COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W.

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Now, AmerGen has estimated the limiting margin from the internal measurements above the mean thickness criterion as .064 inches, but after correcting a few errors in its documents, which mistakenly purported to represent this as a 95 percentile margin, in fact, this is the mean margin. This is the mean estimate of the mean thickness.

The 95 percentile estimate of the mean 8 9 thickness is considerably lower, and so therefore, taking account of uncertainty, which we must do here 10 11 in dangerous (phonetic) because we are а bar 12 situation, the margin is considerably lower than 13 suggesting even if AmerGen is those internal measurements are actually representative, which we 14 15 don't believe they are. And even AmerGen documents 16 say they are not.

let's turn to future corrosion. 17 Now, There's an issue both with interior corrosion and 18 19 exterior corrosion. I think everyone agrees that interior corrosion could occur if water leaks onto the 20 21 floor of the interior during refueling and the pH 22 drops below a certain protective level. There's 23 conflicting testimony about whether that could happen, 24 but I think there's no doubt it could happen.

Exterior corrosion similarly could happen

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1	if there's water on the outside of the sandbed and the
2	coating fails or if there are errors that were never
3	cultured because they were inaccessible.
4	Now, there's really no dispute that water
5	can flow down into the sandbed region during
б	refueling. It has done that in the past, and there's
7	no reason to anticipate that it couldn't do that in
8	the future.
9	Furthermore, condensation is admittedly a
10	possibility that has not been measured properly, but
11	again, we don't get to take the measurements on the
12	inside of this nuclear reactor. AmerGen failed to do
13	the measurements for water for eight years. When it
14	did some analysis of the water, it found inactivity in
15	that water, but then it said, oh, but we didn't check
16	another type of activity that would have identified
17	where the water came from.
18	The reason we don't know whether there's
19	condensation is because the monitoring has been
20	inadequate. In the absence of data, we have to assume
21	that when the drywell chillers are on it will be
22	colder than the atmosphere on the outside, and
23	therefore, you will get condensation.
24	There was a big issue. The most uncertain
25	issue of all really is what the corrosion rate could
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1	be in the future. There's really very poor data on
2	this, indeed. We have asserted that we should assume
3	a reasonable upper bound corrosion estimate of .05
4	inches per year. That's admittedly conservative, but
5	we think that's appropriate when we're dealing with
б	nuclear safety.
7	Now, the other big issue is how long this
8	corrosive environment could last for, and AmerGen has
9	put in some testimony about how quickly the water on
10	the outside that occurs during refueling could dry up.
11	We believe that's really fantasy. The equation they
12	use is for an open pond. This is not an open pond.
13	This is an enclosed area with very limited air flow.
14	Again, there has been no measurements of
15	this air flow. AmerGen seems to be very fond of
16	making assertions about what will happen, but not
17	actually measuring what will happen.
18	We would like this hearing to be based on
19	the evidence and on reality, not on speculation about
20	what could happen in the future. We have shown that
21	there is a very high degree of uncertainty. It is
22	this Board's responsibility to insure that that
23	uncertainty is fully taken into account in the
24	decision making process.
25	AmerGen is drowning in this sea of
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1	uncertainty. The Board should not allow AmerGen to
2	drag the NRC down when AmerGen has had every
3	opportunity to save itself. Based on the record
4	before the board, the unavoidable conclusion is that
5	AmerGen cannot show that it meets the safety
6	requirements for relicensing with any certainty at
7	all.
8	Thus, this Board should determine that
9	Oyster Creek cannot be relicensed. Should the Board
10	determine that Oyster Creek can be relicensed, at
11	minimum the monitoring frequency must be greater than
12	once per year.
13	Thank you very much.
14	CHAIRMAN HAWKENS: Thank you, Mr. Webster.
15	We will now proceed to establishing our
16	panels, getting the witnesses up at this table.
17	Because of the space limitations, we're going to have
18	them sit in chairs behind one another, and to the
19	extent a Judge has a question that any particular
20	witness feels he would be the best individual to
21	answer, we would ask that he come up and assume a
22	chair in front of a microphone and provide the answer.
23	MR. POLONSKY: Judge Hawkens, instead of
24	having bouncing experts, could we just pass the
25	microphone to the people in the back?
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	1	CHAIRMAN HAWKENS: Sure, we could do that.
	2	MR. POLONSKY: Okay.
	3	CHAIRMAN HAWKENS: Whatever is best for
	4	the witnesses, whatever will work.
	5	MR. POLONSKY: Thanks.
	6	CHAIRMAN HAWKENS: Our sound man, is that
·	7	acceptable to you?
	8	PARTICIPANT: Yes.
	9	CHAIRMAN HAWKENS: Would the witnesses
	10	please go over here, and would AmerGen and the NRC
	11	staff and Mr. Webster please introduce the witnesses
	12	who will be on the first panel?
	13	MR. POLONSKY: This is Mr. Polonsky for
	14	AmerGen. For panel number one seated to my right is
	15	Mr. Michael Gallagher, who is the Vice President of
	16	License Renewal for Exelon, which is the parent
	17	company of AmerGen.
	18	Sitting to his right is Mr. John O'Rourke,
	19	who is also with the corporate license renewal group.
	20	And seated to his right is Mr. Fred
	21	Polaski, who is the Manager of corporate license
	22	renewal for Exelon.
	23	MS. BATY: The staff's witnesses on this
	24	panel on the history and commitments are Mr. Hans
· ·	25	Asher, Dr. Davis, Dr. Hartzman, and Tim O'Hara.
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1	MR. POLONSKY: For Citizens, we have Dr.	
2	Rudolf Hausler.	
3	CHAIRMAN HAWKENS: Gentlemen, will you	
4	please raise your right hand?	
5	Do you solemnly swear or affirm that the	
6	statements you make in today's hearing will be true	
7	and correct to the best of your knowledge and belief?	
8	And let me edit that: the statements you will make in	
9	this proceeding, both here and either as we continue	
10	tomorrow and the next day, will be true and correct to	
11	the best of your knowledge and belief?	
12	PARTICIPANTS: Yes.	
13	CHAIRMAN HAWKENS: Let the record reflect	
14	that all witnesses responded in the affirmative.	
15	JUDGE ABRAMSON: Dr. Hausler, let me ask	
16	you. In your opinion, what role did the sand play in	
17	the establishing the existing corrosion pattern?	
18	DR. HAUSLER: Well, Your Honor, I'm not a	
19	structural engineer. Therefore	
20	JUDGE ABRAMSON: But you're a corrosion	
21	expert.	
22	DR. HAUSLER: I am a corrosion expert.	
23	JUDGE ABRAMSON: And I'm not asking you	
24	about structural. I'm asking you about what role the	
25	sand played in causing the existing corrosion.	
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1	DR. HAUSLER: The sand was holding up the
2	water that leaked on the outside of the reactor into
3	the sandbed. The water was at the same time, of
4	course, because, you know, it leaked down through, in
5	essence, an air space. It was oxygenated, and as a
6	consequence, the oxygenated water that, you know, did
7	not immediately evaporate or drain through the sand
8	was held up just like sand on the beach remains wet
9	for a long time after the ocean has flowed over it.
10	And as a consequence, the steel underneath
11	lost its coating first and then started to corrode.
12	JUDGE ABRAMSON: And when you looked at
13	the measurements of the corrosion pattern, what did
14	you find for the corrosion? What was it located vis-
15	a-vis where the original sand was? Was it at the top
16	of the sand? Was it in the middle of the sand? Was it
17	at the bottom? Where was the corrosion worst? How
18	did it relate to the actual physical location of the
19	sand.
20	DR. HAUSLER: Your Honor, it is very
21	difficult to speculate exactly
22	JUDGE ABRAMSON: I'm not asking you to
23	speculate. I'm asking you when you looked at the data
24	what did you see.
25	DR. HAUSLER: It is difficult to determine
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324 where the surface of the sand was because the data 1 2 indicate that the corrosion that is being observed is not like, you know, horizontal, but you know, at times 3 4 it is slanted, and so it is difficult to visualize or 5 assume, in fact, that the sandbed, you know, was in б place in a horizontal fashion so that the water that 7 drained into the sandbed subsequently, you know, formed a uniform pattern. 8 9 Now, you know, coming to your question, you know, we think by looking both at the internal 10 measurements as well as the external measurement, that 11 12 the majority of the corrosion was a few inches below the top of the sandbed. 13 JUDGE ABRAMSON: And is that consistent 14with your understanding of how corrosion processes 15 would take place? 16 17 DR. HAUSLER: Absolutely. 18 JUDGE ABRAMSON: And when the sand was removed, now that the sand is gone, would you expect 19 20 corrosion now to take place if there were any corrosive environment, to take place in a different 21 location? 22 Well, the corrosion will DR. HAUSLER: 23 take place where there is water and where the water 24 25 has access to the surface. Now, the sand is gone. **NEAL R. GROSS** COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. WASHINGTON, D.C. 20005-3701

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1	The water would more likely accumulate at the bottom
2	of the former sandbed rather than, you know, at the
3	top, and therefore, I would expect the most severe
4	corrosion to occur towards the bottom of the former
5	sandbed.
<i>;</i> 6	JUDGE ABRAMSON: So you would expect if
7	there is future corrosion that the rate would be
8	higher at the bottom than near the original top of the
9	sandbed; is that correct?
10	DR. HAUSLER: That's correct.
11	JUDGE ABRAMSON: Thank you.
12	JUDGE BARATTA: I have no questions at
13	this time for Dr. Hausler.
14	I do have some questions concerning the
15	loads and how they come about with AmerGen, and I
16	think that that relates to the drywell physical
17	structure as such. So I'd like to ask those at this
18	time.
19	As I understand it, there are three cases,
20	refueling post accident and accident. Is that a
21	correct summary of the three conditions?
22	MR. GALLAGHER: As far as load
23	combinations?
24	JUDGE BARATTA: Yes.
25	MR. GALLAGHER: Well, there's two main
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326 load -- there's several load combinations, but there's 1 2 two limiting load combinations, and the one is this 3 refueling case we're talking about and the other is the post accident case. 4 5 JUDGE BARATTA: Okay. Ι think Ι 6 understand the refueling case, and the post accident 7 one though is the one I'm -- could you describe that 8 briefly? 9 MR. GALLAGHER: Yes. If I can, can I use an exhibit to point you to? 10 11 JUDGE BARATTA: Okav. MR. GALLAGHER: This will be Exhibit 40, 12 AmerGen's Exhibit 40, page 24. So if you look at the 13 14 last line there where it talks about post accident condition, gravity loads plus water load to elevation, 15 seventy-four, six inches plus seismic, which is two 16 17 times the design basis earthquake, that's the post accident combination, and that's the limiting load 18 19 case for membrane stresses, for pressure. JUDGE BARATTA: 20 Okay. What type of accident are we referring to that would occur? 21 22 MR. GALLAGHER: That's basically a large 23 break loss of coolant accident, which would -- you reactor coolant line break and would 24 know, а 25 pressurize the primary containment. Peak accident NEAL R. GROSS COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W.

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1	pressure is 44 pounds and that's what's evaluated in
· 2	that particular load combination.
3	JUDGE BARATTA: And if a LOCA then, would
4	there be any fuel damage assumed in that?
5	MR. GALLAGHER: Well, in the design basis,
6	I guess there is a minor there's some fuel damage
7	in the LOCA case, but it's within the design basis and
8	we'd have to comply with 10 CFR Part 100, which we
9	JUDGE BARATTA: Right. The off site
10	MR. GALLAGHER: Yes.
11	JUDGE ABRAMSON: Excuse me, Mr. Gallagher.
12	You mentioned this is membrane stress. This is not
13	buckling loads; is that correct?
14	MR. GALLAGHER: That's correct. For this
15	limiting load combination, this is for membrane
16	stresses, which is for pressure, and not for buckling.
17	The limiting load combination for buckling
18	JUDGE BARATTA: Right. I'm trying to get
19	a sequence going now.
20	MR. GALLAGHER: Okay. I understand.
21	JUDGE BARATTA: If you'd bear with me.
22	Once you begin to recover from that post accident
23	condition, what would be the next step, assuming that
24	it's a LOCA? It's design basis. There's some fuel
25	damage.
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1 MR. GALLAGHER: Okay. Well, vour 2 emergency cooling systems would inject to take care of 3 the situation and use the suppression pool as a water source, and actually if yo usee the load combination, 4 5 water load to elevation, 74 feet, six inches, is 6 actually filling the containment to that elevation, 7 which is basically about the top of active fuel, and 8 you know, so again to maintain the core, maintain an 9 adequate core cooling.

10 JUDGE BARATTA: And that level is below level would be at 11 what the under а refueling 12 condition; is that correct?

13 MR. GALLAGHER: Yes. Well, we're talking 14 different volumes here. This would be water inside containment. You know, it would have been injected 15 16 into the reactor and then it comes out the break, and 17 then it would go inside the containment and then fill 18 up.

19 The water for the refueling case in the refueling cavity, the reactor cavity which is above the reactor, I can point you to an exhibit to show you that if you would like.

If you would. 23 JUDGE BARATTA: 24 MR. GALLAGHER: Okay. This is AmerGen's Exhibit 4. 25

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1 MS. YOUNG: Excuse me, Judge Baratta and 2 Judge Hawkens and Judge Abramson. A question of 3 procedure here. While AmerGen is answering questions about various exhibits, staff witnesses do not have 4 5 the stack in front of them, and if it turns out that there's a follow-up question on that exhibit we would 6 need to hand them the exhibit while this questioning 7 is going on in order for them to follow what has 8 9 proceeded. So does the Board have any objection to 10 11 staff counsel passing a book with relevant exhibits during your questioning? 12 No objection. 13 CHAIRMAN HAWKENS: 14 MS. YOUNG: Thank you. 15 MR. GALLAGHER: Okay. Judge Baratta and Judges, if you look at AmerGen Exhibit 4, this is a 16 17 cross-section of the primary containment of the 18 drywell, and I don't know if yours is in color. Is it in color? 19 20 JUDGE BARATTA: Yes, it is in color. 21 MR. GALLAGHER: Okay. So the reactor cavity is the blue cross-hatched area on top of the 22 23 reactor vessel, and so that's the volume that contains the water during the refueling outages, and that was 24 25 the source of the water that went into this sandbed **NEAL R. GROSS** COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W.

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1	region in the past.
2	I can show you the flow path if you would
3	like to go through that. That's the water behind
4	we're talking about.
5	JUDGE BARATTA: All right. Let me
6	continue then with my line of questioning. The
7	recover from such an accident, would you then go into
8 `	a refueling condition?
9	MR. GALLAGHER: From a post accident
10	condition?
11	JUDGE BARATTA: Right.
12	MR. GALLAGHER: An accident condition is
13	basically I don't know if this would be the right
14	term, but it would be a terminus event. I mean, we
15	would not go into a routine
16	JUDGE BARATTA: Well, what I'm trying to
17	get at is the definition of and maybe I should have
18	stated this ahead of time. We have a refueling outage
19	and then we have unexpected outages, and one of them
20	could be if you had a LOCA which then led to an
21	extended period where you were having to de-fuel the
22	reactor. You know, this is based upon what happened
23	at TMI, where it was an extended period of time they
24	were trying to de-fuel it.
25	My concern there is is it possible to be
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1 in that situation where you would have water in the 2 containment, water in the refueling cavity; would it 3 be possible to apply the strippable coating at that point? 4 Because, you know, obviously if you have 5 fuel damage your radiation levels in the containment 6 7 may be high --MR. GALLAGHER: 8 Okay. JUDGE BARATTA: -- as you mentioned. 9 So 10 I'm trying to understand the sequence of events that might occur during an accident. 11 MR. GALLAGHER: Okay. I understand your 12 Well, for an accident such as that, 13 question. basically the design basis would be to maintain a 14 long-term core cooling situation. 15 So you could maintain a coolable geometry and keep the reactor cool 16 17 basically indefinitely. So I think what you're talking about is 18 when we go into recovery operations, which is, you 19 know, well beyond the design of the plant. 20 There would be sufficient time to do careful analysis, 21 22 careful planning, careful development of procedures and that type of thing to go into recovery and 23 . ultimately decommissioning. 24 So I don't think that the question would 25 **NEAL R. GROSS** COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. (202) 234-4433 WASHINGTON, D.C. 20005-3701 www.nealrgross.com

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be really you know, we would have to go into a
refueling. I mean, obviously at some point if you
wanted to de-fuel the vessel, you know, you would have
to put water in there and we'd have to deal with that,
but I think that's way beyond, you know, the design
basis and what we would be required to do at this
point.
JUDGE BARATTA: Well, what other types of
unanticipated outages could occur which would require
you to go into refueling mode, in other words, to
MR. GALLAGHER: Oh, okay.
JUDGE BARATTA: I mean, that's the one
that I came up with.
MR. GALLAGHER: Okay.
JUDGE BARATTA: Is there something else?
MR. GALLAGHER: Well, there has been in
the industry some rare occurrences for, say, the non-
standard refueling outages. Refueling outages are
typically at Oyster Creek every two years.
JUDGE BARATTA: Right.
MR. GALLAGHER: Okay? The outage you're
probably referring to is if we had to go into the
interior of the vessel, if we had to, say, remove a
fuel bundle, a defect fuel bundle, for instance, that
was detected during operating cycle. You would
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basically do all of the refueling procedures that you would need to do in order to access that fuel. So that happens. That has happened, but it has been rare occasions.

Now, as far as applying the strippable coating, we would apply the strippable coating in those particular cases. We'd be using the same procedures in order to access the vessel. That would be to fill the reactor cavity, remove the reactor -the drywell head and the reactor head to access that area.

JUDGE BARATTA: There's no doubt in your mind that there would not be any overriding safety considerations that would cause you not to apply that strippable coating?

MR. GALLAGHER: There's no doubt in my mind we would apply the strippable coating before we put water in the reactor cavity. That's correct. We would do that. There's no doubt in my mind.

CHAIRMAN HAWKENS: And that would be in any of the reactor accident scenarios Judge Baratta was describing as well? You would have the time under those circumstances to apply it?

24 MR. GALLAGHER: Well, we'd certainly have 25 the time. I just can't speculate. He's talking

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334 1 about, you know, an actual accident. Ι can't 2 speculate on the actual procedures we would use and 3 the time. They would be well beyond a normal 4 refueling. 5 So I'm just not able to speculate on 6 exactly what we do. Certainly we would insure that we would maintain the drywell and insure that we do not 7 8 have -- we, you know, approach safety margins. Ι 9 mean, you're talking about a recovery situation, which 10 I think is the exact procedures we used at that point was speculative, but --11 12 JUDGE ABRAMSON: Let's try to clarify this 13 a little bit. MR. GALLAGHER: Okay. 14 15 JUDGE ABRAMSON: How many large break LOCAs have there been in the nuclear industry? 16 17 MR. GALLAGHER: Zero. 18 JUDGE ABRAMSON: And when you do your 19 probabilistic risk assessment, what kind of numbers do you use for the probability of such an occurrence? 20 MR. GALLAGHER: 21 It's in the ten to the 22 minus six range. 23 JUDGE ABRAMSON: So one every once in a 24 million years? 25 MR. GALLAGHER: Yes. NEAL R. GROSS COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. WASHINGTON, D.C. 20005-3701

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1	JUDGE ABRAMSON: Okay, and requirements
2	that the staff places, maybe this is a question for
· 3	staff counsel. Let me ask it first for AmerGen and
4	then if counsel has somebody that's qualified to
5	answer this they could.
6	As I understand what you're replying here
7	is that the requirements that the agency places on a
8.	licensee vis-a-vis a large break loss of coolant
<u>9</u> .	accident are that you be able to keep the core cool,
10	and there are no requirements that describe recovery
11	procedure; is that correct?
12	MR. GALLAGHER: That's correct.
13	JUDGE ABRAMSON: Thank you.
14	Does staff want to offer any comment on
15	that? Do you have an expert that would like to offer
16	anything on that?
17	I'm not demanding that you do, but if you
18	have something to say along those lines we'd welcome
19	it.
20	MR. ASHAR: We have
21	JUDGE ABRAMSON: Give him a microphone,
22	please and give us your name for the record, please.
23	Your name for the record.
24	MR. ASHAR: Hansraj Ashar.
25	JUDGE ABRAMSON: Okay.
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1	MR. ASHAR: I'm not an accident analysis
2	person. I'm a structural engineer. So I cannot, but
3	based on what we have seen during the TMI, okay, it
4	would be just logical to do that type of operation.
5	We agreed as far as taking out the fuel bag and
6	putting up deck time. Access has to be a problem.
7	JUDGE ABRAMSON: But there are no
8	procedures that are preestablished for that and no
9	requirements; is that right?
10	MR. ASHAR: To the best of my knowledge,
11	there are none.
12	JUDGE ABRAMSON: Okay. Thank you.
13	CHAIRMAN HAWKENS: To AmerGen, how long
14	does it take to apply the taping reactor cavity?
15	MR. GALLAGHER: Your Honor, we didn't
16	bring an outage expert with us, but it's a few hours,
17	less than a day type situation, and there's a lot of
18	benefits for putting the strippable coating. So
19	something that's very beneficial to do. When you put
20	the strippable coating on, not only does it, you know,
21	prevent and minimize this leakage. Also it's for
22 <sup>.</sup>	contamination control, and except for refueling
23	outages, it's something we want to do.
24	You put it on the walls, and then when you
25	put the water in there, if there's any contamination
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1	in the water, if you didn't put the strippable coating
2	on, when you lower the water level, you'd have to
3.	clean the walls. So it's better to have it in a
4	coating which you can then strip off and then dispose
5	of.
6	So it takes several hours. It's part of
7	our outage plan, and it was something that we
8	definitely do.
9	JUDGE BARATTA: My point was to try to
10	ascertain how strong a commitment you would have to
11	doing that under an unscheduled outage situation, and
12	actually what you just said makes a lot of sense in
13 <sup>.</sup>	the LOCA situation because you would have damaged fuel
14	that you'd be trying to remove, and you don't want to
15	spread it around any more than you have, I assume.
16	MR. GALLAGHER: Yes. I mean, our
17	commitment is very strong. We've committed to this,
18	to put the strippable coating on before we put water
<u>1</u> 9`	in the reactor cavity. That typically happens in
20	refueling outages, but if there is other outages, we
21	would do the same. It's the same procedures that we
22	would use to access the vessel, that we would use in
23	refueling the wood in a non-refueling time.
24	JUDGE BARATTA: So you would not have any
25	extended period of time where there would be water
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1	without that strippable coating being in there.
2	MR. GALLAGHER: That's correct. We put
3	the strippable coating on before we put water in that
4	reactor cavity.
5	CHAIRMAN HAWKENS: Dr. Hausler, I know
6	that Citizens expressed some concerns about whether,
7	in fact, consistent with the commitment AmerGen would,
8	under forced outage circumstances, apply the
9	strippable coating and taping. Having heard their
10	commitment on the record, how they construe that
11	commitment, do you have any thoughts or concerns you'd
12	like to express?
13	DR. HAUSLER: No, sir, not really.
14	JUDGE ABRAMSON: Okay. For AmerGen let's
15	pick up on what we were discussing earlier with Dr.
16	Hausler about the corrosion. If you're the wrong
17	panel, then we'll get the right people later, but what
18	I'd like to get a handle on is what we think the
19	corrosion rate was before the problem was discovered
20	and before you developed all of before you removed
21	the sand.
22	Is there among you somebody who can just
23	walk us through for the record what we think the water
24	inflow rate was, how much water was actually getting
25	into the sandbed and being hung up so it could
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	1	evaporate and cause a corrosion?
	2	And I'd like to get an idea here because
	3	actually the big question is what's the future rate,
	4	and we need to have some idea of what the corrosion
	5	rate would be, and it depends on what we had in the
	6	past and what the data is.
	7	Is this the wrong panel, counsel?
	8	MR. GALLAGHER: Well, we do have a panel
	9	fully on corrosion rate. That's Panel No. 6, I
	10	believe.
	11	JUDGE ABRAMSON: Is it better that we
	12	address those questions to that panel, counsel?
	13	MR. POLONSKY: Your Honor, the Panel 6 is
	14	focused primarily on future corrosion.
1	15	JUDGE ABRAMSON: Right, and I'm more
	16	interested right now
	17	MR. POLONSKY: We can talk with them about
	18	historical corrosion.
	19	JUDGE ABRAMSON: Will they have the
:	20	technical expertise to answer that, or we can bring up
, ,	21	people at that point?
:	22	MR. POLONSKY: Yeah, we have people here
, , ; ; ;	23	who can answer those questions.
. :	24	JUDGE ABRAMSON: Okay. Now I can defer
•	25	that until we get to the corrosion rate panel, and
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1	we'll just deal with past as well as future.
2	CHAIRMAN HAWKENS: A question for Dr.
3	Hausler. I know Citizens, and I guess we'll go to the
4	structure but not require an expertise in that,
5	Citizens expressed some concern about the limited air
6	exchange, limited air flow in that region, and would
. 7	you address that, please? I'm thinking that it goes
8.、	to the likelihood or the reasonable likelihood of
9 ~	condensation forming.
10	And Citizens expressed concern about the
11	absence of adequate air flow.
12	DR. HAUSLER: if I understand you
13	correctly, you're referring to the external area, the
14	sandbed area.
15	JUDGE ABRAMSON: Correct.
16	DR. HAUSLER: If water were to accumulate
17	there, then of course under certain circumstances it
18	can evaporate, and I believe AmerGen indicated that
19	one could use an equation that reflects the
20	evaporation from a pond, for instance.
21	Now, I think that in the former sandbed
22	area if water accumulates there, we have mainly a
23	stagnant area. There have been, you know, comments
24	about a chimney effect, so to speak, in other words,
-25	you know, that there would be, you know, a continuous
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1	air flow over that area.
2	However, you know, we do have to remember
3	that, indeed, between the drywell and the concrete,
4	you know, shield around the reactor there is about a
5	three inch space that is filled with insulation
6	material that would definitely, you know, prevent any
7	air flow through there.
8	So my conclusion on that is that water
9	will, of course, evaporate until we have saturation in
10.	that area, and you know, subsequently any evacuation
11	so to speak of water vapor from that area would be
12	extremely slow and definitely, you know, very much
13	slower than what the pond equation let me call it
14	that way you know, would have predicted.
15	JUDGE ABRAMSON: And that would be
16	assuming the sandbed has been removed, which is has.
17	DR. HAUSLER: Yes, sir.
18	JUDGE ABRAMSON: If I understand correctly
19	from what you and I discussed earlier, this
20	evaporation would be taking place near the bottom of
21	the old sandbed region.
22	DR. HAUSLER: That's correct.
23	JUDGE ABRAMSON: Thank you.
24	Before we close on that, can somebody tell
25	us let's ask AmerGen what's the remaining
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1	thickness of the drywell at the bottom of the sandbed
2	region approximately? Is there any corrosion there
3	and is it essentially in its as built configuration?
4	MR. GALLAGHER: We're looking for an
5	exhibit we can show you.
è	JUDGE ABRAMSON: Dr. Hausler, do you want
7	to comment?
8	DR. HAUSLER: I think I can answer that at
9	least in part because we have presented some plots and
10	Bay I believe it was 17, you know, off the trench
11	data, and the trench data indicate that, you know,
12	right at the bottom of the trench, the wall
13	thicknesses are of the order between 750 to 800 mils.
14	As you go up in the trench, the wall thickness is
15	fairly constant until you come to roughly the top of
16	the not quite the top but towards the top of the
17	sandbed, and then the wall thickness decreases again,
18	and I believe, if I'm not mistaken, the lowest number
19	there was on the order of 600 or 650 mils towards the
20	top.
21	So in other words, we've had at least 25
22	to 30 percent corrosion in essence in that particular
23	instance.
24	JUDGE ABRAMSON: At the bottom of the
25	trough.
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1	DR. HAUSLER: That's correct.
2	MR. GALLAGHER: We don't agree with that
3	assessment. If I can point you to Exhibit 40.
4	JUDGE ABRAMSON: Four, oh?
5	MR. GALLAGHER: Forty, yes, AmerGen's
6	Exhibit 40, and
7	JUDGE ABRAMSON: Pick a page?
8	MR. GALLAGHER: Yes. Maybe if I could
9	start with page 52 just so you know what we're talking
10	about as far as where the data is taken.
11	JUDGE ABRAMSON: Okay.
12	MR. GALLAGHER: Page 52 is a cross-section
13	of the same region, and it shows a trench that was cut
14	into the interior of the drywell on the floor, and we
15	did two of these trenches. One was in Bay 5 and one
16	was in Bay 17.
17	JUDGE ABRAMSON: How long have these
18	trenches been there?
19	MR. GALLAGHER: They were cut in 1986.
20	JUDGE ABRAMSON: And they were cut at the
2,1	time you discovered the corrosion?
22	MR. GALLAGHER: Yes.
23	JUDGE ABRAMSON: And what was the purpose
24	of it?
25	MR. GALLAGHER: It was part of the
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1	assessment. The purpose was to look at two areas, one
2	that had low corrosion, seemingly low corrosion and
3	one that had higher corrosion and get a profile, and
4	just the question
5	JUDGE ABRAMSON: A vertical profile?
6	MR. GALLAGHER: Yes.
7	JUDGE ABRAMSON: Thank you.
8	MR. GALLAGHER: Okay? And so if you look
9	at the data summarized, it's on page 54, and this
10	Exhibit 40 is the presentation we gave to the ACRS.
11	If you go to page 54 where it shows the we're
12	trying to show here the different elevations of the
13	trench data, and the trench at the floor and we went
14	slightly below the floor in Bay 5. Basically you see
15	Bay 5 is 1,074 mils; Bay 17, 986.
16	JUDGE ABRAMSON: What was the as-built,
17	approximately?
18	MR. GALLAGHER: It's 1,154.
19	JUDGE ABRAMSON: Thank you.
20	MR. GALLAGHER: And then we actually were
21	able to excavate a little bit below the sandbed floor
22	on Bay 5 and that was 1,113.
23	So our conclusion is that the corrosion
24	was higher at the top, and it tapered off as you went
25	to the bottom, which is what you would expect, and so
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1	there's more metal at the bottom, where it meets the
2	sandbed floor.
3	JUDGE ABRAMSON: And is it your conclusion
4	or your experts' conclusions that what you saw in
5	those trenches was relatively typical of what one
6	could expect other places below the concrete if you
7	had actually dug other trends?
8	MR. GALLAGHER: Yes, and definitely below
9	the concrete because, as Mr. Gordon can testify in our
10	corrosion panel, that the
11	MR. WEBSTER: Judge, I'll object to the
12	witness testifying for another witness.
13	JUDGE ABRAMSON: Well, we'll hear from the
14	other witness. Let me hear what he says is data
15	that's typical or not, and we'll hear from the other
16	witness later.
17	MR. GALLAGHER: Is that below the concrete
18	surface.
19	JUDGE ABRAMSON: Where you made the
20	trench, right?
21	MR. GALLAGHER: Yes.
22	JUDGE ABRAMSON: There was a concrete.
23	You made a trench
24	MR. GALLAGHER: Below that.
25	JUDGE ABRAMSON: to get to see what it
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1	looked like.
2	MR. GALLAGHER: A little bit below the
3	surface.
4	JUDGE ABRAMSON: Right.
5	MR. GALLAGHER: So imbedded steel in
6	concrete is basically protected by a concrete pour
7	water because of the alkalinity.
8	JUDGE ABRAMSON: The age.
9	MR. GALLAGHER: Alkalinity, and Mr.
10	Gordon, you know,
11	JUDGE ABRAMSON: We'll hear. We've seen
12	written testimony on that topic and
13	MR. GALLAGHER: That's correct.
14	JUDGE ABRAMSON: we'll hear from him
15	later.
16	MR. GALLAGHER: The other thing I'd point
17	out, Judge, is to address this is there a likely
18	corrosion area at the bottom of the sandbed, we don't
19	think there is. If I could show you Exhibit
20	JUDGE BARATTA: Before you leave page 54,
21	may I ask a question?
22	MR. GALLAGHER: Yes, Judge.
23	JUDGE BARATTA: The 986 that's referred to
24	as the trench lower curb to sandbed floor on Bay 17.
25	Was that taken at different locations along that
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1	bottom or just one location?
2	MR. GALLAGHER: We took several data
3	points from the bottom of the trench all the way to
4	the top.
5	Fred, do you want to answer?
6	MR. POLASKI: Yeah, this is Fred Polaski.
7	The data that was taken in those trenches
8``	was a series of six-by-six grids. So with every one
9.	inch of elevation there were seven readings taken
10	across that level, and so you've got a complete
11	profile of the thickness in the trench.
12	JUDGE ABRAMSON: And the 986 is the
13	average of all those? What's the 986 then?
14	MR. POLASKI: The 986 would be the average
15	in that region that it's presented for.
16	JUDGE ABRAMSON: And was there a pattern
17	to it as Dr. Hausler is suggesting?
18	MR. POLASKI: Yes, there is a pattern. If
19	I could refer you to AmerGen's Exhibit 19, this is an
20	evaluation that was performed at the plant during the
21	most recent refueling outage when these measurements
22	were taken.
23`	JUDGE ABRAMSON: Hang on a second while we
24	get this exhibit.
25	Okay. Thank you.
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1	MR. POLASKI: And I'll refer you. This is
2	the drawing that's referred to
3	MR. POLONSKY: Your Honor, this is Mr.
4	Polonsky.
5	It appears to be Attachment 1 to that
6	exhibit, Attachment 1 and page 8.
7	MR. POLASKI: Attachment 1, page 8.
8	JUDGE ABRAMSON: Attachment 1, page 8.
9	Okay. I see all of the data is tabulated for us.
10	MR. POLASKI: It's Attachment 1, page 8 of
11	10.
12	JUDGE ABRAMSON: Eight of ten. So it's at
13	the back.
14	MR. POLASKI: It looks like this. This is
15	the one I'm referring to.
16	JUDGE ABRAMSON: Okay. It's a table?
17	MR. POLASKI: Yes, it's a table. Just to
18	point out that this table is inverted, if you will.
19	the data at the bottom of the trench is at the top of
20	the table, and the data from the top of the trench at
21	Location 42 is at the bottom, and you can see that is
22	at the bottom of the age. So at the top of the trench
23	you're seeing readings like 1.113, 1.13, and at the
24	bottom the numbers are one or slightly below one.
25	JUDGE ABRAMSON: Dr. Hausler, do you have
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1	this table in front of you?
2	DR. HAUSLER: Yes, sir. Actually I did
3	plot these data in our Exhibit B, page 13, Figure 4.
4	JUDGE ABRAMSON: But earlier you said you
5	had numbers like .70. Did I hear that right, at the
6	bottom of the trench? How do you reconcile that
7	statement with what I'm seeing in this table?
8	DR. HAUSLER: No, actually the low data
9	are on the top.
10	JUDGE ABRAMSON: Yes.
11	DR. HAUSLER: They're basing from the
12	bottom of the trench at about 40, I believe, 40
, 13	inches. There is a number that is, yeah, about 790,
14	I guess.
15	MR. WEBSTER: Judge, may I
16	JUDGE ABRAMSON: Give me a location
17	number. Give us a location number in this table,
18	please.
19	MR. WEBSTER: Judge, may I just make a
20	point here? On this exhibit I think there's an
21	authenticity issue here about what whether this
22	exhibit really is representing the UT measurements for
23	Bay 17 trench. The average of these numbers is given
24	in the exhibit as 1.074, whereas AmerGen's other
25	exhibit says that the average is .986.
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1 JUDGE ABRAMSON: Well, I accept that 2 discrepancy. In either case it's a relatively thick 3 panel. What I'm trying to reconcile this with is what I thought Dr. Hausler said earlier. Perhaps we could 4 5 ask the court reporter to read back Dr. Hausler's 6 earlier response to this. He said something about the numbers at the bottom of the trench being .7. 7 Did I 8 misunderstand that? Am I misremembering it? 9 DR. HAUSLER: No, sir. First of all, I 10 beg your pardon. I did, you know, misspeak, and I 11 refreshed my memory with the graph that I did. At the 12 bottom of the trench the lowest number is on the order 13 of 920, according to this figure here. 14 MR. WEBSTER: Dr. Hausler, could you just 15 prompt the panel which figure you're referring to, 16 please? DR. HAUSLER: I'm referring to Figure 4 on 17 page 13 in Exhibit B. 18 19 JUDGE ABRAMSON: Okay. So if I now have 20 this correct, you're telling us that at the bottom of 21 the trench, which is below the original surface of the cement where they dug down to try to get a handle on 22 what corrosion there was in the bottom of the drywell 23 shell, the number for thickness is something like .98-24 25 something in your view and in the Applicant's it's **NEAL R. GROSS** 

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1	somewhere between that and
2	DR. HAUSLER: The lowest point at the
3	bottom is .4 inches94 inches.
4	JUDGE ABRAMSON: Okay. Thank you very
5	much. That's very helpful because that's a very big
6	that's a much greater margin to the buckling
7	failure than the .7 number or the .6 numbers that
8	we've been worrying about at the top of the sandbed
9	region. I think it's very important for us to look
10	when we're looking at buckling.
11	DR. HAUSLER: Yes, sir. That is
12	absolutely correct, but at the same time, that is only
13	one bay. That's only Bay 17.
14	JUDGE ABRAMSON: Yes.
15	DR. HAUSLER: I would be quite reluctant
16	actually to generalize from this data to the other
17	bays.
18	JUDGE ABRAMSON: Yes, I understand. Thank
19	you.
20	MR. POLONSKY: Can we take a moment,
21	please this is Mr. Polonsky to just confer with
22	the witnesses?
23	CHAIRMAN HAWKENS: Yes, you certainly may.
24	(Pause in proceedings.)
25	MR. POLONSKY: Your Honor, this is Mr.
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1	Polonsky.
2	We all appear to have been referring to
3	the wrong page, although we're in the correct exhibit
4	number and the correct attachment.
5	JUDGE ABRAMSON: Okay.
6	MR. POLONSKY: Page 8 is preceded by page
7	7. Page 7 appears to be a data sheet for Trench 2 in
8	Bay 17. So the assumption was that the following page
9.	on page 8 was Bay 17, which was selected at the time
10	because it was believed to be indicative of corrosion
11	on the outside.
12	However, page 4 of 10 of this same
13	attachment really is the data from Trench 17, even
14	though it is preceded by a page that says data sheet
15	Trench 1, Bay 5 because Bay 5 was the bay that was
16	selected because it had essentially much less
17	corrosion.
18	JUDGE ABRAMSON: And I see on page 4 the
19	numbers at the bottom of the trench are like .94, .93.
20	MR. POLONSKY: Yes, much more in line with
21	the slide that Mr. Gallagher had provided from the
22	ACRS presentation.
23	JUDGE ABRAMSON: Thank you.
24	MR. POLONSKY: There was some confusion.
25	Thank you.
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1	JUDGE ABRAMSON: That's very helpful.
2	Thank you.
3	Now, Mr. Hausler, I saw that your that
4	Susan's counsel had come over to ask you to point
5	something out. Would you like to tell us what he said
6	to you and what it is you'd like to point out?
7	DR. HAUSLER: Yes. He, in essence, Your
8	Honor, he told me the same thing, you know, that
9	AmerGen had pointed to the wrong page.
10	JUDGE ABRAMSON: Okay. Very good. That's
11	all very helpful.
12	DR. HAUSLER: I would perhaps like to
13	follow up on the Figure 4 that I pointed out to you.
14	The points in there, the data points in there are, in
15	essence, the averages over the horizontal points. The
16	complete points, you know, are plotted on the Figure
17	2 earlier, and it is a very interesting figure
18	actually because it kind of shows the variation of
19	corrosion spatially, horizontally, you know, as well
20	as vertically.
21	JUDGE ABRAMSON: Yes, and frankly, we
22	thought your contour plots were very helpful to us in
23	understanding all of these things, but now I know
24	you're not a structural engineer; is that correct, or
25	are you?
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1	Do you understand buckling failure?
2	DR. HAUSLER: Yes, I think I do.
3	JUDGE ABRAMSON: Okay.
4	DR. HAUSLER: But at least let me put it
5	this way in general.
6	JUDGE ABRAMSON: And I must say that I'm
7	nota structural engineer either, but my impression is
8	that for something to fail in buckling it takes a
9	fairly large area to be weakened. This drywell liner
10	at this elevation is what, about 100 feet in diameter?
11	What's the diameter of this drywell shell at the
12	bottom?
13	DR. HAUSLER: Seventy-five? Isn't it 75?
14	JUDGE ABRAMSON: Seventy feet in diameter?
15	DR. HAUSLER: In diameter.
16	MR. GALLAGHER: For the sphere.
17	JUDGE ABRAMSON: And when GE looked at
18	the buckling, they did two sets of analyses, one where
19	they assumed the whole thing was thinned, and what
20	they did as I understand this, they looked at
21	something that was .736 inches thickness, and that
22	that left them at the minimum safety margin of 2.0.
23	Is that in essence the way you understand what that
24	point
25	DR. HAUSLER: Yes, sir.
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1	JUDGE ABRAMSON: Now, that was the whole
2	thing thinned. We are now something that's .9 or so
3	inches at this elevation, which is in fact below the
4	cement, which has some, of course, structural effects,
5	I assume; is that correct?
6	DR. HAUSLER: Well
7	JUDGE ABRAMSON: If you're not an expert,
8	just don't
9	DR. HAUSLER: But to your earlier comment
10	I wanted to point out that they really only looked at
11	GE only looked at a slice, you know, a 36 degree
12	pie slice.
13	JUDGE ABRAMSON: Yes, yes. They assumed
14	symmetry. They assumed symmetry. I understand that.
15	We understand that, and we have lots of testimony on
16	that in front of us in writing.
17	DR. HAUSLER: Okay.
18	JUDGE ABRAMSON: But sine you assume
19	symmetry, you're really looking at the whole thing,
20	right?
21	DR. HAUSLER: I can't answer that either
22	affirmative or not affirmative. I don't know.
23	JUDGE ABRAMSON: That's fine. That's
24	fine.
25	MR. POLONSKY: Judge Abramson, you had
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1	asked a question and we heard some testimony that
2	pointed to Figure 4 of one of Dr. Hausler's memoranda.
3	We do have testimony from a later panel on this
4	particular figure.
5	JUDGE ABRAMSON: Okay. Let's deal
6	MR. POLONSKY: I thought we would bring it
7	here so that you don't have to hear tomorrow about a
8	figure that we talked about this morning.
9	JUDGE ABRAMSON: That's okay. If you have
10	somebody who's capable of
11	MR. POLONSKY: Yes.
12	JUDGE ABRAMSON: As I've said to all the
13	parties in conference calls and in writing, our plan
14	here is to have all the experts talk about topics when
15	we need them to talk about it. So if you've got
16	somebody who's ready to talk about that, let's do.
17	Counsel for the staff, I think, wants to
18	pipe up here.
19	MS. YOUNG: Just a point of order since
20	we've only sworn in this panel. Perhaps we should
21	just swear in all of the witnesses for the proceeding
22	right now, particularly if we have to keep bouncing to
23	people who are not presently seated at the witness
24	table.
25	CHAIRMAN HAWKENS: Why don't AmerGen and
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357 1 Citizens identify the names, the individuals who need 2 to be sworn in? Please have them stand and we'll 3 swear them in. MR. POLONSKY: Okay. Mr. Pete Tamburro, 4 5 Mr. Julien Abramovici, Mr. Martin McAlister, Mr. Francis Howard Ray, Dr. David Garrett Harlow, Barry 6 Gordon, Edwin Hosterman. Behind him is John Cavallo. 7 8 Dr. Harmetta, Ahmed Wo. Is there anyone standing 9 behind you? No, okay. Scott Erickson and Chris 10 Hawkins. That completes it for AmerGen. Staff has one additional MS. BATY: 11 witness who could be sworn at this time. Arthur 12 13 Salomon is standing behind me. MR. WEBSTER: Citizens has no further 14 15 witnesses beyond Dr. 16 CHAIRMAN HAWKENS: You only have a total 17 of five witnesses? MS. BATY: 18 That's correct. 19 CHAIRMAN HAWKENS: Okay. Gentlemen, would 20 you please raise your right hand? Do you solemnly swear or affirm the 21 22 statements you'll make in this proceeding will be true 23 and correct to the best of your knowledge and belief? PARTICIPANTS: 24 I do. 25 CHAIRMAN HAWKENS: Thank you very much. NEAL R. GROSS COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. (202) 234-4433 WASHINGTON, D.C. 20005-3701 www.nealrgross.com

Let the record reflect they all responded
Let the record refrect they are responded
in the affirmative.
MR. POLONSKY: If I could pass the
microphone back to Mr. Pete Tamburro, he can address
this Figure 4.
MR. TAMBURRO: My name is Pete Tamburro,
and I'm looking at the Figure 4.
JUDGE ABRAMSON: Mr. Tamburro, Figure 4 in
which exhibit? Let's make sure we get it identified
MR. TAMBURRO: Citizens Exhibit B.
JUDGE ABRAMSON: Citizens Exhibit B,
Figure 4.
CHAIRMAN HAWKENS: Which attachment to
Exhibit B?
MR. TAMBURRO: The April 25th memo.
PARTICIPANT: No, no, no, no.
MR. TAMBURRO: Page 13 of the April 25th
memo.
JUDGE ABRAMSON: We have an attachment
number we can identify it by.
MR. WEBSTER: I believe that's Attachment
3.
CHAIRMAN HAWKENS: Thank you, counselor.
MR. WEBSTER: If we're going to talk about
Figure 3, there is an updated version of Figure 3
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1	which I believe was supplied as Exhibit 61.
2	MR. POLONSKY: Richard, I think we're
3	talking about Figure 4, but I think we called it
4	Attachment 3, but we're still trying to confirm that.
5	MR. WEBSTER: Yes. Figure 4 is a simpler
6	figure. Really there's an updated version of Figure
7	4.
8	MR. POLONSKY: Well, which one was Dr.
9	Hausler referring to. That's the one we're trying to
10	respond to.
11	JUDGE ABRAMSON: Yeah. Let's just make
12	sure we're talking about the most recent view.
13	MR. WEBSTER: If we could, Exhibit C-1,
14	Attachment 1, Figure 5.
15	JUDGE ABRAMSON: Okay. Dr. Hauser, are
16	you following all of this?
. 17	DR. HAUSLER: Not really.
18	(Laughter.)
19	JUDGE ABRAMSON: Perhaps, Mr. Webster,
20	you'd like to go show your expert what figure you
21	think he should be talking about.
22	DR. HAUSLER: No, this is all right. You
23	know, I didn't realize that when I referred to Exhibit
24	B I should have referred to Attachment 3. My fault.
25	JUDGE ABRAMSON: No, that's not a problem.
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1	It sounds like Mr. Webster thinks you have a different
2	figure.
3	DR. HAUSLER: The figure I referred to is
4	Figure 4 in Attachment 3 of Exhibit B. Now, that
5	figure was
6	CHAIRMAN HAWKENS: One second, Dr.
7	Hausler. Thank you. We're going to
8	JUDGE ABRAMSON: That's the one we had
. 9	out.
10	CHAIRMAN HAWKENS: All right. It would be
11	helpful in the future when you refer to an exhibit,
12	identify it with precision so that we can all look at
13	it with you. All right?
14	DR. HAUSLER: Yes, sir. My apologies.
15	MR. WEBSTER: Could I just suggest just to
16	my witness, Dr. Hausler, if you look at Exhibit C-1,
17	Attachment 1, Figure 5, I think you will find an
18	updated version of the Figure 4 previously referenced.
19	DR. HAUSLER: That's correct.
20	MR. WEBSTER: Perhaps it would be most
21	useful to use the most up to date version.
22	JUDGE ABRAMSON: Let's let all of the
<sup>,</sup> 23	parties get their hands on such an exhibit, including
24	the Judges.
25	MR. POLONSKY: Richard, could you please
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1	for us just walk through that again? Exhibit which
2	number?
3	MR. WEBSTER: It's Exhibit well, it
4	occurs twice. I'm referred to Exhibit C1.
5	MR. POLONSKY: Yes.
6	MR. WEBSTER: Attachment 1.
7	MR. POLONSKY: Yes.
8	MR. WEBSTER: Figure 5, which is on page
9.	18.
10	MR. POLONSKY: Okay, and this is a color
11	update of the prior one that we had just identified as
12	Figure 4?
13	MR. WEBSTER: That's correct, and in
14	another grid.
15	MR. POLONSKY: Okay.
16	DR. HAUSLER: Let me amplify this. You
17	know why we did that. In Bay 17 there were actually
18	two internal grid measurements. We used one earlier
19	for the comparison, and we were taken to task because
20	of that, indicating that the other grid would show
21	lower corrosion rates and would, therefore, you know,
22	not fully support the conclusions that we had at the
23	time. So that's why we did the upgrade of that
24	figure. It is the same data, but the internal grid
25	17D was added to it.
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1	JUDGE ABRAMSON: Mr. Tamburro, if you're
2	ready.
3	MR. TAMBURRO: This is Pete Tamburro.
4	I've looked at this plotting, and there's
5	one point to it that's incorrect. With respect to the
6	elevation of the trench data, which is the line with
7	the solid dots to it, is plotted with elevations that
8	are too high. The actual trenches are much lower
9	along the contour of the drywell, and the entire plot
10	of the trench data should be shifted down a good 20
11	inches.
12	To the right of the plot where you see the
.13	trench data has this change in value and basically
14	goes up and down, that area should be in the same
15	elevation of approximately as the two grids. It
16	should be elevation as depicted on this graph of 25.
17	So this plotting shows the trench data
18	with respect to the other data, the internal grid data
19	and the external data as too far up along the contour.
20	What I'd like to do is point out another
21	exhibit from AmerGen.
22	JUDGE ABRAMSON: Please do.
23	MR. TAMBURRO: AmerGen Exhibit 28. This
24	is an exhibit we provided to the ACRS last year, and
25	it provides a comprehensive spatial representation of
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1	all the data, the internal data, the external data,
2	and the two trenches.
3	Over to the right where you see Bay 17,
4	the long green rectangle, that's the trench, and it
5	has been properly placed with respect to elevation,
6	and as you can tell, the top of the trench is at the
7	mid-plane of the internal grids, which are on either
8	side of it.
9	MR. WEBSTER: Judge, could I just point
10	out that it's not very visible on the figure, on this
11	figure from AmerGen. Actually the figure on its face
12	says it is not to scale.
13	JUDGE ABRAMSON: Yes, we appreciate that.
14	Thank you, counselor.
15	It's a little difficult for us to
16	interpret this figure, Mr. Tamburro, but
17	MR. GALLAGHER: Judge, could I walk you
18	through this figure and show you how we developed it?
19	JUDGE ABRAMSON: I'd be grateful.
20	MR. GALLAGHER: Okay. Because this is a
21	very good figure. I mean, this summarizes all of our
22	data and this is from the 2006 outage also. So it's
23	very fresh data.
24	MR. POLONSKY: Can we clarify when the
25	Board is saying "this exhibit"? It's confusing
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1	because we can't see which one. We have two exhibits
. 2	in front of us. So which one are you finding
3	confusing?
4	JUDGE ABRAMSON: We're looking at
5	Applicant's Exhibit 28.
6	MR. POLONSKY: Great. Thank you.
7	JUDGE ABRAMSON: Is that what we're
8	working from?
9	MR. POLONSKY: Yes, Applicant's
10	JUDGE ABRAMSON: Does everybody have
11	Applicant's Exhibit 28 in front of them? Mr. Hausler?
12	DR. HAUSLER: No, not yet.
13	JUDGE ABRAMSON: Okay.
- 14	DR. HAUSLER: I'm getting there.
15	JUDGE ABRAMSON: We'll wait.
16	CHAIRMAN HAWKENS: And, Dr. Hausler, I'm
17	sure you are listening carefully to what AmerGen is
18	about to say, but I'll be asking you to respond to it,
19	advise if you agree or disagree with it after they
20	describe this chart.
21	JUDGE ABRAMSON: It's the raw data we're
22	looking at; is that correct?
23	MR. GALLAGHER: That's correct. This is
24	a depiction of the data we took during the 2006
25	outage, both from the interior of the drywell, the
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1	grids and the trenches, and the exterior.
2	So let me just walk you through here. At
3	the top has the bay number.
4	JUDGE ABRAMSON: Hang on a minute.
5	Dr. Hausler, do you have this one handy
6	now?
7	DR. HAUSLER: Yes, I do.
8	JUDGE ABRAMSON: Thank you.
9	DR. HAUSLER: I'm looking at it. Thank
10	you.
11	MR. GALLAGHER: At the top are the bay
12	numbers, one through 19. There's ten bays, every odd
13	numbers, and then vertically we showed the elevations,
14	and there's the key points with each elevation, like
15	the sandbed region floor, you know, where it says
16	drywell floor, lower curve, and so forth.
17	So I can show you on the model if you
18	wanted to see that visually on our model, if you'd
19	like to see that, but that's coming up from the bottom
20	and going to the top.
21	The triangles depict exterior data points.
22	The squares depict squares or rectangles depict
23	interior measurements. The color code is such the
24	green is greater than 736 mils. The yellow is between
25	636 and 736. We just picked an arbitrary 100 mil
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1	deficit, and then the red, and there's one single red
2	point is between 536 and 636.
3	JUDGE ABRAMSON: Now, is this every single
4	data point or are these averages at elevations?
5	MR. GALLAGHER: The individual squares, we
6	tried to show the individual points.
7	JUDGE ABRAMSON: The individual data
8	points?
9	MR. GALLAGHER: The individual data
10	points. So if there was an individual point and it
11	was less than 736 mils, it's either a yellow square,
12	a yellow triangle or in the one case the red triangle.
13	We didn't show the individual points greater than 736.
14	So like the green shaded area, all of the individual
15	points would be greater than 736.
16	JUDGE ABRAMSON: And the green triangles
17	on the graph represent the individual data points?
18	MR. GALLAGHER: Yes, from
19	JUDGE ABRAMSON: Every single data point.
20	MR. GALLAGHER: The triangles are
21	external. The squares are internal, and this is every
22	data point that we've taken. And as far as the scale,
23	what we were trying to say here is that, you know,
24	it's difficult to put this on an eight and a half by
25	11, but spatially like if we're saving it's above the
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1	curve and we have that in approximate space, that's
2	correct.
3	Obviously, left to right it's a very
4	compressed scale, but spatially this is a good
5	representation of what we have.
6	So the two trenches we talked about are
7	those two long rectangles, and you can see one of the
8	trenches. The trench in Bay 5 goes below the concrete
9	floor because we were doing some exploratory
10	excavation to see, you know, what that interface
11	looked like.
12	So the footnote on the drawing, just for
13	clarity, it says it's vertically to scale, but not
14	horizontally, which is what I just said. If you've
15	got a magnifying glass, you can look at that.
16	JUDGE ABRAMSON: Yeah. I'll tell you
17	what. Even with my reading glasses I can't decipher
18	that one. I'll get a magnifying glass when I get back
19	to the office, but I'll take you at your word. thank
20	you.
21	CHAIRMAN HAWKENS: Dr. Hausler, do you
22	have any response to any of the representations just
23	made by AmerGen regarding this exhibit?
24	DR. HAUSLER: Well, for one, I think there
25	were a lot more points actually taken. So some of the
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368 1 points that are in the graph are, in fact, averages, 2 not individual points because in Base 17, there are 3 two grids, each of them 49 points. So, you know, we 4 don't see 49 points for the grids, for the internal 5 measurements on Bay 17. JUDGE ABRAMSON: Yeah, let's make sure we 6 7 understand. What, in fact, is this? What do these 8 triangles represent, the green triangles in the Bay 19 9 column. 10 MR. GALLAGHER: If I can just talk maybe 11 -- I'll talk through one bay, Bay 17. JUDGE ABRAMSON: Yeah, let's work through 12 17. 13 14 MR. GALLAGHER: Okay. Seventeen, for instance, above the horizontal line that's noted 15 16 "lower curb, internal," okay, you can see that there's 17 -- I'm working from left to right. There's a green 18 rectangle. So that would be a grid, and in that 19 particular grid that's 17(a). 20 Mr. Tibler, 49 points are in that grid. 21 All of those points are greater than 736. 22 So that's why they're all green, and we just didn't 23 show, you know -- they would be squares because 24 they're taken from the inside. So there would be 49 25 squares. We just depict it as one rectangle. NEAL R. GROSS COURT REPORTERS, AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. WASHINGTON, D.C. 20005-3701

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1	You can see there's a triangle in that
2	square, right around that square to the bottom right-
3	hand corner of that rectangle. That is a green
4	triangle, which means there's a point measured
5	externally that's greater than 736 mils. Okay?
6	JUDGE ABRAMSON: One point though, only
7	one point.
8	MR. GALLAGHER: At that particular
9	triangle, yes, one point, not an average.
10	Then the next grid is depicted by a green
11	triangle green rectangle, but then we show seven
12	individual squares, yellow squares. So they are
13	points that are between 636 mils and 736 mils.
1.4	they're squares. So that means they're taken from the
15	interior. Okay?
16	So the rest of the 49 points in that
17	particular grid are greater than 736 mils. Again, we
18	just didn't show each and every individual point.
19	We tried to show the points of relevance,
20	those less than 736.
21	Further going to the right you see the top
22	of the trench. In the top of the trench is a long
23	rectangle that goes from the top, which is above this
24	lower curb internal all the way down to the bottom,
25	which is the label in that? I'm sorry. My
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bifocals are -- yes, internal. So that would be like 1 2 a water line, if there was a water line on the inside. 3 So that's a rectangle. It goes all the way down, and you can see at the top -- and we're 4 measuring this from the inside of the drywell. 5 So 6 these points are all internal measurements, and you 7 can see there's three squares at the top of that bay, at the top of that trench. So they would be between 8 9 636 and 736. The rest of them are all greater than 736. 10 And as you saw from the other slide, you 11 12 know, down to the bottom, it averaged -- I think this one was 986, 986 mils, and then the right would be 13 another grid. 14 Okay? 15 JUDGE ABRAMSON: Okay. Ι think we understand those. What are the green triangles 16 17 indicated below the 11 foot level left of the trench? What do those tell us? 18 19 MR. GALLAGHER: Now, below, those triangles external, individual 20 individuals are 21 external points taken from when you're in the sandbed, but they are those individual UT measurements that 22 we've been taking, and all of those just happened to 23 be, except that one right at the lower curve line, 24 greater than 736 mils, and it corresponds to what we 25 **NEAL R. GROSS** COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W.

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1	found in the trench.
2	JUDGE ABRAMSON: That's very helpful.
3	Thank you.
4	Dr. Hausler is that consistent with what
5	you believe the data is?
6	DR. HAUSLER: Well, not exactly because,
7	first of all, in the trench there were six grids on
8	top of each other. Each one of these grids has 49
9	points. So the green triangles certainly are not
10	individual points. They are averages.
11	But the other thing that really kind of
12	puzzles
13	JUDGE ABRAMSON: Before we move on to
14	that, Dr. Hausler, I see that Mr. Polaski is
. 15	disagreeing with you.
16	MR. POLASKI: Just to clarify.
17	JUDGE ABRAMSON: Let's hear what this is
18	about.
19	MR. POLASKI: What that means is if that
20	entire rectangle is green, each of the individual
21	points was greater than 736. We did not depict the
22	average here. We were depicting the value of each
23	individual point. We just couldn't put all 49
24	individual points
25	JUDGE ABRAMSON: And those were measured
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1	internally in the trench.
2	MR. POLASKI: Internal.
3	JUDGE ABRAMSON: The green triangles in
. 4	that same graph represent external measurements,
5	correct?
6	MR. POLASKI: Triangles are external.
7	JUDGE ABRAMSON: So that's what the
8	distinction is.
9	MR. POLASKI: Triangles are external;
10	squares or rectangles are internal.
11	JUDGE ABRAMSON: Right.
12	MR. POLASKI: And they're all actual UT
13	measurements because when we did the trenches, we did
14	seven points across, 42 vertical, and when the green
15	says that's all the points in there
16	JUDGE ABRAMSON: We understand that.
17	Thank you.
18	MR. POLASKI: Okay.
19	JUDGE ABRAMSON: I just wanted to make
20	sure that we're on the same page with Dr. Hausler
21	here.
22	Dr. Hausler, what they're saying, I think,
23	what the Applicant is saying is that this solid green
24	rectangle indicates that every single data point was
25	greater than .736. The green triangles left of that
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1	rectangle indicate individual external measurements.
2	MR. GALLAGHER: That's correct.
3	JUDGE ABRAMSON: Now, let's hear what you
4	have to say.
5	DR. HAUSLER: Sir, I agree with you. It
6	is quite confusing actually. Okay. Let's move on to
7	my next point. I mean the clarification is fine.
8	JUDGE ABRAMSON: Okay.
9	DR. HAUSLER: I understood that the
10	sandbed floor is at 11 feet at the elevation of
11	eight feet, 11 inches and three-quarters. That's the
12	sandbed floor. It appears to me that the trench data
13	do not extend down to the floor. That may well be the
14	difference that we have in the elevation with Mr.
15	Tamburro.
16	The way I read the tables that, you know,
17	were referred to earlier with respect to the trench
18	data, you know, bottom to me meant bottom of the
19	sandbed. In other words, the bottom to me meant eight
20	feet and 11 inches.
21	So if there is a distinction there, you
22	know, I can live with it because, you know, I think
23	what is really important is the data themselves. The
24	elevation is a little bit different. That's probably
25	not all that important, but the variation between the
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1	actual UT measurements, that to me, you know, is
2	important, and I think it is important overall
3	perhaps, you know, to look not just at averages, but
4	first of all the individual data. You know, what is
5	the variation of the individual data? And then we can
6	come and look at the averages.
7	JUDGE ABRAMSON: Okay. We will I don't
8	know if now is the right time we will have a
9	discussion about how big a sample one needs to have to
10	get some confidence in the sample and how averages are
11	representing the sample in general and what's the
12	right interpretation of the data. But I don't think
13	that's where we're going right now.
14	MR. POLONSKY: We have experts for Panel
15	No. 3 that can answer those questions.
16	If we could before we move on to another
17	subject, I think maybe 20 or 30 minutes have elapsed
18	now since Dr. Hausler provided some argument about the
19	Ashray evaporation calculation, the pool evaporation
20	calculation.
21	We do have an expert who is on Panel 6,
22	who will be some time tomorrow afternoon. Again, if
23	you'd like to hear AmerGen's response on that, we'd
24	like to bring up that expert now just to get that out
25	of the way, especially since this is the panel who can
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1	talk about the configuration in inner spaces in and
2	around the sandbed region.
3	JUDGE ABRAMSON: I have a feeling we're
4	likely to have a very spirited discussion about
5	evaporation rates.
6	CHAIRMAN HAWKENS: Are you going to
7	discuss the evaporation rates in great detail or just
8	respond to Dr. Hausler's observation that he thinks
. 9	the circulation in the sandbed region there's not
10	very much circulation there?
11	MR. POLONSKY: We can limit it to the
12	latter if you like.
13	JUDGE ABRAMSON: Before we move down that
14	line, what is relevant here, and let's keep this
15	discussion today and throughout this hearing to what's
16	relevant; what's relevant is how much remaining
17	thickness is there, and what's the likely corrosion
18	rate because we're only after how frequently you need
19	to do testing.
20	So if we're generally if what this data
21	is telling us is that at the bottom of what used to be
22	the sandbed region this liner is .9 inches or greater
23	than .736 inches, and what we're starting to quarrel
24	about is what's the evaporation rate for water that's
25	sitting at the bottom so that we can get to the
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1 corrosion rate, let's wait until we want to talk about 2 the corrosion rate because we're starting from much greater thickness than the general buckling criteria. 3 4 So let's say we're starting from . 9 inches and you've got to get to .736 to reach the 5 general buckling criteria. Then that's a very big 6 7 difference than starting at the top of the sandbed 8 region where thickness is already in some areas corroded below that, but we may or may not have a 9 10 corrosive environment at that spot. 11 So I don't want to waste a lot of time 12 talking about the evaporation rate at this point. 13 Now, if my colleagues disagree, I'm certainly happy to cede the floor to them. 14 15 MR. POLONSKY: AmerGen can save the discussion for tomorrow's Panel 6. I just wanted to 16 17 let you know it was out there and wouldn't come for 18 quite some time. 19 MR. POLONSKY: Well, let me just say that 20 I'm not so convinced this hearing needs to go to tomorrow and Wednesday, but let's see where we go with 21 22 these panels. 23 (Laughter.) 24 MR. WEBSTER: Judge, could I just ask a 25 question? Are we planning on a break before lunch or NEAL R. GROSS COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. (202) 234-4433 WASHINGTON, D.C. 20005-3701 www.nealrgross.com

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1	are you going to go all the way through to lunch?
2	CHAIRMAN HAWKENS: I was going to ask the
3	parties that. What I would like to do is finish up
4	with this panel if possible and then see what your
5	preferences are. We could accommodate you. We could
6	empanel the next group of witnesses and go for a short
7	period of time or we could take a break.
8	Mr. Webster, we definitely need a short
9	break after we're done with this panel I'm advised by
10	my colleague on my left, but what is your preference
11	for a lunch break, Mr. Webster?
12	JUDGE ABRAMSON: Is getting older and
13	needs more breaks.
1:4	MR. WEBSTER: Let's see when this panel
15	finishes, Judge. I think if we're after noon when
16	this panel finishes I would suggest we take a lunch
17	break.
18	CHAIRMAN HAWKENS: And with regard to the
19	witness, I was aware that you had not had the
20	opportunity, nor had the NRC staff, to respond to
21	that. Why don't we wait until tomorrow, and we will
22	give you the opportunity at that point, until that
23	panel comes on.
24	MR. GALLAGHER: Judge Abramson, Judges, I
25	do have one thing I'd like to add based on earlier
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1	discussion that I think is relevant. Talked about
2	possibly the corrosion being the are would be at the
3	bottom, and if I can just take you to Exhibit 40,
4	again, Applicant Exhibit 40, Slide 92. Okay. It's a
5	picture. So not only is the metal thicker down there,
6	as your line of questioning was going after Judge
7	Abramson, but there's a caulk seal that is there, and
8	that's what that's depicting, and that caulk seal is
9	inspecting as part of our aging management program.
10	JUDGE BARATTA: I saw that in the picture.
11	Could you describe what the purpose of the caulk seal
12	is?
13	MR. GALLAGHER: It is a protective measure
14	to protect that junction, the junction being where the
15	epoxy floor and the drywall shell comes in, and it's
16	just to prevent any moisture, water, if water got into
17	that region, from getting in there and accumulating or
1'8	sitting on the side there against the metal.
19	Again, it's coated, but it's almost like
20	a belt and suspenders type thing, coated, caulked and
21	sealed.
22	JUDGE BARATTA: That's why I was curious,
23	because you have the epoxy coating on the shell,
24	right?
25	MR. GALLAGHER: That's right
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1	JUDGE BARATTA: And the epoxy coating on
2	the floor, and this is just an additional measure to
3	make sure there's no crack or crevice or anything like
4	that.
5	MR. GALLAGHER: That's correct.
6	MR. O'ROURKE: And this is John O'Rourke.
7	If I may add to that, the floor is sloped
8	away from the shell so that if there's any moisture
9	that gets onto the floor it's sloped away from the
10	shell toward the drain.
11	JUDGE BARATTA: Yeah, the only difference
12	between the as-built and the design is the fact that
13	there's not a trench there, but I did notice that
14	there was a slope of that floor that's depicted in
15	those photographs, and that is, in fact, there?
16	MR. GALLAGHER: That's correct.
17	JUDGE ABRAMSON: Well, just I assume that
18	this floor is not perfectly polished flat so that
19	there are some irregularities that might hold some
20	moisture; is that
21	MR. GALLAGHER: Well, it's a poured epoxy
22	floor, and it was shaped to go towards the drains.
23	JUDGE ABRAMSON: Okay.
24	MR. GALLAGHER: So it's pretty smooth.
25	It's a pretty smooth floor.
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1	MR. O'ROURKE: This was part of the
2	corrective action when they discovered that the floors
3	in the sandbed region were not finished after the sand
4	was removed.
5	JUDGE ABRAMSON: Okay.
6	MR. WEBSTER: Judge, could I just offer
7	some help perhaps? On page 90 of Exhibit 40, there is
8	a photograph of the floor which does appear to exhibit
9.	an indication there on the bottom left.
10	JUDGE ABRAMSON: Thanks, counselor.
11	JUDGE BARATTA: Okay. I want to
12	understand a little bit more the historical
13	perspective, the origin of this 736 that was used in
14	the GE calculations. Is there somebody that could
15	give me a little bit of a historical background on how
16	that came about?
17	MR. GALLAGHER: Judge Baratta, we do have
18	a Panel 2 that can go into a lot of detail, but if I
19	could just give you the overall on that because
20	basically what was done was in the early '90s there
21	was a projection that was made on the corrosion rate
22	because there was corrosion before the corrective
23	action, and the formula projected out a couple of
24	outages, and so what would the thickness of the
25	drywell could it be if we had this corrosion rate,
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1	and it was based on a lower 95 percent confidence
2	level, a higher corrosion rate, in other words.
3	And a number was
4	JUDGE BARATTA: All right. Are you going
5	to discuss how that confidence level was derived with
6	that other panel?
7	MR. GALLAGHER: We can.
8	JUDGE BARATTA: Okay. Would you prefer to
9	wait until then?
10	MR. GALLAGHER: Yes. Because I just
11	wanted to tell you that what it was, it was a
12	projection for a future, and 736 mils was identified
13	as this conservative projection in the future.
14	That number was then given as an input
.15	into the analysis. So the thickness analysis for the
16	stresses and the buckling used 736 as an input. It
17	wasn't an out. Okay?
18	And so that's just a distinction I wanted
19	to make sure was clear. That was done, and the
20	calculations were performed per the ASME code.
21	JUDGE BARATTA: I was more interested in
22	where the 736 came from.
23	MR. GALLAGHER: Yeah, I thought that's
24	what you were asking for. So it was an input based on
25	this projection. That's what was used in the
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1	analysis, and we can talk more about the analysis.
2	JUDGE BARATTA: That projection was based
3	on a statistical analysis of the data.
4	MR. GALLAGHER: It was based on, yes. At
5	that time there was corrosion and so, therefore, it
6	could pass the statistical analyses for a corrosion
<sup>.</sup> 7	rate. You know, it could pass the F test, and there
8	was a projection that was made based on this lower 95
9	percent confidence level, i.e., a conservative
10	projection, and it was just looking forward in the
11	future before the corrective action was made.
12	Obviously once the corrective action was
13	made, the corrosion was arrested, and so there was no
14	further degradation, and that's why that 736 mils can
15	still be used as a good acceptance criterion.
16	JUDGE BARATTA: I don't know whether this
17	is appropriate to discuss this at this point, but in
18	Exhibit 40 on page 13, we have Exhibit 40 out, and if
19	you feel it would be best discussed by a later panel,
20	that would be fine.
21	And I realize that this is not in the
22	sandbed region, but I have a question about the
23	statement. On page 13 of Exhibit 40, it says UT
24	measurements at 13 locations in the upper elevations
25	of the drywell show only one location where minimal
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1	ongoing corrosion, minimum required through 2029 with
2	margin.
3	This goes somewhat to the source of water,
4	I guess. Do you know what the source of water is
5	that's causing that ongoing corrosion in there?
6	MR. GALLAGHER: What we're talking about
7	is the same source. We have a comprehensive aging
8	management program for the drywell. So not only do we
9	measure the sandbed, which is what this proceeding is
10	about, but we also take measurements in the upper
11	drywell, and the upper drywell is not coated because
12	it's not a
13	JUDGE BARATTA: this is the refueling
14	water leakage.
15	MR. GALLAGHER: Yeah. So it's the same
16	leakage. It's just upper. It's in upper elevations
17	of drywell. We monitor that also.
18	JUDGE BARATTA: I gather it was an upper
19	elevation. I was more concerned with where is that
20	water coming from.
21	JUDGE ABRAMSON: Can I clarify this? You
22	say ongoing corrosion. Is that a factually accurate
23	statement or is it a statement that should have said
24	something like corrosion that hasn't been coated or
25	hasn't been treated or something?
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1	You say ongoing leads us to certain
2	implications.
3	MR. POLONSKY: Can I have a moment with my
4	witness, please?
5	MR. GALLAGHER: We have an expert who can
6	go into this in more detail, but I would like to give
7	you the high level and bottom line on this. Let me go
8	to well, we are monitoring the drywell up there,
9	and let me go to an exhibit. Can I take a second
10	here? Because I think this will be helpful.
11	MR. WEBSTER: Could we take just a quick
12	break?
13	CHAIRMAN HAWKENS: We will take a five-
14	minute recess.
15	Thank you.
16	(Whereupon, the foregoing matter went off
17	the record at 11:40 a.m. and went back on
18	the record at 11:48 a.m.)
19	CHAIRMAN HAWKENS: All right. We are back
20	in session, resuming questions of the panel on topic
21	number one.
22	You were going to make a point about
23	MR. GALLAGHER: Yes, I'm sorry, Judge.
24	First of all, I want to correct one thing. If I left
25	the impression that there's an ongoing water source in
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1	the upper drywell, there's not an ongoing water
2	source. It's the same; what I was referring to is the
3	same source, i.e., the refueling cavity.
4	The water goes in the trough and is
5	carried away and does not go into this gap, therefore
6	going into the upper drywell area where the sandbed
7	region is. So there's no ongoing water source even
8	during a refueling outage.
9	This upper drywell area, if I can show
10	you, it was a statistical analysis, conservative call
11	on what a it was basically a statistical analysis,
12	conservatively calling that we had corrosion, and just
13	to give you a number, it's on page 135 of Exhibit 40.
14	It's .66 mils per year. So, you know, extremely
15	small, and we just conservatively call it corrosion.
16	Statistically that's what we determined, .66 mils per
17	year in one location in the upper drywell that is
18	uncoated.
19	JUDGE BARATTA: So you feel that that's a
20	bounding value then?
21	MR. GALLAGHER: I believe if you look at
22 <sup>.</sup>	the actual curves
23	MR. WEBSTER: Can the witness refer to the
24	actual curves?
25	MR. GALLAGHER: Well, for convenience,
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1	let's look at page 133 and 134 of the same exhibit
2	because it's just right before that. These are all of
3	the data points from the upper drywell, and you can
4	see that they're all consistent, and we say no ongoing
5	corrosion. We just have this one area where we're
6	statistically calling it corrosion because we can
7	detect a very small rate.
8	It's probably not an ongoing corrosion
9	that statistically we see at .66 mils per year.
10	JUDGE BARATTA: Now, wait. Which one is
11	that? That's the bottom line?
12	MR. GALLAGHER: Yeah, that's the bottom,
13	the Bay 15, 23L. It's just that one location.
14	JUDGE BARATTA: Okay. Twenty-three L.
15	MR. GALLAGHER: Okay, but if you look at
16	all of the data there, it's flatlined, and we have
17	data curves. I can show you the curves if you want to
18	go to another exhibit, but if you look at that table,
19	which are the basis of those curves, it's all
20	flatlined. So zero corrosion.
21	MR. WEBSTER: Could I just clarify? The
22	witness is testifying there is no statistically
23	significant ongoing corrosion. So where AmerGen says
24	there is ongoing corrosion it doesn't refer to
25	statistically significant ongoing corrosion?
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1	JUDGE BARATTA: Yes, I will ask that
2	question sine he's not supposed to. Okay?
3	MR WEBSTER Sorry
4	TIDGE BARATTA: That's fine because I'm
-	looking at the data. First of all these are
0	Tooking at the data. First of all, these are
6	averages. Are these done in the same way? Again,
7	what I'm trying to get to is is there a source of
8	water that is getting down in there?
9	MR. GALLAGHER: And there's no source of
10	water going into the sandbed region now since we've
11	done the corrective actions, the sandbed region and
12.	this upper drywell because they're connected.
13	JUDGE BARATTA: Right, right.
14	MR. GALLAGHER: The water goes into the
15	trough and the trough drains to a radway system. So
16	we corrected the trough in the early 1990s so no water
17	spills over into this gap which can make their way
18	down there.
19	So there is no ongoing water source.
20	JUDGE BARATTA: I still don't see how you
21	get a corrosion rate from that data.
22	MR. GALLAGHER: Well, it's flatlined.
23	MR. WEBSTER: I don't think the question
24	was answered. I believe that the statistical field
25	from AmerGen has identified statistically significant
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1	ongoing corrosion. I just would like the witness to
2	clarify that.
3	MR. POLONSKY: Can the Board please direct
4	the other parties in the proceeding to hold their
5	questions until they're asked if there are any
6	remaining questions? This is not cross examination.
7	JUDGE BARATTA: Right. It is not.
8	CHAIRMAN HAWKENS: Thank you, and that
9	point is well taken.
10	Thank you, Mr. Webster.
11	JUDGE BARATTA: Maybe we ought to wait
12	until we get the statisticians up here because I'm
13	having trouble understanding how you concluded
14	anything from that data if there's anything
15	statistically significant because the variability
16	appears to be quite large.
17	Well, I shouldn't say large. It appears
18	a lot of variability from one year to the next. So
19	I'd like to at that point do you have somebody that
20	can explain that later on?
21	MR. GALLAGHER: Yes, we can.
22	JUDGE BARATTA: All right. I'll hold my
23	question until then, in which case I have no more
,24	questions for this.
25	JUDGE ABRAMSON: Let me just pick this one
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1	up for one second. Are any of these points in the
2	upper drywell shell where you're talking about this in
3	the sandbed region?
4	MR. GALLAGHER: No.
5	JUDGE ABRAMSON: So this is in an area
6	where the drywell shell is approximately as-built
7	thickness with some little bit of corrosion; is that
8	correct?
9	MR. GALLAGHER: That's correct.
10	JUDGE ABRAMSON: So is this relevant for
11	buckling?
12	MR. GALLAGHER: No.
13	JUDGE ABRAMSON: And is it in the sandbed
14	region where we have an issue?
15	MR. GALLAGHER: No.
16	JUDGE ABRAMSON: Thank you.
17	CHAIRMAN HAWKENS: We've completed our
18	questioning on topic one for the first panel. Absent
19	any objections from Mr. Webster, the staff or AmerGen,
20	let's take a lunch break. Is an hour and five minutes
21	satisfactory?
22	We will recommence at one o'clock. We'll
23	have the second topical panel sitting at that time.
24	Thank you. We're in recess.
25	(Whereupon, at 11:55 a.m., the above-
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1	entitled matter was recessed for lunch, to reconvene
2	at 1:00 p.m., the same day.)
3	CHAIRMAN HAWKENS: It's one o'clock.
4	Please take your seats and we'll resume.
5	(Pause.)
6	This hearing is in session. We finished
7	up topic one this morning. We're going to proceed to
8	topic two which is the acceptance criteria, the sand
9	bed region of the dry well shell.
10	Would the parties please identify the
11	witnesses who will be testifying on this topic?
12	MR. POLONSKY: Yes, Your Honor. This is
13	Mr. Polonsky for AmerGen. We'll be having Mr. Michael
14	Gallagher again, Dr. Har Mehta with G.E., who was
15	involved in the original G.E. analysis so he is the
16	best person to answer the Board's questions on that.
17	And Mr. Ahmed Ouaou who is located in Kennett Square
18	with the Corporate Renewal License Team. Also, Mr.
19	Peter Tamburro, who is not sitting in the front row,
20	he's also designated on this panel.
21	CHAIRMAN HAWKENS: Thank you.
22	MS. BATY: For the staff, we have Mr.
23	O'Hara, Dr. Davis, Dr. Hartzman, Hans Ashar and Art
24	Soloman. And also, if I may ask the Board a question,
25	I've just been informed that witnesses are seated next
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1	to counsel. And we were wondering, the staff was
2	wondering about the ground rules for counsel
3	consulting with witnesses during their testimony.
4	We don't have similar access, obviously,
5	to our witnesses.
6	CHAIRMAN HAWKENS: If you want your
7	witnesses to sit directly behind you, you may.
8	Obviously, the counsel should not be providing the
ġ	expert testimony. They're there to assist in finding
10	the exhibits and to the extent a Citizens' sole
11	witness may have forgotten to add a piece of
12	information, I would have objection to Mr. Webster
13	jogging his memory. But obviously, he's not there to
14	testify or to coach his client.
15	MR. WEBSTER: I assume that would apply to
16	both sides, Judge.
17	CHAIRMAN HAWKENS: I trust that AmerGen,
18	who has been sitting right next to functionally at
19	the same table, has been abiding by those ground rules
20	and will continue to also.
21	MS. BATY: The staff would ask that the
22	statements to counsel, statements to witnesses by
23	counsel, helping them jog their memory, if those could
24	be on the record instead of whispered?
25	MR. POLONSKY: That's fine here, Your
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1	Honor.
2	MS. BATY: Otherwise we don't have a basis
3	to
4	CHAIRMAN HAWKENS: Do you have any objection to
5	that, Mr. Webster?
6	MR. WEBSTER: I have no objection to that.
7	CHAIRMAN HAWKENS: All right, they will be
8	on record. Thank you.
9	Witnesses are reminded that they were
10	sworn in this morning, so they remain under oath or
11	affirmation for all the testimony they will provide
12	this afternoon and I would again request that each
13	witness, before he responds does identify himself to
14	assist the Court Reporter.
15	JUDGE ABRAMSON: I had a question for the
16	previous panel which I think Mr. Gallagher could
17	probably answer if it's okay if I could ask that? I
18	apologize, I hadn't forgotten to ask this.
19	I was I wanted to clarify the
20	commitment relative to the degree of inspection that
21	would be done every other outage. In Exhibit 40, I
22	know this isn't the real reference document, but it
23	provides a summary of what I believe the commitment
24	is.
25	If you go to page 70 of Exhibit 40. Your
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1	commitment is I guess the second bullet there. It
2	says if the Oyster Creek inspected 100 percent of the
3	sand bed region coating in 2006 and will inspect at
4	least three bays every other outage with all and
5	expected every ten years. Is that also true that's
6	referring to the epoxy coating, I believe?
7	MR. GALLAGHER: Yes, Judge Baratta.
8	However, this commitment has been amended to be a full
9	scope every four years.
10	JUDGE BARATTA: Every four years, okay.
11	Does that also extend to the UT full scope every four
12	years?
13	MR. GALLAGHER: That's correct.
14	JUDGE BARATTA: Thank you for clarifying
15	that.
16	JUDGE ABRAMSON: Dr. Mehta, thank you for
17	coming. We're trying to get our arms around what GE
18	did in its original buckling load analysis. Let me
19	summarize what I think we've been told and please fix
20	it if I've got it wrong.
21	It sounds to me and I think to my
22	colleagues that what GE did is they, in the general
23	buckling load analysis, assumed that the whole shell
24	was reduced to .736 inches, did a calculation and
25	found that that gave a safety factor of 2.0.
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1	Is that correct?
2	DR. MEHTA: That is correct, Your Honor.
3	JUDGE ABRAMSON: And was that done by a
4	bunch of parametric studies to find out where the
5	limit was?
6	DR. MEHTA: In this one, since the focus
7	was the sand bed region, Your Honor, so in that we
8	wanted to make sure that the mesh is fine enough in
9	that region to capture the buckling load. So
10	initially we started out with 12 inch by 12 inch and
11	then through the closed form solutions we figured out
12	that three inch by three inch gave us a solution which
13	was matching the third solution for which we knew
14	there was consideration.
15	JUDGE ABRAMSON: And it was fully
16	converged?
17	DR. MEHTA: Fully converged.
18	JUDGE ABRAMSON: And the .736, how did you
19	come up with .736, was that just you did some
20	parametrics at various thicknesses to find out where
21	you got your safety factor at 2.0?
22	MR. GALLAGHER: Judge Abramson, that's
23	probably best answered by us, by Amergen. That was an
24	input to the analysis.
25	MR. WEBSTER: Judge, I'll object to
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1	AmerGen answering the question when the witness, the
2	GE witness is clearly the best qualified witness.
3	JUDGE ABRAMSON: Well, the GE witness,
4	well, okay, so Dr. Mehta, do you know where the .736
5	came from? If not, we'll ask Mr. Gallagher where it
6	came from?
7	DR. MEHTA: This .736 inch was an input
8	for GE from the plant owner.
9	JUDGE ABRAMSON: Okay, so Mr. Gallagher,
10	where did the .736 come from and why?
11	MR. GALLAGHER: That's what I was
12	referring to before was a projection, based on
13	before the corrective action was put in place, what
14	corrosion what thickness there could be in a future
15	outage and so that was given as an input into the
16	JUDGE ABRAMSON: So it was just a pure
17	stroke of coincidence that that turned out to be a
18	safety factor of 2.0?
19	MR. GALLAGHER: That's correct.
20	JUDGE ABRAMSON: So you weren't seeking
21	what thickness would give you the 2.0. You were
22	looking to see what would .736 give you for a safety
23	factor?
24	MR. GALLAGHER: That's correct.
25	DR. MEHTA: That is correct, Your Honor.
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1	JUDGE ABRAMSON: Thank you.
2	JUDGE BARATTA: Do we have the witnesses
3	here that can give the details about how that .736
4	came about or is that on a later panel?
5	MR. GALLAGHER: Mr. Tamburro, you'd be
6	best to answer that question.
7	MR. TAMBURRO: This is Peter Tamburro.
8	The .736 came from the UT data from the internal
9	grids. The internal grids prior to the sand removal
10	were inspected at every outage of opportunity. We
11	took internal grids were inspected eery outage of
12	opportunity at that time prior to sand removal. We
13	then performed curve fits on the average data and then
14	performed statistical testing of the curve fits to
15	ensure that they best represented the corrosion.
16	We then, based on the curve fit of the
17	average points, calculated a lower 95 percent
18	confidence interval on that curve fit. The point
19	where that lower 95 percent confidence interval
20	intersected a future outage which was at the outage we
21	were going to repair the sand bed, that thickness
22	ended up being .736.
23	JUDGE ABRAMSON: I see, so that was your
24	projection for how much worse case, 95 percent
25	confidence, how much thickness would remain at the
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1	time you intended to actually take the corrective
2	actions on the sand bed, not future, not 20 years out.
3	MR. TAMBURRO: That's correct, sir. And
4	it was in the most limiting of the internal grids.
5	JUDGE BARATTA: Okay, when you say you use
6	the lower 95 percent confidence limit, what we're
7	referring to is the lower limit that was obtained by
8	calculating a confidence interval in a statistical
9	manner using a student's t distribution?
10	MR. TAMBURRO: Yes, sir.
11	JUDGE BARATTA: And that you then used how
12	many different sets of measurements to obtain that?
13	MR. TAMBURRO: I don't recall offhand, but
14	by that point we would have had five, six
15	JUDGE BARATTA: More than two,
16	considerably more than two?
17	MR. TAMBURRO: Yes, sir.
18	JUDGE BARATTA: Okay. And then that
19	projected out to you say the outage where you had
20	intended to repair?
21	MR. TAMBURRO: The 1992 outage.
22	JUDGE BARATTA: And at that point you were
23	projecting the thickness would be .736?
24	MR. TAMBURRO: Yes, sir.
25	JUDGE BARATTA: And that's what then you
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1	gave to GE to use their bases for their analysis?
2	MR. TAMBURRO: I wasn't part of that
3	portion that interfaced with GE, but it is my
4	understanding that's what we gave to them.
5	JUDGE BARATTA: Is that correct, Mr.
6	Gallagher?
7	MR. GALLAGHER: Yes, that was an input
8	into the analysis. And as Mr. Tamburro said, this was
9	the worst case corrosion projection. We obviously did
10	not get to .736 in that outage in the 1992 outage
11	before we took the corrective action.
12	JUDGE BARATTA: Why did you feel that the
13	lower confidence, lower limit was the appropriate one
14	to use? Because it gave the thinnest?
15	MR. TAMBURRO: It was a conservative
16	projection based on the data did have some scatter.
17	The regulator provided some feedback that we should
18	bound the corrosion rate and that was a point which
19	a confidence factor which we chose.
20	JUDGE ABRAMSON: This was all done as part
21	of your operating license, your on-going O&M, right?
22	MR. TAMBURRO: Yes, sir.
23	JUDGE ABRAMSON: It had nothing to do with
24	license extension, is that correct?
25	MR. TAMBURRO: Yes, sir.
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399 1 JUDGE ABRAMSON: The .736 just 2 fortuitously worked out to be a safety factor of 2.0 3 which is what the ASME code requires. Is that correct also? 4 5 Dr. Mehta? 6 DR. MEHTA: Yes, Your Honor. It's the 7 code case M284 and the ASME code specified, in fact, to 2.0 for these kinds of --8 9 JUDGE ABRAMSON: So how you got to .736 is really irrelevant, is that correct, because what we're 10 after now is when you do a buckling load analysis the 11 worst case you can tolerate and still be in compliance 12 with the ASME code or code case, whatever that number 13 was, is .736 uniform degradation. Is that correct? 14 DR. MEHTA: Exactly. 15 JUDGE ABRAMSON: So all this 95 percent 16 17 confidence is interesting, but not relevant to what 18 the system can handle. Is that correct? DR. MEHTA: Yes, sir. It's the .736 mils 19 20 all around in the sand bed region throughout the 360 degree of the sand bed region. 21 22 JUDGE ABRAMSON: Thank you very much. Dr. Mehta, have you had a chance to look 23 at the information that the Applicant has provided to 24 25 us regarding the local acceptance criteria, the one NEAL R. GROSS COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. (202)-234-4433 WASHINGTON, D.C. 20005-3701 www.nealrgross.com

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1	with the smaller section, the one with the what is
2	it, I've forgotten, three feet by three feet?
3	MR. GALLAGHER: Yes, the local criteria.
4	JUDGE ABRAMSON: The local criteria. Have
5	you had a chance to look at that?
6	DR. MEHTA: Yes, Your Honor. I had just
7	looked at the so-call CALC 24 which was exhibit number
8	something which I had looked through that.
9	JUDGE ABRAMSON: Was GE responsible for
10	that calculation?
11	Did GE do that calculation?
12	DR. MEHTA: No, sir.
13	MR. GALLAGHER: I think Dr. Mehta was
14	referring to an analysis AmerGen did to use the
15	calculation. I think the question
16	JUDGE ABRAMSON: My question is
17	MR. GALLAGHER: Is related to the analysis
18	
19	JUDGE ABRAMSON: The local acceptance
20	criteria which has a three foot by three foot section
21	degraded to X, and then tapering out to something
22	larger over the next set of cells.
23	MR. WEBSTER: Judge, could I just point
24	out there are three versions of Calc 24 so it's not
25	clear which calculation you're talking about.
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1	JUDGE ABRAMSON: I'm interested in what GE
2	did.
3	MR. WEBSTER: Yes, sir. Dr. Mehta did say
4	he did review a Calc 24, but he didn't say which
5	version.
6	JUDGE ABRAMSON: Let's come back to that
7	because right now my question has to do with whether
8	GE is responsible for this local area acceptance
9	criteria?
10	DR. MEHTA: Your Honor, the local
11	acceptance criteria uses the GE sensitivity study. GE
12	did the sensitivity study where the model, the local
13	thinned area and transmitter that results to the plant
14	owner and then the acceptance criteria was developed
15	by the plant owner.
16	JUDGE ABRAMSON: Okay, so GE did the
17	calculation. Did GE compute from those calculations
18	what sort how close they were to buckling? Was
19	there a safety factor involved in those calculations?
20	DR. MEHTA: When we Your Honor, when we
21	modeled the local thinned area, we then calculated the
22	reduction in safety factor from the uniform .736 mils
23	results. What is the
24	JUDGE ABRAMSON: I see, I see. So it was
25	a reduction from the 2.0?
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	402
1	DR. MEHTA: Yes.
2	JUDGE ABRAMSON: Okay. And what was the
3	size of that reduction for this local thinned area, do
4	you recall, for the one that's actually become used?
5	DR. MEHTA: When we used the 636 mils
6	which is 100 mils lower, in that case we got about 3.5
7	percent reduction from the original safety factor.
8	And when we used 536 mils thickness in the
9	thinned region, in that case, there was about 9
10	percent reduction.
11	JUDGE ABRAMSON: Did you look at larger
12	thinned regions or was that area for the thinning
13	prescribed for you?
14	DR. MEHTA: Your Honor, the area of
15	thinning was actually specified for GE to do the
16	analysis was specified by the plant owner.
17	JUDGE ABRAMSON: Thank you.
18	MR. WEBSTER: Judge, could I just ask for
19	a clarification of the record. When we're referring
20	to "this area" the local acceptance criteria are we
21	referring to a three feet by three feet area or are we
22	referring to a three feet by one and a half feet area?
23	I don't think it's clear for the record.
24	JUDGE ABRAMSON: Let's get it clear. Is
25	it a three foot by three foot area? It's got a mirror
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403 1 image, it's at the end, is that correct? Is it a 2 three foot by three foot area? 3 DR. MEHTA: Your Honor, since we 4 considered a 36 degree slice and on one side we 5 modeled the thinned area, there is due to symmetric 6 conditions, there is a similar area on the other side 7 so essentially even thought we model 12 inch and 6 inch width, the 6 inch width is on the other side --8 9 JUDGE ABRAMSON: So it's mirror image at that boundary? 10 11 DR. MEHTA: Mirror image. 12 JUDGE ABRAMSON: So it's three foot by 13 three foot. Is that correct? 14 15 DR. MEHTA: That is correct. Physically, physically 16 JUDGE ABRAMSON: what's being looked at would be a three foot by three 17 18 foot area because of the mirror image at the boundary. 19 DR. MEHTA: Yes, Your Honor. 20 JUDGE ABRAMSON: Thank you. 21 MS. BATY: Your Honor, can I ask, could 22 you ask Dr. Mehta if he's referring to a specific 23 exhibit where he's getting the local area acceptance 24 criteria parameters, for the clarity of the record. 25 That's the only purpose. **NEAL R. GROSS** COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. (202) 234-4433 WASHINGTON, D.C. 20005-3701 www.nealrgross.com

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· :	1	JUDGE ABRAMSON: Okay, if we have one.	
2	2	I assume we don't. We saw it earlier, I think.	
	3	MR. WEBSTER: I think, Dr. Mehta, if you	
	4	look at Exhibit 39, Figure 1A, might find some	
!	5	enlightenment there.	
	6	MR. GALLAGHER: For the record, the	
	7	exhibit is 39.	
·	8	DR. MEHTA: Exhibit 39 had the area study.	
:	9	Figure 1A, it's a couple of pages.	
10	0	JUDGE ABRAMSON: That's the one we saw	
1:	1	earlier, thank you.	
_ 1:	2	MR. WEBSTER: Judge	
1:	3	JUDGE ABRAMSON: We've got it.	
- 14	4	MR. WEBSTER: Judge, I think there's just	
1	5	one clarifying issue here, which is the nine square	
10	6	foot area, is that in one bay or is that in two bays?	
1	7	MR. POLONSKY: Your Honor, again, can we	
1	8	have the parties save their questions until the end of	
1	9	questioning, especially if they're coming from	
2	0	counsel?	
2	1	JUDGE ABRAMSON: From my perspective, this	
22	2	is consummately clear. When you do these analyses,	
2:	3	you assume a reflective boundary condition which makes	
24	4	it mirror image, so it obviously goes into two 36	
2	5	degree segments and if you're trying to help me, it	
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ŀ	was unnecessary. If you're trying to help yourself,
2	that's another question.
3	MR. WEBSTER: I am trying to help you,
4	Judge.
5	JUDGE BARATTA: Before you change
6	looking at the boundary condition or the line, that is
7	the one edge of the 36 degree sector and then the
8	other edge on the right is the other edge of the 36
9	degree. And then relative to the vents, where would
10	they be located?
11	DR. MEHTA: The vents are to the right
12	side of this area. The lefthand side extreme of this
13	is the center line between the two vent lines.
14	JUDGE BARATTA: And that center area is
15	the most highly stressed area, is that correct?
16	DR. MEHTA: That is correct. Yes.
17	JUDGE BARATTA: So from a stress analysis
18	standpoint are you then putting the thinnest area in
19	the most highly stressed area?
2.0	DR. MEHTA: Yes, Your Honor. From the
21-	buckling point of view that is the worse location to
22	put in in terms of any reduction in the safety factor.
23	JUDGE BARATTA: Now if you overlap this
24	with the so-called bay areas, is the lefthand boundary
25	the center of one of the bays then? In other words,
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1	we've talked about the ten bays.
2	DR. MEHTA: Yes, sir.
3	MR. GALLAGHER: AmerGen Exhibit 6 is an
4	overhead and I think that will be clear. It's a plan
5.	view of the ten days.
6	JUDGE BARATTA: Yes.
7	MR. GALLAGHER: So the area where that,
8	where the analysis would be would be between the two
9	vent headers so it is the bay boundary in all cases if
10	you see that.
11	JUDGE BARATTA: So in other words on any
12	given bay, there would be actually two areas which
13	would total nine square feet. Am I correct? Because
14	if you
15	MR. GALLAGHER: That is correct.
16	JUDGE BARATTA: Because there would be a
17	reflected boundary. For example, bay 11 which, I'm
18	sorry. Let me take bay 17, which is the one that's in
19	the upper right hand there, for example, would have an
20	area adjacent to bay 13, which would be four and a
21	half square feet and then an area adjacent to bay 17,
22	which would have a four and a half square foot. Is
23	that correct? It would be thin? One on either
24	boundary of that bay?
25	MR. GALLAGHER: Yes, there's black lines.
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i	If yours is in color, the black lines are the lines of
2	symmetry.
3	MR. WEBSTER: Judge, let me point out.
4	MR. GALLAGHER: So there wold be the four
5	and a half, you know, the half a tray on each side of
6	that so you could have a full three by three.
7	DR. MEHTA: That is
8	MR. WILLIAMS: Judge, in Dr. Hartzman's
.9	testimony talks about one of these areas, every
10	alternate bay.
11	MR. POLONSKY: Your Honor, can we please
12	have no interruptions from counsel. It sounds like
13	they are testifying here, and if he'd like to enter a
14	CV, the Board can consider his expertise in this area.
15	MR. WEBSTER: Perhaps I could clarify for
16	my edification. We heard from NRC witnesses on these
17	issues?
18	CHAIRMAN HAWKENS: We will hear from them,
19	but as I indicated this morning, we're going to give
20	you the opportunity to provide the Board with
21	additional questions. And if you would restrain from
22	interrupting during the questioning of a witness, we
23	would be grateful. Thank you.
24	JUDGE ABRAMSON: May I also remind that it
25	is not the NRC's application or the NRC's work that is
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1	at issue here. It is the Applicant's work and we're
2	trying to understand the Applicant's work to the
3	extent that the staff is able to help us understand
4	what they found in their review or how they found the
5	Applicant's work to be acceptable. We will ask that,
6	but their work is not at issue here.
7	MR. WEBSTER: Perhaps I misunderstood,
8	Judge. I thought their role was one of amicus, and
9	therefore I would have anticipated, I don't know if
10	the panel expects them to point out when there are
11	discrepancies between AmerGen's testimony and the
12	NRC's expert testimony. I would have thought it would
13	be easiest to deal with those discrepancies as they
14	arise, rather than try to wrap them all up later.
15	JUDGE ABRAMSON: I think that's
16	appropriate.
17	Does staff have anything their experts
18	would like to add to this? Do staff experts have
19	anything they would like to add to the substance of
20	this discussion?
21	MR. POLONSKY: In the future, Judge, if we
22	could make sure AmerGen is done at least with its
23	answer here. I mean, we got interrupted in the
24	middle. So we may in fact be done, but I would hate
25	for the Board to just have set a precedent to allow
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1	for interruption of the questions.
2	DR. HARTZMAN: This is Dr. Hartzman. Do
3	you have a specific question?
4	JUDGE ABRAMSON: No, the question was do
5	you have anything you want to add on this point that
6	we're discussing. All we're asking about is where is
7	the symmetry point and does it mean a three by three
8	grid that tapers out gradually to the original
9	thickness and I think it's been asked and answered
10	three or four times now. I just, and counsel, what /
11	we're trying to make sure is that if there is
12	something that might lead to a conflict between what
13	the Applicant is saying and what the staff found in
14	its review, that we know that.
15	Did staff find anything different on that
16	point?
17	DR. HARTZMAN: We don't have any conflict
18	with what GE did. We believe that there may be some
19	additional thinned areas.
20	JUDGE ABRAMSON: That's not where we're
21	going right now. We're asking about the GE analysis.
22	DR. HARTZMAN: We found the GE analysis
23	acceptable.
24	CHAIRMAN HAWKENS: Dr. Hartzman, if you
25	could speak right into it for the benefit of the Court
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2 DR. HARTZMAN: We found GE's analysis 3 acceptable.

4 MS. YOUNG: Judge Abramson, I believe the 5 question to the Dr. Hartzman related to a statement by 6 one of the AmerGen witnesses that tried to explain 7 where the thinned areas were located in relationship to the various bays and testimony was provided that 8 9 talked about the area being between, for example, in response to Judge Baratta's question, bays 15 and 17. 10 JUDGE ABRAMSON: I don't feel it's my job 11 to try to explain this to the various counsel here 12 13 what the engineering results show, but there are reflective boundaries on the analysis. They took a 14 half of one of those sections. There's going to be a 15 16 reflection on either side. I think it's quite clear 17 what this analysis was.

Judge Baratta, do you have any further questions about what this analysis was?

JUDGE BARATTA: Just one question relative to the analysis. In each bay then there's a total of nine square feet of thinned area, but they're not connected in a given bay.

24 MR. GALLAGHER: Just a clarification, so 25 there can be by this analysis nine square feet in each

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bay. We don't have that.

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JUDGE BARATTA: No, no, that's true. This is the analysis.

MR. GALLAGHER: And the way the analysis was done was that nine foot square, the 12 by 12 tapering is in the middle between the vent headers of each bay which is the location of highest stress. And the location of highest stress, not only the symmetrical location, but the location of highest stress which is conservative. Therefore, we could apply it to any location in the bay.

JUDGE BARATTA: Had that nine square foot area been continuous, had you chosen instead of -- let me rephrase that question.

15 From a stress analysis viewpoint, instead 16 of using 36 degree sectors, you had chosen larger sectors, say 72 or something like that and have a nine 17 18 square foot area located in the center of a bay which 19 is different than where you had it, would that have been more conservative or less conservative relative 20 21 to buckling. That's a lower stress area, is it not? 22 DR. MEHTA: Your Honor, the reflection is 23 already included in the model that we analyzed, so if 24 we were put this three feet by three feet area, let's 25 say below a vent pipe, it is my opinion that this

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412 would be -- would give results which would be 1 2 conservative compared to what's in the way we have 3 actually put the area. JUDGE BARATTA: Would be conservative or 4 5 would be --Smaller reduction in safety 6 DR. MEHTA: factor than what is --7 JUDGE BARATTA: Conservative thought is 8 9 something --DR. MEHTA: I apologize. 10 JUDGE BARATTA : 🦯 It would be 11 12 nonconservative, yes. Thank you. 13 JUDGE ABRAMSON: So let's then turn to how 14 AmerGen picked the three foot by three foot area which 15 16 seems to be the other question. Sorry, before I go to that, staff's witness, what is the current licensing 17 basis on this small -- what are we calling this? The 18 small area? 19 MR. POLONSKY: Your Honor, local buckling 20 criteria. 21 JUDGE ABRAMSON: Local buckling criteria 22 I want to hear from the staff's witness what 23 area. the current licensing basis is for the local buckling 24 area criteria. What's the geometry of the area and 25 **NEAL R. GROSS** COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. WASHINGTON, D.C. 20005-3701 www.nealrgross.com (202) 234-4433

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1	what's the thickness.
2.	Mr. ASHAR: I am Hansraj Ashar with the
3	staff. We have evaluated this particular during the
4	questioning of the licensee of the various aspects
5	including the three areas which have been located
6	underneath the vents. We reviewed the particular
7	report from their schedule statement at that time and
8	we felt that that particular analysis was
9	conservative.
10	JUDGE ABRAMSON: Dr. Ashar, I'm afraid my
11	question is much simpler than that. I don't care what
12	you reviewed. I want to know what the current
13	licensing basis is and if you don't know you can tell
14	me you don't know.
15	Mr. ASHAR: No, I know, sir. Okay,
16	current licensing basis for the general thickness of
17	the shell is .736 inches. For the thinned areas, it
18	is .5376 inch per one square foot and then conditioned
19	to three square foot tray.
20	JUDGE ABRAMSON: And what's the
21	relationship between what you just told me for the
22	thin area and what we've been hearing described as a
23	three foot by three foot thinned area transitioning
24	out over the next one foot, two feet?
,25	MR. GALLAGHER: No, for clarity, it's the
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1	12 by 12 transitioning to the three by three.
2	JUDGE ABRAMSON: It's the 12 by 12 because
3	it had
4	MR. GALLAGHER: Do you want us to show you
5	an exhibit that has a picture of that?
6	JUDGE ABRAMSON: What I'm having problems
7-	with is that we've been talking about three foot by
8	three foot.
9	MR. GALLAGHER: If you go to Exhibit
10	AmerGen 11. When we say the tray, this is what we're
11	referring to.
12	JUDGE ABRAMSON: And the center area is
13	if I draw a vertical line on that center area, that's
14	midway between the center lines for two of the
15	downcombers, the vents?
16	MR. GALLAGHER: Yes, that's correct.
17	JUDGE ABRAMSON: And what's been analyzed
18	is one half of that, assuming a mirror image at the
19	boundary, is that correct?
20	MR. GALLAGHER: That's correct.
21	JUDGE ABRAMSON: And the little squares we
22	were seeing on the GE analysis diagram were the grid,
23	the element sizes, right, which added up to a one foot
24	by one, actually a one foot by six inch square in the
25	center, tapering out. Is that correct?
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1	MR. GALLAGHER: That's correct.
2	JUDGE ABRAMSON: And that's what you just
3	described, Dr. Ashar, as the current licensing basis
4	for the local area buckling criteria?
5	MR. ASHAR: That is correct.
6	JUDGE ABRAMSON: And does AmerGen agree
7	that that's their current licensing basis?
8	MR. GALLAGHER: That's correct.
9	JUDGE ABRAMSON: Thank you.
10	CHAIRMAN HAWKENS: It's been alleged that
11	there has been an inconsistency for the localized
12	buckling criteria. Would the NRC staff address that?
13	Is localized buckling criteria, as you've just
14	described it, been consistent and consistently
15	applied?
16	MR. ASHAR: It is consistent with the
17	analysis that was performed by GE and the schedule has
18	shown that, but I just want to point out one thing
19	that in 20.424, AmerGen has done so many other things
20	which we have not fully reviewed because it wasn't
21	submitted to us.
22	So we agree with what was presented so
23	far, the CLB
24	JUDGE ABRAMSON: Are any of those other
25	calculations relevant to the current licensing basis?
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, <b>L</b>	MR. ASHAR: NO, SIT.
2	JUDGE ABRAMSON: Thank you.
3	CHAIRMAN HAWKENS: AmerGen, do you have
4	anything to add to that regarding the consistency and
5	the established localized buckling criteria?
6	MR. GALLAGHER: Yes. This criteria was
7	established by this GE analysis in the early 1990s and
8	has been used throughout. In our calculations, which
9	is CAP 24, there are conservative limits that we
10	sometimes use to analyze. In other words, we might,
11	instead of bringing using the 536 floor of the
12	tray, say well, if it's above 636, it's okay too. So
13	there's some of those calculation-specific limits that
14	we put in there. But the local acceptance criteria,
15	that tray, has been unchanged and has been applied
16	consistently.
17	JUDGE BARATTA: I'd like a clarification
18	on that point 636. Is that one square foot or is that
19	per a three by three?
20	MR. GALLAGHER: The way the analysis was
21	done and Dr. Mehta has explained, is the floor of that
22	tray was either 536 or 636.
23	JUDGE BARATTA: Okay, or 636?
24	MR. GALLAGHER: Yes, it was done two ways.
25	JUDGE BARATTA: Just strictly that one
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1	foot by one foot area then. It's not the entire three
2	by three, is that correct?
3	MR. GALLAGHER: Right, and then it
4	transitions from whatever deficit there was back to
5	736 over a 12 inch area around that. So it's always
6	three by three, but the square in the middle is either
7	100 mils deep or 200 mils deep.
8	JUDGE BARATTA: Thank you.
9	JUDGE ABRAMSON: Dr. Hausler, I'm now
10	talking specifically and narrowly about the current
11	licensing basis. Do you have anything to add about
12	whether this is or is not the current licensing basis
13	which is an administrative matter between the NRC and
14	the Applicant?
15	MR. WEBSTER: Judge, I think Dr. Hausler
16	could comment on the consistency point. I don't think
17	he can comment on the CLB.
18	JUDGE ABRAMSON: Fine, then there's
19	nothing for him to say.
20	MR. WEBSTER: You wouldn't want to hear
21	from him on the consistency point?
22	JUDGE ABRAMSON: We are interested in what
23	the current licensing basis is, because that's the
24	question of what can be challenged or cannot be
25	challenged. When we come to talking about how much
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1 margin there is, it is measured against a current 2 licensing basis, unless I'm missing something. 3 MR. WEBSTER: Perhaps I'm missing 4 something, Judge. There were some questions asked	[ [.
<ul> <li>2 licensing basis, unless I'm missing something.</li> <li>3 MR. WEBSTER: Perhaps I'm missing</li> <li>4 something, Judge. There were some questions asked</li> </ul>	[ [.
3 MR. WEBSTER: Perhaps I'm missing 4 something, Judge. There were some questions asked	<b>f</b> L
4 something, Judge. There were some questions asked	L.
	L
5 about consistency of the other two parties.	l
6 CHAIRMAN HAWKENS: Well, let's hear from	
7 Dr. Hausler on consistency of application, localized	ι.
8 buckling.	
9 DR. HAUSLER: Before I answer the specific	!
10 question you just asked, I think let me comment.	• •
11 It would be very helpful if we had the precise wording	
12 of the current licensing basis. The reason for that	
13 is precisely that over the past there have been	
14 discrepancies in the various documents that we have	
15 seen to the point where the latest one, acceptance	
16 criteria was defined as a six by six area that is no	
17 less than 693 mils. That is very confusing,	
18 obviously, to anybody who reads the documentation and	
19 tries to compare the actual measured data to what is,	
20 in fact, called the acceptance criteria in the various	
21 documents that describe the calculations specifically.	
22 I referred to calculation 24, revision 2. I believe	
23 it's under something like .6 point something, but	
24 there specifically and they've referenced, it's in my	
25 documentation, it was said that the acceptance	
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1	criteria now is six by six inches and 693 mils for the
2	minimum thickness.
3 .	There are other documents
4	CHAIRMAN HAWKENS: Excuse me, Mr. Webster,
5	are you able to identify what exhibit that is so we
6	can take a look at it?
7	MR. WEBSTER: Yes, indeed, Judge. I'm
8	just in the process of doing that. I think this is
9	Applicant's Exhibit 16 and let me find the page that
10	Dr. Hausler is referring to.
11	CHAIRMAN HAWKENS: Was that 60 or 16?
12	MR. WEBSTER: Sixteen, 1-6.
13	CHAIRMAN HAWKENS: 16, 1-6, thank you.
14	MR. WEBSTER: Let me just try and find the
15	page. Yes, I think we find the discussion of
16	acceptance criteria on page 10 of Applicant's Exhibit
17	16. This is actually I think Dr. Hausler was
18	actually referring to revision 1, when he just made
19	that last statement, but maybe we can take revision 2
20	first and then move on to revision one after that
21	since we are at the page.
22	(Pause.)
23	CHAIRMAN HAWKENS: While you're struggling
24	with this, let me ask the staff this. We have a
25	current licensing basis, there seem to be other
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1	evaluations that were done by the Applicant. Did I
2	correctly understand that none of these are relevant
3	to the current licensing basis?
4	MR. ASHAR: Hansraj Ashar. As far as we
5	are concerned what was described so far in this
6	meeting is the current licensing basis, what we stick
7	to. I was going to tell you before, there are
8	attempts made by AmerGen to simulate different ways of
9	orienting their degraded areas. We have not reviewed
10	them and they do not form the current licensing basis.
11	JUDGE ABRAMSON: When you're looking at
12	the current licensing basis to see whether there needs
13	to be some action taken under the current license, as
14	opposed to what happens going forward
15	MR. ASHAR: That's correct.
16 <sup>.</sup>	JUDGE ABRAMSON: You look at the current
17	licensing basis, not these other calculations?
18	MR. ASHAR: No, Judge.
19	JUDGE ABRAMSON: Thank you.
20	JUDGE BARATTA: Before you sit down, could
21	I ask you to point to a specific document or two which
22	spells, which shows that this analysis is part of the
23	current licensing basis?
24	MR. ASHAR: Yes, the specific document
25	that we came to know in the current licensing basis
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1 was an update 10 of FSAR. I think that one is a part of the testimony somewhere, but I don't remember the 2 3 exhibit number exactly. But it refers to TDR 1108 as 4 part of the statement in the update. That а 5 particular TDR takes us to the definition of report that we talked about which is called thinned area 6 7 analysis which is .536 and .09 and those are the 8 things that we accepted and that is being part of the 9 CLB. 10 MR. POLONSKY: Your Honor, just to clarify the record, the exhibits I think that were just 11 identified AmerGen submitted relevant portions of the 12 UFSAR for the Oyster Creek plant as AmerGen's Exhibit 13 38. And the TDR which is a Technical Data Report that 14 Mr. Ashar just referred to was previously submitted by 15 16 AmerGen as AmerGen's Exhibit 27. JUDGE BARATTA: Could you be specific in 17 the updated UFSAR as to where it is because I'm 18 looking for that. 19 I could consider that 20 MR. POLONSKY: 21 testimony, so I'll defer to Mr. Gallagher. 22 MR. GALLAGHER: Are you asking AmerGen or the staff? 'Would you like me to answer? 23 24 JUDGE BARATTA: Well, either one, because it's your document, but they reviewed it, so I think 25 NEAL R. GROSS COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. WASHINGTON, D.C. 20005-3701 (202) 234-4433 www.nealrgross.com

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1	you're qualified to
2	MR. GALLAGHER: I can just walk you through
3	how we get to CLB. So, first, 10 CFR 54.3, states
4	that NRC approvals, as well as design basis
5 .	information contained in the updated final safety
6	analysis report is part of the CLB, Current Licensing
7	Basis.
8	We have, as Mr. Polonsky indicated, in
9	Exhibit 38, UFSAR, the applicable UFSAR sections. The
10	relevant piece of that is Section 3.8.2.5 which is
11	entitled Structural Acceptance Criteria.
12	And it states that the Structure
13	Acceptance Criteria related to the design, relating
14	the design and analysis results for the loads and load
15	combination, given the Subsection 3.8.2.3 to the
16	allowables is presented in Subsection 3.8.2.4, and
17	other referenced documents.
18	The design, the basic design phase of the
19	containment system is given in Subsection 3.8.2.4, and
20 5	the references listed in the Subsection 3.8.6.
21	These referenced documents must be
22	addressed to obtain complete information. So, that
23	Reference 44, in the 3.8.6, is TDR1108, which is
24	Applicant Exhibit 27.
25	And in that, on Page 17, it does describe,
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1	specifically, the local acceptance criteria, at the
2	paragraph labeled, Acceptance Criteria to Local Wall.
3	And that clearly describes, it's a 12 by
4	12 square down, reduced by 200, .2 inches, 200 mils.
5	And then with the 12 inch transition up to the
6	original thickness of 736.
, 7	MR. WEBSTER: Judge, we're ready to go
8	forward with the testimony on consistency.
9	CHAIRMAN HAWKENS: Please go ahead.
10	JUDGE ABRAMSON: Before we begin, let me
11	just ask Dr. Hausler, what we've been hearing is what
12	the staff and the Applicant define as the local
13	acceptance criteria in the current licensing basis.
14	Now, so when you talk about
15	inconsistencies, I appreciate if you would refer us to
16	specific things and where you think those relate, who
17	those relate to the current licensing basis?
18	MR. WEBSTER: Judge, the witness simply
19	can't relate those in the current licensing basis.
20	That's a legal framework which with he's not familiar.
21	He can certainly point out what the
22	documents say, and it's up to the panel to draw
23	conclusions from the current licensing basis.
24	JUDGE ABRAMSON: That's fine.
25	DR. HAUSLER: Well, I am looking at the
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1	Applicant's Exhibit 20, which is calculation
2	1402187831041. Specifically 1155. And it does say
3	here if an area is less than 736 mils, then that area
4	shall be greater than 693 mils.
5	And so not, so it would be no larger than
6	six by six inches.
7	JUDGE ABRAMSON: Okay, let's, let me ask
.8	AmerGen, what was that calculation all about?
9	MR. GALLAGHER: Mr. Tamburro, you're the
10	best to answer that question.
11	MR. TAMBURRO: Yes. Your Honor, this our
12	calculation 41 which performed an analysis of the
13	internal grids and a preliminary analysis on the
14	external grids.
15	That criteria was selected as calculation
16	criteria, as specific criteria which was much more
17	conservative than the current licensing basis criteria
18	of 536.
19	JUDGE ABRAMSON: What was the purpose of
20	the calculation?
21	MR. TAMBURRO: The purpose of the
22	calculations was to demonstrate that the external,
23	that the corrosion rates from the internal portions of
24	the dry well, to understand what the corrosion rates
25	on the internal portions of the dry well were, which
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1	we found no statistical, observable corrosions.
2	JUDGE ABRAMSON: Did that have anything to
3	do with your current licensing basis? Did is affect
4	your current licensing basis in any way?
5	MR. TAMBURRO: No, sir. In addition, Your
6	Honor, we did look at the external data points.
7	JUDGE ABRAMSON: That's fine. I just, what
8	I'm trying to do is to understand what are, what are
9	alleged to be inconsistencies in the current licensing
10	basis.
11	What you're telling me is this particular
12	calculation has nothing to do with the current
13	licensing basis, is that correct?
14	MR. TAMBURRO: This particular calculation
15	has nothing to do with the local buckling criteria and
16	would apply to much more conservative criteria.
17	JUDGE ABRAMSON: We understood that, thank
18	you. But that's not what I'm asking.
19	MR. WEBSTER: Could I just
20	JUDGE ABRAMSON: Yes, let's go on, Dr.
21	Webster.
22	MR. WEBSTER: Dr. Hausler hasn't testified
23	the CLB is being consistently.
24	JUDGE ABRAMSON: I understand that. But
25	what we're trying to do is, let me perhaps give you
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1	all a little background, in case you weren't aware of
2	this.
3	A, current licensing basis is not properly
4	at issue in this hearing. B, what we're trying to
5	understand is whether the Applicant can meet the
6	current licensing basis for the proposed license
7	extension term.
8	That has to do with what the current
9	thickness is, which we will get to, and what corrosion
10	is expected.
11	So, we need to understand, as a basis for
12	going forward, what the current licensing basis is.
13	We don't need to understand what other calculations
14	AmerGen has done.
15	So if there's an inconsistency that Dr.
16	Hausler can point to, that leads us to believe that
17.	what we're being told is the current licensing basis,
18	is in fact not the current licensing basis, then it's
19	relevant. Otherwise it is not. So now please go on,
20	Dr. Hausler.
21	DR. HAUSLER: Well, as you well know, as I
22	pointed out earlier, Judge, I don't have the exact
23	text of the current licensing
24	JUDGE ABRAMSON: I understand that. But
25	you've got some calculations that led you to believe
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1	that there are inconsistencies. We'd like to have you
2	identify those calculations so that we can find out
3	whether they are, in fact, inconsistencies in the
4	current licensing basis or not.
5	DR. HAUSLER: The calculations, Your Honor,
6	deal with the valuation of the measurements. And the
7	calculations that are being referred to are entirely
8	independent of the acceptance criteria.
9	The acceptance criteria does derive from
10	the calculations, but is in fact used to categorize
11	say, or to judge the current measurements, but are
12	devoid.
13	Now if somebody tells me or tells us that
14	we should not accept areas that are larger than six by
15	six, or thinner than 693 mils, that has absolutely
16	nothing to do.
17	That is a statement as the criterion, it
18	is not a calculation. And I think that that needs to
19	be, you know, very clarified. Just because the
20	statement occurs in the calculation sheet, it doesn't
21	mean it is a calculation.
22	If I am wrong, I would very much like to
23	have that clarified.
24	MR. WEBSTER: Could I just, could I just,
25	perhaps, help my witness a little bit here. Dr.
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1	Hausler, is what you're saying or maybe I'll address
2	it to the Board.
3	Would the Board like for Dr. Hausler to
4	clarify that what he's saying is that normally when
5	one reads in a calculation an acceptance criteria, one
6	expects the calculation to then apply that criteria to
7	the data in a consistent way.
8	But, what he's found, is that actually the
9	data, there's a mismatch in the acceptance criteria
10	and the data.
11	JUDGE ABRAMSON: I think we've understood
12	that quite clearly from your written pleadings. What
13	we're trying to settle here is our questions, not your
14	questions.
15	DR. HAUSLER: Well, perhaps, it might be
16	helpful if, well even perhaps down the road, at a
17	future point, we would be furnished the exact text of
18.	the current licensing basis referring to the
19	acceptance criteria.
20	Because there have also been, you know,
21	confusing formulations. And I think they, you know,
22	exact syntax might be very helpful.
23	JUDGE ABRAMSON: If you would like to go
24	down your list of areas where you think that the
25	Applicant has said, the following should not be
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1	accepted.
2	I gather that's what you're suggestion it.
3	That they've done calculations to say the following
4	things should not be acceptable, let's go down it now,
5	and let's get it all on the record.
6	DR. HAUSLER: Well, I've given you one.
7	JUDGE ABRAMSON: You've given me one. Do
8	you have more? Let's have more? Let's have all of
9	them? And, or, if you prefer, Dr. Hausler, and
10	Counselor, if you want to point us where in your pre-
11	file testimony these things are covered, we can avoid
12	wasting everybody's time here repeating things.
13	The job here is to answer our questions,
14	not to repeat what's been said.
15	MR. WEBSTER: I think if the panel may
16	permit me to refer the panel to a certain pleading we
17	submitted previously on this point.
18	It is Exhibit B, Attachment 5, and it's
19	covered under Heading B, there, on Pages 2 through 5.
20	JUDGE ABRAMSON: And is there anything in
21	addition you want to add to that, or is that it? Are
22	you just wanting to repeat what's already in writing
23	in front of us?
24	MR. WEBSTER: I just wanted to make that we
25	had full testimony. We had some testimony from
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1	AmerGen, from the NRC on consistency of application.
2	I wanted to make sure the Board wasn't
3	misled by our testimony.
4	CHAIRMAN HAWKENS: Question, while Judge
5	Baratta is looking over some material, which changes
6	the topic a little bit. It's for the NRC Staff.
7	Perhaps Dr. Hartzman may be the individual
8	best situated to answer it. ASME criteria and the
9.	requirements it imposes for a safety factor or the
10	CLB, I believe it was your affidavit that, there were
11	some edits which talked about the ASME.
12	Initially there had been ASME requirements
13	and you edited it to say ASME specifications. Can you
14	please tell me why you made that change and what
15	conclusions we should draw from that change?
16	DR. HARTZMAN: The ASME Section 3 is a
17	design code. Those sections and the code case and 284
18	are requirements under design stage of a structure.
19	In checking or verifying a particular
20	structure that's already built, in the as built
21	conditions, where the loads are already well known,
22	the code case is not a requirement, it's a
23	specification.
24	It is in that sense that I wrote my
25	testimony.
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1	JUDGE ABRAMSON: So do I correctly
2	understand then, that the code case is not part of the
3	current licensing basis?
. 4	DR. HARTZMAN: The code case is part of the
5	current licensing basis for new construction.
6	JUDGE ABRAMSON: For the as built. But
7	DR. HARTZMAN: No, not for the as built.
8	For new, for
9	JUDGE ABRAMSON: For design.
10	DR. HARTZMAN: For design and for proposed
11	modifications.
12	JUDGE ABRAMSON: So when you're looking at
13	margin that's left, to decide whether the plant meets
14	its current licensing basis, do you or do you not
15	include the ASME, the calculation you're talking
16	about?
17	DR. HARTZMAN: In doing this we followed
18	the provisions of the code case. But the, we take
19	into consideration that the factor of safety may be
20	less than the specified, than specified in the code
21	case for the as built conditions.
22	Where the structure is well known, the dry
· 23 .	well shell is well identified, well described. The
24	loading conditions are well known also.
25	That means that the uncertainties, the
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1	uncertainties that went into the code case, into the
2	factor of safety that's in the code case, are smaller.
3	There's less uncertainty about the
4	structure than when it was designed.
5	JUDGE BARATTA: Wait, wait, wait a minute.
6	There's more to this than just the structure. The
7	industry has always followed a belt and suspenders
8	approach.
9	Which means that you, you know, you plan
10	for the worst. And I don't understand what you're
11	saying here.
12	DR. HARTZMAN: At the design stage you do,
13	you do plan for the worst. That's exactly correct.
14	That is when you assume the highest
15	uncertainty that goes into forming the factor of
16	safety. That is right. We are talking now of an as
17	built structure, as it exists today, under well-
18	defined loading with well-defined method of analysis.
19	A well-defined model of the structure.
20	And there are other, there are other conservatisms
21	that enter into this refined analysis.
22	JUDGE BARATTA: I don't understand how you
23	can say that. Because we don't know the exact
24	configuration of that dry well.
25	We think we know it, but there's still
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1	some uncertainty in it.
2	DR. HARTZMAN: That is correct.
ġ.	JUDGE BARATTA: So how can you accept the
4	fact of less than two, if that's unknown?
5	DR. HARTZMAN: In the case of buckling, in
6	the cast of buckling, which is the failure mode that
7	has been determine to be the failure mode for the
8	shell, there are factors which reduce the theoretical
9	buckling stress considerably, by up to 80 percent.
10	So that the actual buckling stress is
11	considerably lower than the theoretical buckling
12	stress.
13	And, in that sense, part of the
14	uncertainty disappears there. But the rest of it is
15	known. We know, for example, more or less, what is
16	the thickness of the various parts of the dry well
17	shell.
18	We know the loading, which is very
19	important. We know that there is dead weight, dead
20	weight due to the shell dead weight and there is the
21	dead weight due to the water at 2 psi external
22	pressure, and the seismic loading.
23	JUDGE ABRAMSON: Let me see if I can
24	understand where we are. The question that we're
25	struggling with is what's the current licensing basis?
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1	And in development of the initial current
2	licensing basis, you used this code case to determine
3	whether the design would satisfy what was then
4	determined to be the load, the current basis, right?
5	DR. HARTZMAN: I don't believe this, no.
6	I don't believe this code case was used at the design
7	phase.
8	JUDGE ABRAMSON: It wasn't used at all,
9	okay.
10	DR. HARTZMAN: It wasn't, it didn't exist.
11	JUDGE ABRAMSON: Okay. So, and now when
12	the staff is looking in its ordinary, administrative
13	process, not looking to a license extension, but in
14	its ordinary administrative process, to see whether
15	this shell meets the current licensing basis for
16	localized thinning.
17	And one does the calculation with the CLB
18	that's been described here, reduced to .536 over a one
19	square foot area and tapering up.
20	DR. HARTZMAN: That's correct.
21	JUDGE ABRAMSON: One finds that the safety
22	factor is reduced from 2.0 to 1.9 or something like
23	that. The staff finds that that is a satisfactory
24	number, and therefore is an okay current licensing
25	basis. Is that, am I correct in understanding that?
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1	DR. HARTZMAN: Yes.
2	JUDGE ABRAMSON: So, whatever that number
3	is, a safety factor is not terribly relevant to us.
4	What we're trying to understand is what is the
5	thickness distribution for the current licensing
6	basis.
. 7	And has this been accurately described to
8	us, as a one square foot area reduced to .536, for the
9	local thinning?
10	DR. HARTZMAN: I believe it is a good model
11	of what the actual distribution might be.
12	JUDGE ABRAMSON: I'm not worried about the
13	actual distribution, I'm worried about what the staff
14	has accepted for a current licensing basis?
15	DR. HARTZMAN: We have accepted the .536
16	tapering up to .736.
17	JUDGE ABRAMSON: Okay, thank you.
18	DR. HARTZMAN: To a uniform thickness of
19	.736.
20	JUDGE ABRAMSON: I understands. Where in
21	fact the shell is originally one inch or a little
22	over?
23	DR. HARTZMAN: 1.15 inches.
24	JUDGE ABRAMSON: Thank you.
25	MS. YOUNG: Judge Abramson, just to clarify
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1	the record, I believe that Dr. Hartzman answered that
2	the code case was not a part of the original design
3	CLB for the plant.
4	If the Board looks at Exhibit 37, that's
5	the safety evaluation. AmerGen's Exhibit 37. That's
6	the safety evaluation that analyzed the code case N284
7	for the first time in 1992.
8	JUDGE ABRAMSON: A few years after the
9	original license?
10	MS. YOUNG: Correct.
11	CHAIRMAN HAWKENS: Is compliance with the
12	safety factor in the ASME code for buckling, part of
13	the CLB?
14	DR. HARTZMAN: Only for design.
15	CHAIRMAN HAWKENS: The ASME code provides
16	a safety factor of 2.0 for design, but the NRC Staff
17	will allow going to below 2.0 for actual
18	DR. HARTZMAN: For as built conditions.
19	CHAIRMAN HAWKENS: As built conditions.
20	DR. HARTZMAN: Yes.
21	CHAIRMAN HAWKENS: Is there a minimum
22	safety factor that the NRC Staff believes would
23	provide reasonable assurance of safe operations?
24	DR. HARTZMAN: We have not determined that.
25	JUDGE BARATTA: Okay, how can you say that
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1 you've even determined the loads, because you haven't 2 done any strain gauging -- or AmerGen hasn't done any 3 strain gauging or anything like that, have they? 4 DR. HARTZMAN: The loads depend on the 5 structure. 6 JUDGE BARATTA: Say that again? 7 DR. HARTZMAN: The loads depend on the 8 structure. JUDGE BARATTA: Yeah, it depends on the 9 10 structure which is --DR. HARTZMAN: The dead, it's the dead 11 weight of the structure which is fairly well known. 12 And also the dead weight of the water in the refueling 13 14 pool. JUDGE BARATTA: But I mean you have not 15 actually, there has not been an actual physical 16 measurement of the strain and stress in those, is that 17 18 correct? DR. HARTZMAN: Not that I'm aware of. 19 JUDGE BARATTA: The world that I come from, 20 the submarine world, we do that. 21 We don't just strictly count on the calculations for safety reasons. 22 I would defer 23 DR. HARTZMAN: to the 24 Licensee for that. I'm not aware of any measurements 25 that were made. NEAL R. GROSS COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. (202) 234-4433 WASHINGTON, D.C. 20005-3701 www.nealrgross.com

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1	JUDGE BARATTA: Mr. Gallagher, has there
2	been any actual measurement of the loads?
3	MR. GALLAGHER: I'm sorry, I didn't get the
4	question?
5	JUDGE BARATTA: Has there been any actual
6	measurement of the loads that are imposed on the dry
7	well, as a result of the refueling activities?
8	MR. GALLAGHER: Well, we've factored in the
9	loads that are, that we needed to model, into this.
10	Perhaps Dr. Mehta could comment on the loading that we
11	included.
12	DR. MEHTA: Your Honor, we took the loads
13	for the greatest penetrations at the job which came
14	from the drawings.
15	And we applied those loads on the model.
16	So essentially it was from referenced sources. If I
17	might add one thing that is there is the backdrop to
18	that safety factor we got was for 736 mils all around
19	the sand bed region.
20	So there are two factors that we feel that
21	make the safety factor actually greater than two,
22	which are properly there in the as built calculation
23	right now.
24	And one of that is that the locally
25	thinned area were modeled in a worse area, whereas the
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1	thinned area are in a, not in the worst area.
2	That is one conservatism in our
3	calculation. Secondly, the whole sand bed region was
4	modeled with a uniform thickness of 736 mils.
5	And the third conservatism is that the
6	ASME code, when they determined for the buckling, from
7	the third typically calculated buckling load to the
8	realistic buckling load, the use a capacity of
9	reduction factor.
10	And that's in Factor 5. And that is based
11	on the lower of the test data. So there is some
12	conservatism built in those factors also.
13	JUDGE ABRAMSON: Let's make sure I
14	understand this one more time. Sorry, I have to keep
15	coming back to this.
16	In the locally thinned area criteria,
17	buckling load criteria, is it the assumption that it's
18	.536 over this one square foot area, and then it
19	tapers up to .736, not back to the original 1.15?
20	DR. MEHTA: That is correct.
21	JUDGE ABRAMSON: So where you might have
22	found a safety factor of 2.0, if you assume the whole
23	thing was degraded to .736, now you're saying that if
24	we assume that the whole thing is degraded to .736,
25	and now we thin an additional area beyond that, to
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1	.563 over one square foot and taper it back up, we
2	find that we would have a safety factor of 1.9 or
3	something like, is that correct?
4	DR. MEHTA: Yes, Your Honor.
5	JUDGE ABRAMSON: Okay. And what the, and
6	when the staff is talking, Dr. Hartzman, about other,
7	what's the right word? Conservatisms built into that
8	computation, is not it a huge conservatism to assume
9	that the entire shell is degraded to .736?
10	DR. HARTZMAN: Yes, yes, we do.
11	JUDGE BARATTA: I think, Dr. Mehta, you hit
12	on a very good point. That your analysis was
13	conservative because you, A, assumed the .736.
14	You also placed that tray region in the
15	highest stressed area. And you also have a capacity
16	reduction, capacity reduction factor of, I don't think
17	it's high, I think they use a .3 something.
18	DR. HARTZMAN: Up to 80 percent.
19	DR. MEHTA: It's 0.204, Your Honor. And
20	then, of course, to account for the fact that in the
21	sand bed region there is a membrane stress which tends
22	to straighten out the need for construction
23	irregularities.
24	So there is a bump up of that factor from
25	.04 to something like 0.32.
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1	JUDGE BARATTA: Okay, I stand corrected.
2	MR. WEBSTER: Can I just clarify the record
3	on this point, Judge. There is some disagreement
.4	about capacity reduction factors. Sandia suggests
5	that shall not be there, however GE says it should be
6.	there. So it's not clear that is a conservatism.
7	JUDGE BARATTA: So, the actual, while the
<sup>′</sup> 8	actual factor safety is not known, because we don't
9	have measured stresses, we don't have 100 percent UT
10	inspection of the entire shell.
11	So, in your expert opinion, would you
12	anticipate it to be greater than two?
13	DR. MEHTA: Your Honor, this is my
14	judgement that when all things are taken into account,
15	that if we put the actual thickness, then the safety
16	factor that would come out of that would be greater
17	than two.
18	JUDGE BARATTA: Do you, can you go, if you
19	don't feel comfortable with answering this, you can
20	say no, okay.
21	Do you feel it would be considerably
22	greater than two?
23	DR. MEHTA: I guess, Your Honor, I could
24	only say that it will be greater than two. This is my
25	judgement call.
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1.	JUDGE BARATTA: All right, I preface my
2	question. I understand, Dr. Hausler, you're not a
3	structural engineer. But do you, I've noticed this,
4	what looks like some sort of an inconsistency, which
5	you pointed out in the acceptance criteria.
6	Although, I'm not sure it really is. I
7	think it appears they were doing other things trying
8	to figure out just local spots and such.
9	Does that help you understand what
10	analysis of record or the COB is, at this point, and
11	how they've applied it?
12	Or do you still feel that there are some
13	inconsistencies that you'd like addressed?
14	DR. HAUSLER: Judge, I'm not really
15	prepared to accept what's been said with respect to
16	the COB because I don't know anything to the contrary.
17	So, I cannot discuss that. But I would
18	like to make a comment with respect to how well do we
19	really know things.
20	Dr. Hartzman just testified that we fully
21	understand the as built situation, condition and
22	properties of it, and I would like to point out that
23	I don't think we really do.
24	And, for the following reason. And I have
25	to, you know, come back to this Sandia Study. The
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1 Sandia Study clearly states that they have been 2 looking for the appropriate to calculate through their 3 model, and they didn't find it. Because the original GE files have gotten 4 As a consequence, they had to use nominal 5 lost. 6 properties for the steel, which, as you know, can vary quite a bit in the as delivered, you know, condition. 7 of the things that particularly 8 One 9 worried me, when Ι looked over the various measurements or the description of the measurements 10 that have been made, I came across comments about UT 11 measurements having to have been discarded because 12 13 they review inclusions in the steel. And, you know, if we, you know, find a 14 15 relatively high frequency of inclusions in the steel, 16 and, you know, these were not just, you know, one inclusion, there were several. 17 18 Now, I really tend --19 CHAIRMAN HAWKENS: May I interrupt you. Can you point to where in the record you're referring 20 to? 21 DR. HAUSLER: I was just getting to that, 22 23 Judge. Actually, right off hand I can't, but I can, 24 you know, refer to it, refer to it tomorrow. 25 The reason being that we have read over, NEAL R. GROSS COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. (202) 234-4433 WASHINGTON, D.C. 20005-3701 www.nealrgross.com

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1	you know, over the years, you know, hundreds of pages
2	and we're focused on specific calculations and
3	specific presentations.
4	But, you know, on the way, you know, you
5	see a lot of other things, and so that stuck in my
6	mind. When Dr. Hartzman said, we know things very
7	well, I felt compelled to point out that perhaps we
8	don't really know things, you know, as well as we
9	think we do.
10	Particularly, because, you know, Sandia
11	also had to point out that, you know, some of the
12	records from GE had gotten lost and they had to, well,
13	not exactly invent numbers, but they had to use
14	nominal numbers for the specifications of the steel as
15	they, you know, as they could find them in ASME.
16	JUDGE BARATTA: Let me, if I could, ask Dr.
17	Mehta about that, if I may.
18	DR. HAUSLER: Certainly.
19	JUDGE BARATTA: Dr. Mehta, is, when you do
20	a design you put on various conservatisms. Do they
21	account for such things as inclusions in the steel and
22	the possibility that, well, maybe you're not exactly
23	on the nominal properties in material, or not?
24	DR. MEHTA: Well, Judge, could you repeat
25	the question?
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1	JUDGE BARATTA: Okay. When you do a
2	design, why do we have this factor of say, is it
3	because certain things are really not known at the
4	time you're designing?
5	And do they include such unknowns as, is
•6	there going to be, or are there going to be inclusions
7	in the steel?
8	DR. MEHTA: Yes, Your Honor, yes, I think
9.	if there is mature properties, although the mature
10	properties are lower bound in the ASME code.
11	So, essentially, the ASME code takes into
12	account actual manufacturing properties and they come
13	up with a lower bound value of the acceptable or
14	allowable stress, and that is what is used in the
15	design.
16	JUDGE BARATTA: Dr. Hausler, does that
17	help?
18	JUDGE ABRAMSON: Gentlemen, before we go
19	too far down this field, let's remember what we're
20	after, Judge Baratta.
21	DR. HAUSLER: I think my comment is, you
22	know, pertinent in that respect. Again, let me sort
.23	of like, you know, apologize for the fact that I have
24	read a lot of things and I may not necessarily be able
25	to pinpoint where I read them, at this particular
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1	point in time.
2	However, I do believe that there are
3	records available that indicate that the original
4	safety factor of the plant, as built, was of the order
5	of three and a half to four or 4.7, in that order of
6	magnitude.
7	I think what we see now is that this
8	conservatism, which probably was very justified
9	conservatism at the time, you know, hails from down
10	to, you know, somewhere around two or perhaps even
11	lower.
12	Now, I just want to make that comment. I
13	have to, obviously, leave it up to the panelists what
14	to make of that information, because again, I'm not a
15	structural engineer. So, all I can do is pass it on.
16	JUDGE BARATTA: Thank you.
17	MR. WEBSTER: Judge, before you, could I
18	just say that I'm certainly not clear from the
19	testimony, whether the staff believes the CLB contains
20	a requirement of the ASME code to be 1.9 or .8 or 2.
21	It seems like we've switched around
22	between saying the conservatism is sufficient that we
23	would be able to.
24	JUDGE BARATTA: I share your concern. I'd
25	like to have someone respond to that.
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	1	DR. HARTZMAN: This is Dr. Hartzman. I
	2	stated earlier that for design purposes, or for
	3	proposed modifications, the current licensing basis
	4	includes the ASME code case, with all the provisions
	5	that it has.
	6	For very fine, for checking as built
	7	structures it does not necessarily, it is not
	8	necessarily that these provisions be followed.
	9	It is provided there is a good
	10	understanding of the various conservatisms that enter
	11	into the analysis of the as built, of the as built
	12	structure.
	13	It is possible that we may, we may accept
	14	a lower factor of safety, for the simple reason that
	15	the uncertainties that go with the factor safety of
	16	two or less. There's less of a certainty.
	17	JUDGE BARATTA: All right, can you point
	18	specifically to where the NRC has accepted in this
	19	case?
	20	DR. HARTZMAN: I would have to call the
	21	safety evaluation, the license renewal safety
	22	evaluations.
,	23	JUDGE ABRAMSON: Let me follow this one up.
	24	I think I've asked this, this may be the third or
	25	fourth time I've asked this.
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1	Current licensing basis for buckling,
2	which is what's been alleged to be, begin approached,
.3	and therefore is a threshold for our inquiry, has two
4	elements.
5	One current licensing basis for buckling
6	is the general buckling. And for that, as I
7	understand it, the computation assumes, and therefore
8	it's the current licensing basis, that the entire dry
9	well shell is degraded to .736 inches. Is that
10	correct?
11	DR. HARTZMAN: That is correct.
12	JUDGE ABRAMSON: Okay, and the other
13	element of the current licensing basis is the locally
14	thinned area, I keep getting this one wrong.
15	DR. HARTZMAN: .536.
16	JUDGE ABRAMSON: .536 over one square foot
17	tapering up to .736, not going back to the original
18	thickness.
19	DR. HARTZMAN: Uniformly degraded.
20	JUDGE ABRAMSON: Uniformly degraded .736.
21	DR. HARTZMAN: Yes.
22	JUDGE ABRAMSON: So, from the staff's
23	perspective, and the Applicant has agreed that this is
24,	correct, the current licensing basis has Element 1,
25	.736 uniformly degraded, and Element 2, .736 uniformly
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1	degraded, and superimposed on that this erosion of a
2	tray down to .536 over one square foot?
3	DR. HARTZMAN: Yes.
4	JUDGE ABRAMSON: That is the current
5	licensing basis, period?
6	DR. HARTZMAN: Yes. From a uniformly
7	degraded thickness.
8	JUDGE ABRAMSON: Yes, thank you.
9	JUDGE BARATTA: So then it's not the UFSAR,
10	it's the updated SAR then?
11	MS. BATY: That's correct. Your Honor,
12	there may be some confusion here. We're looking at
13	the regulations at Section 54.3, is where it's defined
14	what the current licensing, where the current
15	licensing is pulled from.
16	And so I think, the regulation states that
17	the current licensing basis includes the final safety
18	evaluation report and design, other design
19	information.
20	And the UFSAR, of course, is Exhibit 37,
21	AmerGen Exhibit 37 or 38, excuse me, in this case.
22	CHAIRMAN HAWKENS: Dr. Hartzman, in your
23	affidavit, as edited, you indicated, your language was
24	assuming the corrosion is as extensive and as severe
25	as depicted by Dr. Hausler's contour plots.
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1	The staff estimates, and then you
2	continued, I believe, to indicate that the safety
3	factor was in the 1.9 range.
4	DR. HARTZMAN: Yes.
5	CHAIRMAN HAWKENS: And that that was
6	acceptable. Do I read that to say that that was based
7	purely on the representations made by Citizens and
8	that you would come to a different conclusion based on
9	your interpretation of the data, as to what the actual
10	safety factor is similar to what AmerGen said in his
11	professional expert opinion, the safety factor remains
12	at least 2.0?
13	DR. HARTZMAN: Yes to the first part to
14	your question. Yes, it was made based
15	CHAIRMAN HAWKENS: It was a poorly phrased
16	question. So tell me what you believe?
17	(Laughter.)
18	DR. HARTZMAN: I'm getting there.
19	CHAIRMAN HAWKENS: Thank you.
20	DR. HARTZMAN: It was based on Citizens, on
21	Citizens data. Specifically the contour plots. And
22	the factor of safety that I stated was an estimation,
23	shall we say.
24	Even better a guess. But the objective of
25	making that statement was we never understood what
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1	exactly Citizens, what did they try to say when they
2	say there was zero margin?
3	By having a factor of safety at 1.9,
4	obviously the margin was less than zero. And I
5	guessed or I surmised that what Citizens was trying to
6	say is that when the margin is zero, buckling with a
7	curve.
8	And by stating the factor of safety as
9	1.9, that I wrote in my testimony, I came to the
10	conclusion that the shell should have buckled, should
11	have buckled already.
12	But no buckling of the shell was found in
13	2006, when they did their latest measurements.
14	CHAIRMAN HAWKENS: Let's
15	DR. HARTZMAN: Therefore, the factor of
16	safety must have been greater than two.
17	JUDGE ABRAMSON: Dr. Hartzman, I'm really
18	getting befuddled now by what you're saying. Let me
19	see if I can ask a few questions, one-by-one to try
20	and understand this.
21	You looked at the Citizens claim that
22	there was no margin left?
23	DR. HARTZMAN: Yes.
24	JUDGE ABRAMSON: And when you looked at
25	that, you assumed if there were any degradation,
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1	beyond that, the shell should buckle?
2	DR. HARTZMAN: That's how I interpreted
3	what were Citizens, were stating.
4	JUDGE ABRAMSON: Okay, all right. And if,
5	but that differs, that would imply a safety margin of
6	less than 1.0, is that correct?
7	DR. HARTZMAN: Less than zero.
8	JUDGE ABRAMSON: Less than zero, no, less
9	than 1.0 is it? Safety margin of one takes you to the
10	buckling load?
11	DR. HARTZMAN: Now we have to be very
12	careful here.
13	JUDGE ABRAMSON: I said a margin, right, I
14	said a margin is 1.0, it means you've got double the
15	ability to handle the stresses, right?
16	DR. HARTZMAN: I principle, yes.
17	JUDGE ABRAMSON: Okay. So a margin of 2.0,
18	means you've got three times the ability to handle the
19	load, is that correct?
20	DR. HARTZMAN: Yes.
21	JUDGE ABRAMSON: More or, this is in lay
22	terms, but remember we've got a bunch of lay folk
23	around. Some of us, even.
24	So, when you say to us that the safety
25	margin of 1.9
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1	DR. HARTZMAN: The factor of safety is 1.9.
2	JUDGE ABRAMSON: Factor of safety of 1.9,
3	implies that it can handle much more than is necessary
4	to cause it to buckle?
5	DR. HARTZMAN: Yes.
6	JUDGE ABRAMSON: That is can handle much
7	more than the buckling?
8	DR. HARTZMAN: Yes, that is correct.
9	CHAIRMAN HAWKENS: And based on your
10	interpretation of the data, not your interpretation of
11	Citizens presentation of the data.
12	Based on your expert interpretation of
13	AmerGen's data, what, in your expert opinion, is the
14	current factor of safety?
15	DR. HARTZMAN: I would have to say that
16	it's probably about two, even greater than two. For
17	the simple reason that the criteria, and this is what
18	we have been stressing all along.
19	The criteria were based on the uniformly
20	degraded shell, 2.736. Obviously, the shell, the
21	measurements that have been shown, that have been
22	taken, just considering the data by both Citizens and
23	AmerGen, show that there is more than .736, on
24	average.
25	So, we must conclude that there are thick,
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1_	the shell is thicker, over most of the sand bed		
2	region, than the .736.		
3	So my conclusions must be, that the factor		
4	of safety is around two or greater. I can't tell		
5	without doing an actual calculation.		
6	JUDGE ABRAMSON: And without having real		
7	measurements over the whole shell. Because this whole		
8	analysis assumes uniform degradation to .736, which we		
9	don't have, clearly don't have. No data indicates		
10	that. Is that correct?		
11	DR. HARTZMAN: That is correct.		
12	JUDGE BARATTA: Dr. Hausler, you've looked		
13	at the data. We've just heard a statement that		
14	there's no data that indicates there's a uniformly,		
15	the shell is uniformly equal to .736 or less.		
16	Do you agree with that? Uniformly, now,		
17	I'm not talking about local areas, uniformly?		
18	DR. HAUSLER: Would you please repeat the		
19	question, I'm sorry?		
20	JUDGE BARATTA: We just, could the Court		
21	Reporter just read the last statement that Dr. Hausler		
22	made.		
23	READ BACK		
24	CHAIRMAN HAWKENS: And based on your		
25	interpretation of the data, not your		
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1	int	terpretation of Citizens presentation	
2	of	the data. Based on your expert	
3	int	cerpretation of AmerGen's data, what,	
4	in	your expert opinion, is the current	
5	fac	ctor of safety?	
6		DR. HARTZMAN: I would have to say	
7	tha	at it's probably about two, even	
8	gre	eater than two. For the simple reason	
9	tha	at the criteria, and this is what we	
10	hav	ve been stressing all along. The	
11	cri	iteria were based on the uniformly	
12	deg	graded shell, 2.736. Obviously, the	
13	she	ell, the measurements that have been	
14	sho	own, that have been taken, just	
15	Cor	nsidering the data by both Citizens and	
16	Ame	erGen, show that there is more than	
17	. 73	36, on average.	
18		So, we must conclude that there are	
19	thi	ick, the shell is thicker, over most of	
20	the	e sand bed region, than the .736. So	
21	my	conclusions must be, that the factor	
22	of	safety is around two or greater. I	
23	car	n't tell without doing an actual	
24	cal	lculation.	
25		JUDGE BARATTA: Thank you, court report	ter.
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1	Let us know when you're ready.
2	COURT REPORTER: Ready sir.
3	JUDGE BARATTA: Please, go ahead.
4	DR. HAUSLER: I have at this time
5	absolutely no reason to believe that the sand bed,
6	which is about three feet high all around the
7	periphery, is in fact, you know, degraded to .736. I
8	don't think that's a fact simply because there are
9	some areas that we know have less corrosion and
10	therefore are, you know, some bays haven't seen as
11	much water as others.
12	To answer your question, the sand bed is
13	not corroded uniformly to .736.
14	JUDGE BARATTA: Thank you. We've
15	concluded our questions for this panel. Let's take a
16	ten minute break; and, when we resume, we'll have the
17	third panel seated. Thank you. We'll meet back here
18	at 2:40.
19	(Whereupon a recess was taken from 2:35
20	p.m. to 2:45 p.m.)
21	CHAIRMAN HAWKENS: We are ready to resume.
22	Would AmerGen please introduce their witnesses on this
23	panel?
24	MR. POLONSKY: This is Mr. Polonsky for
25	panel number 3 to discuss available margin. We have
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457 Mr. Fred Polaski, who was introduced previously. 1 Mr. 2 Pete Tamburro was also introduced previously; Dr. David Gary Harlow from Lehigh University, AmerGen's 3 expert in statistics. 4 5 To his right is Mr. Martin McAllister, who is an NDE level III. If I didn't get that right, 6 7 you'll correct me, Marty, technician and training 8 person at Oyster Creek station. He is here to answer any questions on how the UT measurements themselves 9 10 are taken on the UT equipment. And then behind me and slightly to my left 11 since we ran out of seats, sitting in the first row, 12 Julien Abramovici, who was 13 the pews, is Mr. а 14 contractor to AmerGen called Enercon. He also is a former employee of the prior owner and operator, GPUN, 15 and has historic experience regarding the corrective 16 17 actions, et cetera, at the sand bed region. CHAIRMAN HAWKENS: Thank you. 18 For the staff, NRC staff, the 19 MS. BATY: 20 same panel group of witnesses for this panel, Mr. 21 O'Hara, Dr. Davis, Mr. Ashar, Dr. Hartzman. And seated behind our row of witnesses is Mr. Salomon, who 22 is also testifying on this panel. 23 CHAIRMAN HAWKENS: Thank you. 24 On this panel will be Dr. 25 MR. WEBSTER: NEAL R. GROSS COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W.

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1	And then we'll deal with the other data.
2	MR. TAMBURRO: Your Honor, I am looking
3	through an exhibit right now.
4	JUDGE ABRAMSON: We can also look at the
5	trench data, which I think we went over a little bit
6	ad nauseam earlier today, but if there's any
. 7	MR. POLASKI: You are correct. We can
8.	look at the trench data, but there's other data that's
9	single points on the outside that may have a smaller
10	value than what we saw from the trench data. That's
11	what we'll need to look at because we've never looked
12	at it from that standpoint of what's the thinnest
13	point. We have always been looking at what's the
14	thinnest point anywhere in the same
15	JUDGE ABRAMSON: Yes. And I understand
16	the thinnest points are near where the top of the sand
17	used to be, but if that's not going to hold moisture
18	anymore, then we need to be looking at at least we
19	need in the alternative to think about the margin near
20	the bottom or where the sand bed used to be.
21	MR. TAMBURRO: Your Honor, something that
22	I wanted to point out was AmerGen exhibit 28.
23	JUDGE ABRAMSON: That's the one we were
24	looking at earlier.
25	MR. TAMBURRO: Yes, sir.
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1	MR. POLASKI: Yes. That's the map with
2	the green and yellow that shows all of the points.
3	MR. TAMBURRO: The thinnest point, which
4	is a triangle over in bay one, was less than 736. I
5	don't have the exact number, but that gives you a
6	relationship of which bay it is in, what elevation it
7	is in, and its basic thickness.
8	JUDGE ABRAMSON: Those are the yellow
9	points that indicate they are between .636 and .736?
10	MR. TAMBURRO: Yes, sir. If you want the
11	exact number, I can look it up, but that may take some
12	time. I might point out that in the trenches, all the
13	points in the trenches are green, which indicate they
14	are greater than 736.
15	I believe you asked what is the area of
16	that point.
17	JUDGE ABRAMSON: Yes. Can you give us an
18	approximate
19	MR. TAMBURRO: That is a single reading.
20	The UT probe is approximately three-eights of an inch
21	in diameter. So it's over an area less than
22	three-eights of an inch.
23	JUDGE ABRAMSON: And I see 6 yellow
24	triangles in bay one, just slightly above the 11-foot
25	or am I looking in the wrong area?
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461 1 MR. TAMBURRO: That's correct, Your Honor. 2 There is yellow triangle below one elevation, ten-foot. 3 4 MR. POLASKI: Your Honor, if I could add, 5 those six triangles are up in the area up at the top of where the sand was. 6 7 JUDGE ABRAMSON: That's above the sand bed. 8 9 MR. POLASKI: Yes. 10 JUDGE ABRAMSON: So if I look at what is 11 actually in the sand bed, the yellow triangle is somewhere between nine-foot and ten-foot. Were there 12 13 no measurements down near the bottom of the sand bed in any of the regions? 14 15 MR. TAMBURRO: Only in the trench areas. 16 JUDGE ABRAMSON: And when we look at that 17 one data point, all other data points -- let's talk about the bay one, where we see one yellow point and 18 19 two green points, which those of you who can't see this, this one is yellow. Those two are green. 20 Is 21 that right? . 22 MR. TAMBURRO: Yes, sir. JUDGE ABRAMSON: Are those the only data 23 24 points that were measured in that height in bay one, 25 the only locations that were measured? **NEAL R. GROSS** COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. (202) 234-4433 WASHINGTON, D.C. 20005-3701 www.nealrgross.com

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	1	MR. TAMBURRO: Those were the only
	2	external data points that were observed to be
	3	significantly biased then.
· · · · · · · · · · · · · · · · · · ·	4	JUDGE ABRAMSON: Okay. Were they close
	5	together? Do we know how far apart they were? Do you
1	6	have any information?
	7	MR. TAMBURRO: Yes, sir. I have to go to
	8	another exhibit. Your Honor, AmerGen exhibit 44
	9	provides a larger map of bay one. And it provides all
1	0	of the external points in that region.
1	1	One thing I could I would like to point
1	2	out, the squares are points less than 736. The
1	3	triangles are greater than 736.
1	4	MR. POLASKI: Now, those are all single
· · 1	5	points, which correspond to the triangles on the
1	6	previous map that we were looking at that had the
1	7,	green and the yellow on it?
1	8	> JUDGE ABRAMSON: I am having difficulty
1	9	correlating these two figures. Can you
2	0	MR. TAMBURRO: This bay, Your Honor, is
2	1	scaled. It's only bay one. And the one thing that I
. 2	2	would have to point out, they are a mirror image of
2	3	each other.
2	4	So, for example, the yellow triangle I
2	5	pointed out on the previous sketch is the square at
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1	the very bottom of the 36 by 36-inch area criteria.
2	So you asked how close is the point
3	closest to the triangle. A couple of inches, Your
4	Honor, if you look at the scale up above.
5	JUDGE ABRAMSON: So if I look at those
6	three data points, the two triangles and the square,
7	which would be two greens and a yellow, is that
8	correct?
9	MR. TAMBURRO: Yes, sir.
10	JUDGE ABRAMSON: They would be within a
11	one-foot linear distance, well within a one-foot
12	linear distance, correct?
13	MR. TAMBURRO: Yes, sir.
14	MR. WEBSTER: Judge, we have an exhibit
15	that has the points to scale. And we have labeled
16	with both point numbers and values.
17	JUDGE ABRAMSON: What exhibit number would
18	that be? Let's take a look.
19	MR. WEBSTER: That would be exhibit 61,
20	figure 1, Citizens 61.
21	JUDGE ABRAMSON: It's not here in 61.
22	MR. POLONSKY: Your Honor, if we could,
23	frankly, object to that for this purpose?
24	JUDGE ABRAMSON: That is contour plots.
25	MR. POLONSKY: AmerGen is testifying. It
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1	is contour plots. And we're trying to understand the
2	spatial relationship. And I understand why Richard
3	wants us to turn to this exhibit, but I don't think
4	it's relevant to do that right now unless you want to
5	get into why AmerGen thinks this is appropriate or
6	inappropriate at this time.
7	JUDGE ABRAMSON: If only it shows me what
8	the physical distance between the points is, that's
9	all I'm interested in. I understand you don't like
10	the contours. And we'll deal with that.
11	What I am trying to get a handle on is if
12	we had to use this is also sand bed regions the
13	bottom of the sand bed region, if we had to establish
14	an initial condition at the beginning of the license
15	extension for the remaining thickness at the bottom of
16	the sand bed region, these might give us some numbers.
17	And then we could talk about expected
18	corrosion rates going forward and try to come up with
19	how much margin there was here and what frequency we
20	needed to have. Let's at least look at the numbers.
21	Are you having any luck finding this?
22	It's their exhibit 61.
23	MR. WEBSTER: It's exhibit 61, figure 1.
24	And it does have some contour plots on it, but, I
25	mean, you can ignore those and just look at
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1	JUDGE ABRAMSON: Yes. I intend to ignore
2	them since I don't want to deal with the controversy
3	about them.
4	MR. WEBSTER: Flip forward from there, two
5	pages forward, I think. It's actually page 14 of the
6	exhibit, I think. Go forward. Keep going. Keep
7	going. There it is in black and white. That's the
8	figure except that is in black and white. The color
9	figure is there. Those are all in black and white.
10	JUDGE ABRAMSON: Is there a color figure
11	or is this going to be black and white?
12	MR. WEBSTER: It's a color. It should be
13	in your exhibit binder.
14	JUDGE ABRAMSON: I see. But what we have
15	here is black and white?
16	MR. WEBSTER: Well, the reason for that is
17	there are some redactions, Judge. And we have to
18	rescan the exhibit. And so
19	JUDGE ABRAMSON: Let me take a look at
20	this. Thanks.
21	MR. TAMBURRO: Your Honor, the data sheets
22	give you how many inches down, how many inches over
23	each point. We could read you the coordinates from
24	the data sheets.
25	JUDGE ABRAMSON: Actually, I can see it
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·1	from here. That's good enough. Okay. We just needed	
2	to have some information about what the thicknesses	
3	were at the bottom.	
4	We've heard a lot of information about the	
5	data in the sand bed region, in the upper part of the	
6	sand bed region, where it's really corroded. Staying	
7	away for the moment from what corrosion is to be	
8	expected or what is to be expected of the epoxy	
9	performance over time, let's talk for a minute about	
10	how one would take the data points and lay them out in	
11	a way to make them comparable to the local area	
12	thinning	
13	MR. POLONSKY: Local buckling criteria.	
14	JUDGE ABRAMSON: Local buckling criteria.	
15	Okay. Right. How do you take the data that you have	
16	in the most severely corroded area and lay that out in	
17	a way that it can be compared to the local buckling	
18	criteria?	
19	MR. POLASKI: Your Honor, Mr. Tamburro is	
20	going to address that. He does that as part of his 24	
21	cap for the external points as part of the evaluation	
22	of the data. I'll let him go through the details of	
23	that.	
24	MR. TAMBURRO: I am going to talk to	
25	AmerGen exhibit 16. I would first like to go through	
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1	to page 13 of that exhibit.
2	MR. WEBSTER: I'm sorry, Judge. We do now
3	have the color version if you want it.
4	MR. TAMBURRO: Okay.
5	JUDGE ABRAMSON: We have the figure in
6	front of us here. There we go. Okay.
7	MR. TAMBURRO: This figure is a schematic
8.	only. It only is intended to represent methodology.
9	The figure provides in the vertical axis the thickness
10'	of the plate. And in the horizontal direction is a
11	profile depending of the tray and data. So this
12	figure provides a tray with a bottom of 636 mls and is
13	the criteria that is applied.
14	The data can I continue?
15	JUDGE ABRAMSON: Please.
16	MR. TAMBURRO: The data that we collected
17	is over very small areas. And they were chosen to be
18	biased then. So we know that they're the most
19	thinnest points in the contour of the material that's
20	being analyzed.
21	JUDGE ABRAMSON: So in this figure, the
22	black areas represent where you took the measurement?
23	The dotted lines indicate what you think the remaining
24	thickness looks like in those areas?
25	MR. TAMBURRO: Yes, sir. And that's how
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1 we applied the tray. I would like to move on to the 2 same exhibit, page 29. Actually -- I'm sorry -- Your 3 Honor, page 30, page 30 of AmerGen exhibit 16. 4 This figure applies the tray. And it 5 applies the tray over areas, external points, that б were lower than 736. And it applies the tray on an 7 Excel spreadsheet that accurately plots the x-axis of 8 the tray and the y-axis. The scales are different. The tray is a 9 square. However, because of the scaling, you see a 10 With that envelope of the tray over the 11 rectangle. points, again, the points are plotted according to 12 their x and y coordinates from the data sheets. 13 Thetray is also modeled according to its x and y data 14 sheet from the -- by its size. 15 We then look at the profile 16 in two directions. So if you look at the bottom of this 17 figure, there is an arrow saying, "Profile in figure 18 1-4." And then if you look to the side on the right, 19 you see "Profile in figure 1-5." We're taking a 20 two-dimensional cut in two directions: one up and one 21 to the left. 22 So the next figure, figure 4.1, which is 23 page 31, plots the criteria as its position and the 24 points which are less than 736. By showing that the 25 **NEAL R. GROSS** COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W.

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1	points are greater and above the tray, we're showing
2	compliance.
3	The next figure, which is on page 32, does
4	the same thing but only at a 90-degree angle looking
5	at it from the left of that figure. And, again, we're
6	showing the points that we know the thickness, the
7	spatial relationships, and that were above the
8	criteria.
9	JUDGE ABRAMSON: And if you had relocated
10	those trays, if you will, on your data, is this the
11	worst condition you found?
12	MR. TAMBURRO: This is the worst location,
13	Your Honor.
14	JUDGE ABRAMSON: And the worst what's
15	the right what do I want to say orientation or
16	
17	MR. TAMBURRO: Yes, sir.
18	JUDGE ABRAMSON: worst possible
19	configuration?
20	MR. TAMBURRO: Yes, sir. It took a while
21	to get the tray in the proper location to accurately
22	represent, to accurately be used for comparison
23	through there.
24	MR. POLASKI: And I would like to also
25	point out, as Mr. Tamburro mentioned before, this was
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1	using a tray with only 636 at the bottom. So if we
2	used the actual current licensing basis acceptance
3	criteria, 536, it would mean that the slopes on the
4	side would be steeper and there would be more room to
5	the actual points than what you see here.
6	JUDGE ABRAMSON: This is very helpful
7	because now I can see at least how one would take the
8	data and compare it to the local area, local buckling
9	criteria.
<u>,</u> 10	The difference is if you wanted to compare
11	it to the local buckling criteria, your tray would be
12	deeper, .536, instead of
13	MR. POLASKI: That's correct, yes.
14	JUDGE ABRAMSON: Thank you.
15	Okay. So now we understand how we get
16	from the actual measurements to looking at the local
17	buckling criteria, all of this, of course, with the
18	assumption that the local buckling criteria assumes
19	that the entire shelves degraded the .736, right?
20	MR. POLASKI: Yes, sir.
21	JUDGE ABRAMSON: Do you have any data that
22	would indicate what the overall degradation of the
23	shell is? Have you tried to lay the whole thing out
24	to see what it looks like, the whole sand bed region?
25	MR. POLASKI: Your Honor, we have not
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attempted to do that. In order to do that, in order 1 2 to measure accurately the local points that were 3 measured from the outside, the 106 points, those areas 4 had to be prepared by grinding to actually remove 5 metal to give you a smooth surface. To do that on any other locations beyond that would require removal of 6 7 more metal, which we don't want to do. 8 However, we have generated some plots --9 and I'll let Mr. Tamburro go through these -- that 10 overlay in one picture both the internal grids and the 11 external single points, which will show that between 12 those external single points that the average 13 thickness between those points and those areas where 14 they are in close proximity, it is actually thicker 15 between the local points based on the internal 16 readings. 17 So, Mr. Tamburro, can you --JUDGE ABRAMSON: 18 Let's take a look at that. 19 20 WEBSTER: Can I just clarify one MR. 21 I think the record is quite clear that not all point? 22 of the points are ground. I mean, some of the points 23 are ground. 24 MR. POLASKI: There are some points that 25 were taken in the area of the upper elevations, **NEAL R. GROSS** COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. (202) 234-4433 WASHINGTON, D.C. 20005-3701 www.nealrgross.com

actually in areas where there was no corrosion, just 1 2 to get some readings on that. So those did not have 3 to be ground because the surface had never been corroded. 4 5 JUDGE ABRAMSON: But in the region that is 6 corroded, it had to be ground? No measurement was 7 taken where it wasn't ground? Is that correct? 8 MR. POLASKI: I am going to ask Mr. 9 McAllister, who is our level III NDE, to comment on 10 that. MR. MCALLISTER: I believe that 11 is 12 correct. The area was corroded to a point where you could not do the ultrasonic test without surface prep. 13 14 JUDGE ABRAMSON: Please, Mr. Tamburro? MR. TAMBURRO: The exhibit that Fred was 15 16 describing is AmerGen exhibit 44. And it provides an 17 accurate mapping of the four bays that had the worst corrosion. 18 The last page, bay 19, shows an example of 19 how the external points lie right next to known 20 So if I could walk through this 21 internal grids. 22 sketch here -- this exhibit? Excuse me. For example, external point 9, which is in the center but slightly 23 to the right, had a thickness in 2006 of 728 mls. 24 Slightly to the left of it, within about 25 NEAL R. GROSS COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W.

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1	six inches, is internal grid B, which has an average
2	thickness of 848 mls over a 6 by 6-inch area.
3	Slightly to the left of that again is external .10,
4	which in 2006 was measured at 736 mls.
5	And then practically overlaid on top of
6	that is grid 19C, which was measured from the inside.
7	And over a 6 by 6-inch area, that grid averaged 824
8	mls.
9	JUDGE ABRAMSON: Talk to us for a little
10	bit about averaging over a six by six area. How many
11	points were taken? And what was the reason to
12	average?
13	And then I want to ask Dr. Mehta about how
14	that fits with the structural model.
15	MR. TAMBURRO: The in measuring the six
16	by six-inch area from the inside because the inside is
17	smooth, we took 49 UT measurements on one incentives.
18	JUDGE ABRAMSON: Uniform seven by seven or
19	
20	MR. TAMBURRO: It's six
21	JUDGE ABRAMSON: Six by six, but you're on
22	the edges.
23	MR. TAMBURRO: We're on the edges. So
24	it's every inch we have the probe.
25	JUDGE ABRAMSON: Okay.
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474 1 MR. POLASKI: And the way that's done is 2 with a template that's match marked against locations 3 on there. So it's repeatedly always go back to the 4 same location. And the template keeps the probe as 5 closely as you can to the exact same locations every time. 6 7 JUDGE ABRAMSON: Okay. And I assume you 8 found variation over those 49 points. 9 MR. TAMBURRO: Yes, sir. 10 JUDGE ABRAMSON: Was it material? 11 MR. TAMBURRO: The variation is due to the 12 rough surface on the back, due to the corrosion. 13 Okay? We take those 49 points, and we take the 14 average of those 49 points and compare that to the local buckling criteria, 736 mls. Did I say local? 15 I apologize. General buckling criteria of 736 mls. 16 17 JUDGE ABRAMSON: Okay. Dr. Mehta, if I may, when GE does the analysis and builds finite 18 19 elements, the finite elements were three by three. Is that correct? 20 21 DR. MEHTA: Yes, Your Honor. JUDGE ABRAMSON: And am I correct in my 22 23 belief that when one does finite element analysis, one has to have a set of properties assigned to each 24 element? And, therefore, there would be a thickness 25 NEAL R. GROSS COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. (202) 234-4433 WASHINGTON, D.C. 20005-3701 www.nealrgross.com

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assigned to that element as a whole? So each three by
three element has a thickness assigned to it and other
physical properties, structural, et cetera?
DR. MEHTA: And each one when we did the
sensitivity analysis, other than the thickness, the
properties of the elements were the same.
JUDGE ABRAMSON: Okay. So for each
three-inch by three-inch element, it had uniform
properties?
DR. MEHTA: It had the uniform properties.
JUDGE ABRAMSON: Okay. Across that
three-inch by three-inch?
DR. MEHTA: Yes, sir.
JUDGE ABRAMSON: Now, if you were going to
do structural analysis, would there be any basis to
use anything other than the average properties for
that three-inch by three-inch element?
In other words, would one get more
representative results in a finite element analysis if
one used the thinnest measurement in that three by
three or the thickest? What would give you the most
representative buckling analysis?
DR. MEHTA: Well, Your Honor, when we use
shell analysis, there is a parameter called square
root of radius times thickness. It is a
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representative of how far any local events will travel.

And in this case, the radius of the shell in the spherical shell is 420-inch. And if you take a thickness of 0.736-inch, the square root of r/t works out to be about 18 inches. And so any small area of thickness difference which is less than, quite a bit less than, 18-inch would not actually affect. 8 There is a reason, a good reason, to use a uniform or averaging less than that area.

JUDGE ABRAMSON: See if I can put that in 11 12 terms that an appellate court might understand and 13 lawyers might understand. In doing the finite element analysis, if one has property variations over areas 14 that are smaller than this square root of the radius 15 over the thickness, property variations that are 16 smaller than that will not show up in the analysis 17 results, in the structural analysis results. 18 Is that 19 correct?

DR. MEHTA: That is correct, Your Honor, 20 in the sense that it would not materially affect the 21 results. 22

JUDGE ABRAMSON: Okay. Right. So the 23 buckling safety factor that one would compute would 24 not be materially altered if there were fluctuations 25

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•	1	in thickness of a smaller nature than over a distance
	2	smaller than, say, 18 inches in this case?
	3	DR. MEHTA: Yes, Your Honor. And this
	4	three-inch by three-inch, any variation, like in the
	5	averaging is done over that three-inch by three-inch,
	6	that should capture any uniform thickness.
	7	JUDGE ABRAMSON: And would it matter that
	8	they averaged them over a six by six, instead of three
	9.	by three, when we're talking about physical
	10	properties?
	11	So what they are saying to us is they took
	12	a six-inch by six-inch square, which is four elements,
	13	and they used the average properties for those four
	14	elements. Would that be expected to materially affect
	15	the safety factor computed from a buckling analysis?
	16	DR. MEHTA: Your Honor, since it is still
	17	like smaller, quite a bit smaller than the square root
	18	of r/t, the extensive 18-inch, you know, this is my
	19	judgment call that that shouldn't affect materially
	20	the buckling margin.
	21	JUDGE ABRAMSON: Okay. And is there any
	22	reason from a structural analysis point of view to
	23	represent one of those elements as something other
· .	24	than an average?
	25	In other words, I understand now that it
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.1	wouldn't show up in the results if there were these
2	kinds of fluctuations, but suppose that one argued
3	that one should represent the physical properties of
4	these elements as being thinner than the average for
5	some reason.
6	Would that be representative or would that
7	be unrepresentative? What would give you the more
8	accurate result?
9	DR. MEHTA: Well, if this average were a
10	three-inch by three-inch area, I think that could be
11	used in the analysis, Your Honor.
12	JUDGE ABRAMSON: And that would be more
13	representative of the expected safety factor than
14	using a smaller number? If the data showed smaller
15	numbers, it would be more representative, it would
16	give you a more accurate result, a better best
17	estimate result than using a thinner number?
18	DR. MEHTA: That is correct, Your Honor.
19	JUDGE ABRAMSON: There was something I was
20	going to follow up on. It's just gone. Sorry.
21	Sorry. I'll come back to this if I remember what it
22	was. I think I have exhausted my brain at the moment.
23	JUDGE BARATTA: Dr. Hausler, would you
24	like to comment on what you just heard? In other
25	words, I believe we have heard that the variations
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1	that are on a characteristic length of less than eight
2	inches probably would not influence the ability of the
3	shell to withstand buckling. Would you care to
4	comment on that?
5	DR. HAUSLER: Your Honor, I can't really
6	comment on that because that's a structural question.
7	JUDGE ABRAMSON: Okay. My brain has come
8	back into gear, and I've remembered, Dr. Mehta, once
9	more. Sorry.
10	Let's talk about buckling failure
11	generally for a moment. What we have done is you have
12	done finite element analysis. And I know we're on
13	available margin, but we need to understand how the
14	data translates into what we have got for buckling
15	analysis.
16	When one looks at the buckling failure,
17	what is the smallest characteristic length over which
18	something would have to be weakened, something like
19	this, which is 70 feet in diameter, for it to actually
20	be susceptible to buckling?
21	In other words, if you have thinning over
22	a one-foot circle on this 70-foot diameter vessel,
23	would that be the kind of thinning that might lead to
24 <sup>.</sup>	buckling?
25	DR. MEHTA: Your Honor, the parameter,
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1	like I mentioned earlier, square root of radius times
2	thickness, is about 17 inches. So I would think that
3	somewhere in the range of 15 to 20 inches, somewhere
4	there we would start seeing some impact.
5	JUDGE ABRAMSON: So you're telling me that
6	if I had a 70-foot diameter cylinder let's take a
7	cylinder, for example and I thinned an 18-inch
8	square on that cylinder, that that cylinder would
9	suddenly be susceptible to buckling or am I just off
10	the wall with this? It seems illogical to me. It
11	seems counterintuitive.
12	DR. MEHTA: Your Honor, the cylinder
13	diameter is one component. The thickness is another
14	component because square root of the radius times
15	thickness, that kind of like comes into play.
16	JUDGE ABRAMSON: Okay. So if I took a
17	70-foot-diameter cylinder with a one-inch thickness
18	and I thinned down 18 inches of it, height 18 inches
19	and along a circumference 18 inches, to a quarter of
20	an inch, would that make that cylinder likely to
: 21	buckle?
22	DR. MEHTA: The 70 feet diameter would
23	make it 35 feet radius, which would be about like 400
24	inches radius to 400 times
25	JUDGE ABRAMSON: No. That's all right.
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1	I mean, I understand that your number is going to tell
2	you that is the characteristic length, but it just
3	seems so counterintuitive to me that such a small
4	fraction of the periphery thinned would lead to a
5	buckling failure.
6	JUDGE BARATTA: What I thought you said is
7	that
8	JUDGE ABRAMSON: It's a different answer.
9	I don't want to muddle when the wavelength gets
10	important for interpreting how thick something is to
11	what can lead to buckling.
12	JUDGE BARATTA: Did you say that if you
13	have an imperfection and it's over an area that's less
14	than 18 inches, that it would not have a significant
<b>1</b> 5	influence on the buckling capability?
16	JUDGE ABRAMSON: He said it wouldn't
17	affect the safety, the computed safety factor.
18	DR. MEHTA: No. I think to put that, Your
19	Honor, in perspective would be, for example, when we
20	did the sensitivity study, we had this 3-foot area,
21	which is 36 inches,
22	JUDGE ABRAMSON: Okay.
23	DR. MEHTA: which when we reduced the
24	thickness by 100 mls, it only reduced the safety
25	factor by 3.5 percent.
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1	JUDGE ABRAMSON: Okay. So it took it
2	DR. MEHTA: And so that gives us
3	JUDGE ABRAMSON: three and a half
4	percent closer to buckling, but it still can handle
5	three times the load that it would take to buckle it?
6	DR. MEHTA: Right.
7	JUDGE ABRAMSON: Okay.
8	JUDGE BARATTA: Thank you because I didn't
9	think you were saying it would buckle.
10	JUDGE ABRAMSON: You just happened to
11	examine that area, and you found that this is the size
12	of an affected hat. Is that correct?
13	DR. MEHTA: Could you repeat that
14	question?
15	JUDGE ABRAMSON: You just happened to
16	examine that particular area because your client asked
17	you to look at that area, and you found it had this
18	small percentage reduction or this five percent
19	reduction?
20	DR. MEHTA: I recall having interaction
21	with the plant owner at that time. And we were asked,
22	where would you have put that area in terms of worse
23	impact on buckling margin? And that's where we
24	realized that when we looked at the buckling mode
25	shape, the areas that we have, where there is the
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1	buckling wave, has the maximum amplitude. That's
2	where we would like to put that area.
3	JUDGE ABRAMSON: I see. Okay.
4	DR. MEHTA: And so that's what we did,
5	Your Honor.
6	JUDGE ABRAMSON: By putting the buckling
7	wave, putting the area at the peak in the buckling
8	wave, which was at the midpoint between the
·. 9	downcomers, that made the worst case?
10	DR. MEHTA: And also in the middle of the
11	sand bag.
12	JUDGE ABRAMSON: Yes. Okay. Thank you.
13	I think that's all I have on that point for the
14	moment.
15	MR. POLONSKY: Your Honor, if I could?
16	Oh, go ahead.
17	JUDGE BARATTA: Go ahead.
18	MR. POLONSKY: If I could consult with my
19	witness? But I guess I'll do it transparently.
20	Mr. Tamburro, you had answered a question
21	about comparing the exterior single data points to
22	this tray. And I was wondering if you could also walk
23	through for the Board why it is that we cannot compare
24	that to the local buckling criteria and why we use it
25	just to compare to the ASME code.
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1	MR. TAMBURRO: I am not sure I understand	
2	your point.	
3	MR. POLONSKY: Okay. We had talked about	
4	a volumetric criteria. And that had caused some	
5	confusion on the record. I wanted to make sure that	
6	was very clear for the judges.	
7	JUDGE ABRAMSON: Let's make sure that I	
8	understand. When we are looking at the tray, we're	
9	looking at the local buckling criteria.	
10	MR. POLONSKY: That's correct. This is	
11	all about the local buckling criteria.	• •
12	JUDGE ABRAMSON: Okay.	·
13	MR. TAMBURRO: I would like to go to	
14	AmerGen exhibit 16, page 13. Again, this reflects a	
15	schematic only. And it provides a profile of the tray	
16	and what the data looks like.	
17	In order to understand margin with respect	
18	to this tray, the tray is a volumetric analysis. You	
19	have over this 36-inch by 36-inch area a significant	
20	amount of material that has been lost.	
21	For example, for the 536 criteria, you	
22	would have to lose approximately 125 cubic inches of	,
23	material to approach this tray, to get the dimensions	
24	of this tray.	
25	In order to understand margins in this	
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1	tray, we would have to have a volumetric understanding
2	of what material was there in respect to this tray.
3	We don't have that. We only have a few
4	points over a three-eighths of an inch area.
5.	Therefore, we cannot calculate a margin, which in this
6	case is a volumetric measurement.
7	A margin just simply can't be calculated
8	with respect to the tray. We only have a few points
. 9	that are thin. We don't have measurements of the
10	entire thickness over this 36 by 36-inch area. And
11	then can't compare that to the same area of the tray.
12	JUDGE ABRAMSON: So this comes back to the
13	question I was asking Dr. Mehta about what is the
14	proper way to represent that set of data in a
15	structural analysis, where one has three-inch by
16	three-inch elements.
17	So you've got 16 elements in the bottom of
18	your tray. And the question is, what are the physical
19	properties one should assign to those 16 elements?
20	The worst case would obviously be to take
21	the bottom-most point, which you indicate as I
22	don't know the left on your area 3, right?
23	MR. TAMBURRO: Yes.
24	JUDGE ABRAMSON: That would be the most
25	conservative computation. Assign that number to all
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1	of the elements in the bottom of the tray.
2	But to do that calculation, if one did
3	that calculation, one would still indicate that the
4	safety margin is greater than the safety margin
5	associated with the local buckling criteria because
6	you have removed less material than the local buckling
7	criteria seemed removed. Is that an accurate
8	statement?
.9	MR. TAMBURRO: That would be an overly
10	conservative calculation.
11	JUDGE ABRAMSON: Yes, an overly
.12	conservative representation of the data. But it would
13	still if I'm hearing everybody correctly indicate that
14	you were not approaching the local buckling criteria
15	safety margins.
16	MR. TAMBURRO: Yes, sir.
17	MR. POLASKI: That's correct.
.18	CHAIRMAN HAWKENS: Dr. Hausler, we have
19	not heard from you, and I don't want you to think we
20	are ignoring you. Do you have anything to add to
21	that, anything to contradict what AmerGen has said?
22	DR. HAUSLER: I am greatly puzzled by this
23	figure and by the question of calculating the volume.
24	I do fully understand that, of course, you are
25	calculating the volume. You know, that would
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1	correspond to this figure would be rather difficult.
2	However, AmerGen turns right around and
3	then groups various different points in specific areas
4	and calculates an average residual wall thickness from
5	that average.
6	Now, it would seem to me that if we do
7	that over a given area, we could very well calculate,
8	in fact, the volume that has been lost. So it seems
9	to me that there is a little bit of a discrepancy
10	here.
11	You know, we say, on one hand, you know,
12	we can't do it because we have to calculate the
13	volume. We cannot compare what we have to a
14	criterion. We cannot calculate the margin because we
15	cannot calculate the volume. On the other hand, we
16	turn right around and do it anyway.
17	JUDGE ABRAMSON: And I agree with you, Dr.
. 18	Hausler. There is no reason one couldn't take those
19	averages and calculate the volume. Let's pick this
20	theme up for a moment.
21	You have raised some questions about the
22	statistical significance of this data. What we have
23	been hearing is that one should use average physical
24	properties to represent these three-inch by three-inch
25	elements in order to get the most realistic estimate
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24 25	I'm thinking it would probably be all right to calculate an average and say that this average
23	according to, say, you know, Gaussian distribution,
22	them, well, if, in fact, those points are distributed
21	question, we have 49 points and what do we do with
20	Then to come a little bit closer to your
19	still have only assessed a small area.
18	mind, mean that we now have assessed a large area. We
17	lot of measurements doesn't really, at least to my
16	I mean, just the mere fact that we make a
15	a relatively small area.
14	though they are 49 points, they're still representing
13	have to keep that in mind that this, you know, even
12	you know, with respect to the rest of the bay. So we
11	other words, that's and those are very small areas,
10	points, Your Honor, refer to the internal grids. In
9	DR. HAUSLER: All right. The 49 data
8	Do you want to talk about that?
7	physical property, the thickness that one should use?
6	these 49 data points, and from them generate the
5	take these, let's say, 7 by 7, these 49, data points,
4	How would you think is the best way to
3	of what safety margin is remaining for buckling.
2	conservative. We're talking about the best estimate
1	of the buckling. We're not talking about
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represents this particular area.

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However, we are also saying that these 49 data points are not randomly distributed with a Gaussian distribution in the sense that the 49 data points have been samples where, say, the top 30 have been a lot cleaner than the bottom 19 or something like that. In other words, there was a definite trend in those 49 data points as you would move to lower elevations. I think AmerGen recognized that and, in fact, did split the 49 data points into 2 sets and then calculated the averages separately.

You know, looking at the six by six-inch, seven by seven-inch area, I don't think you can do very much more than just calculate an average. And, you know, compare that to a criterion. I think --JUDGE ABRAMSON: Mr. Webster, if you are going to ask him questions, let's ask them openly, If you are going to ask him to respond to please. something, don't just stick a paper under his nose. Everybody is trying to do this in the open. If you want to prompt him, let's prompt him and hear what he has to say.

DR. HAUSLER: Okay. I mean, you know, that's fine. You know, your question was, what do we do with the 49 data points, how do we interpret them?

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1	There are two ways I think, you know, to look at that.
2	First, yes, they could be, you know,
3	randomly distributed. And it could follow a Gaussian
4	distribution. That's one way to look at them.
5	Perhaps the data already do that.
6	There is another way to look at it. And
7	that is to ask the question, you know, what is, in
8	fact, the deepest penetration? That does not go to
9	the buckling criteria. That goes to the local
10	pressure criteria. You know, that's what we tried to
11	assess.
12	JUDGE ABRAMSON: Okay. And I can
13	appreciate that. Unfortunately or fortunately,
14	depending how you view it, the challenge we're looking
15	at here and the challenge that has been raised, as I
16	understand it, is whether or not this is approaching
17	buckling criteria.
18	I don't remember any challenge ever being
19	raised by citizens as to whether or not we are
20	approaching the pressure failure, the membrane
21	failure.
22	DR. HAUSLER: Absolutely did, sir.
23	JUDGE ABRAMSON: Okay. Well, then let's
24	
25	DR. HAUSLER: We'll need to come back to
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1	that if you don't mind.
2	JUDGE ABRAMSON: Okay. That's fine.
3	DR. HAUSLER: I would like to get to the
. 4	other presentation. It seems to me that if you look
5	at the complex situation where you have a large area,
6	where you have corrosion features and they are of
7	different depths, you may not want to look just in a
8	two-dimensional fashion but, in fact, in a more
9	complete fashion. What I'm aiming at is, of course,
10	the contour plots.
11	Now, let me make a general comment here.
12	We have done that, you know, for the purpose of trying
13	to visualize what the corrosion damage is in these
14	various areas.
15	We have been accused of having manipulated
16	the data for our own purposes. And I would really
17	seriously take umbrage to that kind of
18	characterization that we have done.
19	JUDGE ABRAMSON: And let's not dwell on
20	whether the contour plots are useful or not. Let's
21	talk about how you take the data points we have and
22	compare them to the local buckling criteria, which is
23	the one that I think is at issue.
24	What is the best way to compare those?
25	How should we be comparing those data points,
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1	overlaying them to try to understand whether or not
2	we're approaching local buckling
3	DR. HAUSLER: We have defined the areas
4	that are less than 736 mls thick. We have done that
5	by means of the contour plots. Perhaps I might want
6	to call the contour plots, you know, somewhat
7	different. They're really topographical maps of the
8	area that is remaining.
9	MR. WEBSTER: Can I suggest at this point
10	it might be useful for Dr. Hausler to put up one of
11	those contour plots on the screen? And then he can
12	perhaps talk about it more specifically. We do have
13	a color version, actually, which Ms. Lemense will help
14	Mr. Hausler with.
15	MR. POLONSKY: Richard, while we're going,
16	which page and exhibit should we be looking at?
17	MR. WEBSTER: It's exhibit 61, figure 1.
18	DR. HAUSLER: Basically what this tells
19	you is how we represent different penetrations that
20	occur on the surface and how they relate to each
21	other.
22	What the calculation behind this is, first
23	of all, it's called a triangulation. What it does is
24	it takes every point and calculates the average
25	between, you know, every other point in the vicinity
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1	of that one.
2	And then, you know, it uses these averages
3	in an algorithm to generate the lines of equal
4	remaining wall thickness or you could say in analogy
5	to the topographical map, you could say what it does
6	is it calculates the lines of equal height, of equal $\int_{1}^{1}$
7	elevation.
8	So basically what you are looking at is a
9	corroded surface and how the thickness of that
10	corroded surface, you know, varies from point to
11	point.
12	JUDGE ABRAMSON: This was done by
13	interpreting the data, right?
14	DR. HAUSLER: No, sir. This is done by
15	calculating the lines in this. It's essentially done
16	by calculating averages and then plotting.
17	JUDGE ABRAMSON: What you have done is you
18	have taken the data points that were measured, and you
19	have used some sort of an interpolation scheme to lay
20	out curves of equal you've basically done a
21	topographic map from a limited set of data, right?
22	DR. HAUSLER: Yes, that's correct.
23	JUDGE ABRAMSON: Okay. Now, I'm trying to
24	interpret this. You have vertical position on the
25	left. What is the thing on the right? Is that
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1	distance in degrees or distance in inches? What are
2	those numbers on the horizontal axis?
3	DR. HAUSLER: Oh. That's the horizontal
4	position. All of these points when they were measured
5	were characterized by coordinates. The coordinates
6	referred to a single point. I believe that single
7	point was located underneath the vent point or in
8	close incentive. It wasn't always clear where the
9	reference point was.
10	JUDGE ABRAMSON: Can we relate this figure
11	at all to a one-foot by one-foot square or a
12	three-foot by three-foot square? Is there any way to
13	relate this? I see some rectangles laid out on there.
14	I don't understand what their significance
15	is, but I'm trying to figure out how you take your
16	view of the data and look at it in the context of the
17	current licensing basis.
18	DR. HAUSLER: That's exactly what we've
19	done. The rectangles that you see there are, in fact,
20	the areas that Mr. Tamburro has defined and that
21	you know, where Mr. Tamburro has calculated various
22	and sundry averages. And these are also the points
23	that he has located in the trays in the figures that
24	we have seen previously. Now
25	JUDGE ABRAMSON: So okay. Help me. I
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1	see, what, four rectangles? Three rectangles? I
2	can't tell for sure.
3	DR. HAUSLER: There are actually three.
4	JUDGE ABRAMSON: Okay. So there is a
5	horizontal
6	DR. HAUSLER: There is a long horizontal
 7	one. There is a rectangle on the right, and there is
8	another one on the left.
9	JUDGE ABRAMSON: Okay. And when I look at
1,0	those three rectangles, are they supposed to be the
11	three-foot by three-foot squares that represent the
12	boundaries of a local criteria or not?
13	DR. HAUSLER: Those are rectangles that
14	Mr. Tamburro has defined in this figure 1-2.
15	JUDGE ABRAMSON: Let me ask Mr. Tamburro.
16	Were those rectangles on your original figure? Do
17	they represent the boundaries of a three by three?
18	MR. TAMBURRO: The rectangle to the right
19	of the figure, which is the largest rectangle, is the
20	tray, Your Honor.
21	JUDGE ABRAMSON: The entire tray?
22	MR. TAMBURRO: The entire tray.
23	JUDGE ABRAMSON: And the central area
2,4	would be one foot by one foot if we drew a
25	MR. TAMBURRO: Yes, sir. Yes, sir.
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1	JUDGE ABRAMSON: Okay.
2	MR. TAMBURRO: The other two rectangles
3	are basically this was taken from a figure that
4	just provided the general understanding of what some
5	of the regions were in that bay, Your Honor.
6	JUDGE ABRAMSON: So if we took a tray, if
7	the rectangle on the right represents a tray, then we
8	could move that around to indicate what a tray would
9	look like anywhere on that figure? Is that correct
10	the way this is laid out?
11	MR. POLONSKY: Is this to scale? I just
12	don't know. Richard?
13	DR. HAUSLER: Yes, it is to scale.
14	JUDGE ABRAMSON: Well, let's assume it
15	started from Mr. Tamburro's figure. But what I am
16	trying to get a handle on is we have got some data.
17	And I assume that the dots on your figure, Mr.
18	Hausler, are the data points.
19	DR. HAUSLER: Those are the data points.
20	They're identified by the number of the data point as
21	well as the depth.
22	JUDGE ABRAMSON: Okay. So those marks
23	indicate the actual data. So if I look at the
24	rectangle on the right, which Mr. Tamburro tells us
25	represents one tray, there are about maybe a dozen
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1	data points in that tray. Is that? I'm just
2	ballparking, eyeballing it.
3	DR. HAUSLER: That's correct.
4	JUDGE ABRAMSON: About a dozen data
5	points. And your contour plot would indicate that
6	little brown strip or red strip, whichever color you
7	call that, on the upper left quadrant of your right
8	rectangle, as being less than 700 mls and the stripes
9	being between 700 and 740 and the rest is larger. Is
.10	that correct?
11	DR. HAUSLER: That's correct.
12	JUDGE ABRAMSON: So that the actual
13	erosion in this tray, whether we look at it in your
14	contour plots or look at it in terms of the data
15	points, is quite localized. And if we had to
16	calculate the actual amount of erosion in that tray,
17	most of the erosion would take place in the striped
18	and heavy red areas, right?
19	DR. HAUSLER: That's correct.
20	JUDGE ABRAMSON: Okay.
21	DR. HAUSLER: The objective of presenting
22	this particular graph is in order to show where the
23	data points are and to compare Mr. Tamburro's work
24	with this type of
25	JUDGE ABRAMSON: And we appreciate that.
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1	And, as you know, we were interested in what
2	information we might gain from this, but in the end or
3	and in the end, we need to understand what this
4	information tells us about how much degradation there
5	is and whether that degradation approaches the local
6	buckling criteria. And although I don't see any
<sup>.</sup> 7	computation of it, it would surprise me if that
8	degradation pattern you have indicated there indicates
9	anything like the kind of erosion which is
10	characterized by the local buckling criteria. Is that
11	
12	MR. WEBSTER: Judge, can I perhaps just
13	remind the witness that there is an issue about the
14	size of area 3, that Mr. Tamburro had indicated that
15	area 3 was .696 inches in average thickness? But I
16	believe the witness has a different opinion about the
17	necessary size of area 3.
18	DR. HAUSLER: It appears to be a little
19	larger. The main point I think, Your Honor, that we
20	wanted to make with this is really referring to Mr.
21	Tamburro's calculations regarding the area 2, which is
22	the elongated rectangle, you know, covering part of
23	the red area.
24	We would have been of the opinion that
25	that rectangle ought to embrace all of the red and
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1	yellow area to calculate some sort of average or
2 .	whatever, rather than just half of it.
3	JUDGE ABRAMSON: Yes. And that might well
4	be an appropriate critique of that particular
5	calculation. But, as I understand it, that
6	calculation doesn't have anything to do with the
7	current licensing basis or a comparison of the current
8	licensing basis. Is that correct?
9	Let me ask the applicant. Is that large
10	rectangular grid the horizontal rectangle? I don't
11	know. I can't tell.
12	MR. TAMBURRO: Your Honor, that
13	rectangular grid, the elongated one with respect to
14	the
15	JUDGE ABRAMSON: The one with a greater
16	horizontal length and vertical length?
17	MR. TAMBURRO: Yes, sir. That was
18	originally on the original data sheets highlighted as
19	the bathtub ring. That figure, that box, was carried
20	over from the original data sheets to this data sheet,
21	which is not to scale.
22	JUDGE ABRAMSON: Does that have anything
23	to do with a comparison to the current licensing
24	basis,
25	MR. TAMBURRO: No, sir.
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1	JUDGE ABRAMSON: either one of them?
2	MR. TAMBURRO: No, sir. It's simply a
3	JUDGE ABRAMSON: Did you do any
4	calculations from that grid?
5	MR. TAMBURRO: Yes, sir. Based on the
6	available external data, which was biased thin, an
7	average of those external data in that bathtub grid,
8	as shown on figure 1-7 of AmerGen exhibit 16, that
9	area was approximately 751 mls.
10	MR. POLASKI: But just to
11	JUDGE ABRAMSON: And if I understand Dr.
12	Hausler correctly, he is suggesting that had you
13	shifted it over, you would have gotten a smaller
14	number. Is that correct, Dr. Hausler?
-15	DR. HAUSLER: I think so.
16	MR. POLASKI: Just to clarify, if I may,
17	the analysis that Mr. Tamburro did where he calculated
18	the average of the local points in that elongated
19	horizontal rectangle was only of the measurements
20	taken at those points and doesn't take into account
21	the actual thickness of any of the material in between
22	those points, which we know was thicker.
23	So it's a very conservative calculation
24	that's done that doesn't really check margin to a
25	current licensing basis.
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1	JUDGE ABRAMSON: Well, but to repeat or to
2	clarify, was there any comparison made between those
3	numbers and the current licensing basis, either the
4	local area or the general area?
5	MR. TAMBURRO: With respect to the
6	general, yes. The average of that, the average of
7	that elongated box using the biased thin areas was 751
8	mls.
9	JUDGE ABRAMSON: Okay. Now, you're saying
10	that's compared to the general, but am I incorrect in
11	saying that the general buckling criteria assumed .736
12	for the entire dry well liner or was it only for the
13	bathtub ring?
14	MR. TAMBURRO: For the entire dry well
15	liner.
16	JUDGE ABRAMSON: Okay. So what is the
17	significance of comparing that over the bathtub ring?
18	MR. TAMBURRO: It meets the criteria for
19	uniform if it's the uniform.
20	JUDGE ABRAMSON: If it were .751, it would
21	be fine compared to the uniform, uniformly degraded
22	calculation, but you haven't looked at this isn't
23	the uniformly degraded calculation situation. This is
24	you're saying we've got erosion around, corrosion
25	around this bathtub ring. And I guess the conclusion
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1	you are suggesting is that that area itself is fine.
2	MR. TAMBURRO: Yes.
3	JUDGE ABRAMSON: Even if the whole thing
• 4	were degraded to that, we would be all right. This is
5	a local degradation problem, not a general degradation
6	problem.
7	MR. TAMBURRO: We know we have much
8	thicker material between the external points. So that
9	area is probably much thicker.
10	JUDGE ABRAMSON: I don't understand. What
11	Dr. Hausler is suggesting is that perhaps as you
12	looked at the data a little differently, you might
13	have gotten a smaller number than .751 and might not
14	have been able to make the point that even the bathtub
·15	ring area is okay compared to the general buckling
16	criteria.
17	But I ask you, so what? The general
18	buckling criteria is if the whole shell is degraded to
19	.736. What does it matter if there is a part that is
20	degraded less than that or not only in comparisons to
21	the local buckling criteria?
22	Am I correct, staff? Have I got this
23	right? Somebody speak from the staff.
24	MR. ASHAR: Hansraj Ashar. Yes, that is
25	correct, sir.
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1	(Laughter.)
2	JUDGE ABRAMSON: Thank you. It's good to
3	know I've got it right.
4	MR. WEBSTER: Judge, if I can ask my
5	witness? The issue is if this area 3 is indeed larger
6	than nine square feet and is on average less than .736
7	inches, which is what the record shows Mr. Tamburro's
8	assessment shows, that seems to go beyond the size of
9	the tray.
10	So I would ask my witness whether he is
11	confident that that area can be bounded by the tray.
12	JUDGE ABRAMSON: But that not's relevant
13	to us. What's at issue here is, is there a
14	degradation pattern anywhere on this thing that
15	exceeds the current licensing basis? And the current
16	licensing basis is expressly and only comparable to
17	that tray pattern. So let's talk about that tray
18	pattern.
19	MR. WEBSTER: That's exactly what I am
20	asking my witness to talk about, Judge. I'm asking my
21	witness to say whether that area, area 3, goes beyond
22	the degradation that Mr. Tamburro has calculated and
23	that area 3 goes beyond the boundaries of the tray.
24	JUDGE ABRAMSON: I'm lost, but perhaps
25	your witness can explain it to me.
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Well, the area that we're DR. HAUSLER: 2 talking about is, at least according to this graph, 36-inch by 44 or maybe 36 by 42, which is more than 9 square feet. And the average thickness is less than 700, which according to again the current licensing basis local wall thickness buckling criteria would not fit that criteria.

8 JUDGE ABRAMSON: Dr. Hausler, help me understand this. 9 We have said no less than a dozen 10 times now that the local buckling criteria is based on 11 a calculation. And it's based on a calculation that 12 assumes that the central area that's eroded is one 13 foot by one foot and that the peripheral area tapers 14 gradually up to .736 over the next one-foot linear 15 So that adds up to nine square feet. dimension.

But that should not be confused with any geometric nine square feet, only the square nine square feet. So if you want to compare this to the local buckling criteria, you have to stick to what the licensing analysis did.

You can't take nine square feet that's 21 one-foot vertical and nine feet wide. You have to 22 compare it to what the analysis looked at. 23

24 DR. HAUSLER: Well, yes, Judge, you are 25 absolutely correct. And I will not, you know, even

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1	try to dispute that. But the question as to what
2	other geometric forms of corrosion do with respect to
3	the buckling criteria has not been resolved.
4	JUDGE ABRAMSON: I understand that's a
5	question you would like to raise, but that is a
6	question directed at the current licensing basis and
7	is not proper topic for this proceeding. That can be
8	taken up with the staff in a challenge to the current
9	licensing basis, but it cannot be challenged here.
10	MR. WEBSTER: Judge, can I just interject
11	here a little bit? I think the confusion here is that
12	the current licensing basis has a tray which is nine
13	square feet in area that is less than .736 inches.
14	JUDGE ABRAMSON: Square tray?
15	MR. WEBSTER: It's a square tray. The
16	thing is, there are square areas on this dry well,
17	which are bigger than 36 by 36, which are still
18	thinner than .736 inches.
19	So one interpretation of the CLB is that
20	it limits. Even if you take the AmerGen's view of the
21	CLB, one interpretation of the CLB is that the CLB
22	limits the area in any one bay that can be thinner
23	than .736, the contiguous area, to less than 9 square
24	feet, the square feet.
25	JUDGE ABRAMSON: That is simply not the
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1.	case. There is an entire analysis that makes up the
2	current licensing basis. And that analysis is based
3	on the assumption that there is an erosion of one
4	square foot tapering up over the next foot so that you
5	have a three-foot by three-foot degraded area. And
6	that is the assumption that is in the current
7	licensing basis. And that is what has been analyzed.
8	And if you have an interpretation of the
9	data that indicates that there is some region of the
10	dry well shell that is degraded in a manner that
11	approaches that tray, then let's hear it.
12	But don't talk to us about things that are
.13	not relevant in comparison to what is the current
14	licensing basis. If you want to challenge the current
15	licensing basis, do it in that context, not here.
16	MR. WEBSTER: Judge, we do not intend to
17	challenge the current licensing basis. We had
18	understood from Dr. Mehta that it was a real
19	engineering judgment of the applicant to translate his
20	analysis into these squares.
21	Now, what we have ended up with is a
22	situation where the assumption of the model is
23	blinding us to. The reality is that we don't have
24	square areas of corrosion.
25	It's not surprising. These areas of
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1 corrosion are not square. They're not tray-shaped. 2 That's not surprising. So the question is, given the 3 square tray shape in the CLB, how do we compare the 4 square tray shapes with the reality? 5 It's Citizens' legal contention or legal 6 assertion that, in fact, the CLB creates a boundary, 7 the reason they took those trays is to bound the 8 corrosion, and that if the corrosion goes beyond the 9 boundaries of those tray shapes; i.e., for instance, 10 if there was an area that was, say, 4 feet by 2 feet 11 that was thinner than .736, that would go beyond the 12 spatial envelope of the tray. Because it goes beyond the spatial envelope of the tray, it is our legal 13 14assertion it, therefore, goes beyond the CLB. 15 JUDGE ABRAMSON: Well, you are certainly 16 free to make that argument in your proposed findings, sir. 17 MR. WEBSTER: Well, in order to do that --18 ,19 CHAIRMAN HAWKENS: May Ι interrupt, 20 please? I would like to hear AmerGen's response to 21 that, please. MR. POLASKI: Mr. Tamburro will respond to 22 that. 23 We disagree. 24 MR. TAMBURRO: 25 CHAIRMAN HAWKENS: That's the short NEAL R. GROSS COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. (202) 234-4433 WASHINGTON, D.C. 20005-3701 www.nealrgross.com

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1	answer.
2	(Laughter.)
· 3	CHAIRMAN HAWKENS: Can I hear the long
4	answer?
5	JUDGE ABRAMSON: Let's ask the staff. The
6	staff establishes the licensing basis. Is there
7	somebody in this? Counsel for the staff, do you want
8	to talk about the legal meaning of the current
9	licensing basis and whether or not these geometries
10	are flexible from the point of view of the licensing
11	basis and what the significance was of talking about
12	this degradation?
13	Certainly I understand that and I think
14	Judge Baratta understands it from a structural
15	engineering point of view.
16	MS. BATY: Your Honors, the staff doesn't
17	set the current licensing basis because there are
18	licensee-controlled documents that make up part of the
19	current licensing basis.
20	And I would direct you to the definition
21	in 54.3 that says it includes licensee-controlled
22	documents, such as the FSAR. It also includes
23	licensee commitments that are not set by the NRC.
24	CHAIRMAN HAWKENS: It may be this
25	discussion is beyond the scope of the issues this
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1	Board has to consider, but I am, nevertheless,
2	interested in some response if AmerGen has it
3	sounds like the staff says AmerGen has established the
4	CLB.
5	I understand the geometry of that limiting
6	buckling area. And if we have a geometric figure that
7	is inconsistent with this three-foot by three-foot
8	limited buckling criteria similar to what their
9	asserting exists here, what is your view about that?
10	MR. POLASKI: Your Honor, we can explain
11	I think the discrepancy and try to so you'll
12	understand what happens.
13	Mr. Tamburro?
14	MR. TAMBURRO: First of all, we evaluated
15	all 106 external data points in 2006. Every single
16	one of those points was looked at. And it met one of
17	the three criteria. There was no exclusion from the
18	criteria.
19	As I understand it, they have looked at
20	figure 1-2 of our exhibit, AmerGen exhibit 16, and
21	have looked at the scale and said, "Oh, this box has
22	been drawn wrong. It's really 44 by 36 inches large."
23	That may be true, but that was not the intent of
24	figure 1-2.
25	Figure 1-3 accurately applies the tray in
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1	a 36 by 36-inch area and accurately plots the data
2	points of developments. And that is the application
3	of the tray criteria in figure 1-3.
4	JUDGE ABRAMSON: Let me see if I can try
5	to find some crossover area here. I think we all know
6	that the corrosion wasn't so nice and neat to look
7	like a tray.
8	And nobody doubts that there are lots of
9	ways to look at this. And it would have been nice to
10	do analysis, structural analysis, of the as-degraded
11	shell, but we don't have that. What we have is a
12	current licensing basis that was established years ago
13	on the basis of some analyses.
14	None of those analyses, as I understand
15	it, looked at a bathtub ring degradation. Is that
16	correct?
17	MR. TAMBURRO: That's correct.
18	MR. POLASKI: That's correct, yes.
19	JUDGE ABRAMSON: So we don't have analysis
20	of how much bathtub ring degradation this shell can
21	take before it approaches buckling. Is that accurate?
22	Dr. Mehta, is that accurate? You didn't do anything
23	like that, right? Dr. Mehta? The record will reflect
24	Dr. Mehta is indicating no.
25	The applicant chose to characterize its
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1	investigation by looking at this degradation as a
2	tray; is that correct, rather than as a bathtub ring?
3	MR. POLASKI: That's correct.
4	JUDGE ABRAMSON: And the staff has
5	accepted that as the current licensing basis. Is that
6	correct? I think that we have heard from Dr. Hartzman
7	before.
8	DR. HARTZMAN: Yes.
9	JUDGE ABRAMSON: Yes, that is correct.
10	Dr. Hartzman has agreed. Who didn't hear this? Dr.
11	Hartzman, stand up and tell us whether the staff has
12	agreed that that is a current licensing basis or not.
13	I think we have heard it several times, but let's hear
14	it_again.
15	DR. HARTZMAN: This is Dr. Hartzman. Yes.
16	JUDGE ABRAMSON: Thank you, Dr. Hartzman.
17	So what Citizens is suggesting is that we
18	have missed something, the staff and the applicant
19	haven't looked at the real life situation. And the
20	question is what to do about it. Let me ask the
21	lawyers now what to do about this.
22	We have a current licensing basis, as I
23	understand it, that looks at two possibilities. One,
24	it's uniformly degraded. Two, it's degraded uniformly
25	plus an eroded tray, three-foot by three-foot tray.
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1	What is the proper place, mechanism to
2	propose or suggest that there is a worse scenario that
3	nobody has looked at? Is it here? Staff?
4	MS. YOUNG: I believe Judge Abramson is
5	referring to the 2206 process if there is a contention
• 6	by Citizens that the degradation of the shell
7	currently does meet and within acceptance criteria for
8	local wall fitting. Then the process is to ask for an
9	order that would challenge the current operation of
10	the facility. It's not something done in the context
11	of license renewal.
12	JUDGE ABRAMSON: Now, what Mr. Webster is
13	saying is they are not challenging the current
14	licensing basis. What they would like to have this
15	forum somehow do is to say, "We've got a current
16	licensing" go ahead, Mr. Webster.
17	MR. WEBSTER: Well, you are characterizing
18	what I am contending. So perhaps I will put it in my
19	own words, which is that this panel has to decide
20	whether this plant will meet the CLB during any
21	extended period of operation.
22	Our contention is not that this plant is
23	currently beyond the CLB, although it may be. That's
24	something we recognize we can't actually contend in
25	this proceeding.
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513 So, therefore, we are contending on day 1 *,*2 one of relicensing the plant will be beyond the CLB 3 because the CLB requires the corroded areas to be contained by the spatial envelope of the trays. 4 5 if the corrosion on day one And of 6 relicensing goes beyond the spatial envelope of the 7 tray, then this Board cannot grant relicensing to this 8 plant. 9 MR. POLONSKY: This is Mr. Polonsky. Ι think we are into an academic question because I think 10 if our panel could be allowed to attack each of these, 11 12 we would be able to demonstrate that there are no current areas that are greater than 36 inches by 36 13 inches that are less than 736. 14 15 The way that Mr. Tamburro has analyzed the data in his various calculations has been extremely 16 17 overly conservative. He has assumed in some cases 18 only the thinnest points were present and ignored the thicker points and has also assumed at times that the 19 remainder of the shell outside of that is at 736. 20 21 Ι mean, those are all so overly And we have data, real hard data, that 22 conservative. 23 we know the areas between those points are thicker. than that. 24 25 JUDGE ABRAMSON: This may be actually a NEAL R. GROSS COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W.

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1	very nice way to address what might otherwise become
2	a very murky legal issue. And so let's tackle it.
3	Mr. Tamburro, would you kindly address the
4	maximum extent of an area that could be degraded to
5	below .736 by .736 on a 3-foot by 3-foot grid? Are
6	there any areas greater than three-foot by three-foot
7	that could be degraded to less than .736?
8	MR. POLONSKY: And I would ask Mr.
9	Tamburro as he walks through just to identify the
10	various conservatisms that he has used in the
11	analysis, I mean, including, as we already discussed,
12	the starting assumption is we're using some
13	calculation-specific criterion, which is a 636
14	criterion as well.
15	MR. TAMBURRO: I am not sure what it is
16	all the questions are.
17	JUDGE ABRAMSON: Let's make it as simple
18	as we can. Look at the data. Show us whether there
19	are any areas that are greater than three-foot by
20	three-foot where things are degraded to less than
21	.736, which I think is the contention that Citizens
22	are making. Is that correct, Mr. Webster?
23	MR. WEBSTER: We could have Dr. Hausler
24	make that showing if you'd like to.
25	JUDGE ABRAMSON: I would rather have the
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1	applicant address it. And then we'll have Dr. Hausler
2	address it.
3	MR. TAMBURRO: If we could go to exhibit,
4	AmerGen exhibit, 16, page 29? This provides a scale
5	drawing of all of the external points in bay one.
6	There are four major areas that were
7	evaluated in this sketch. First of all, all the
8	triangles are external points that were greater than
9	736 mils. So the triangles meet our acceptance
10	criteria.
11	Now we have three boxes. The first box,
12	which I'm going to talk to, is the tray, which is in
13	the center of this figure. That tray was not drawn to
14	scale on this figure. It was simply overlaid using a
15	PowerPoint box.
16	However, if you go to figure 1-3, 1-4, and
17	1-5, as shown on this, that tray is evaluated. Those
18	points were outside the tray. And all those points
19	met the criteria, as demonstrated on page on figure
20	1-4 and 1-5.
21	JUDGE ABRAMSON: So if I understand
22	correctly, you moved the tray around
23	MR. TAMBURRO: Yes, sir.
24	JUDGE ABRAMSON: under the points?
25	MR. TAMBURRO: Yes, sir.
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· 1	JUDGE ABRAMSON: And you found that under
2	no circumstances did the points get below the outline
3	of the tray?
4	MR. TAMBURRO: Yes, sir. There are two
5	other boxes on that original figure 1.2.
6	MS. BATY: Your Honor, for clarity of the
7	record, it looks like it's dash, instead of dot.
- 8	MR. TAMBURRO: I'm sorry. I meant dash.
9	MS. BATY: So that we're clear which
10	documents we are looking at.
11	MR. TAMBURRO: I'm sorry. So the second
12	major box, which there is a note that says, "These
13	readings are evaluated in figure 1-6." If you go to
14	figure 1-6, which is page 33 of the calculation, those
15	are evaluated and found within the contours of that
16	box to be greater than 736. Though I'm not applying
17	the tray in this point, I'm applying the uniform
18	criteria.
19	Finally, the bathtub ring, which is on the
20	figure 1-2, I simply average all the points in the
21	bathtub ring and come up with an average of these
22	external points, which are biased thin. And the
23	results are provided on figure 1-7 as boxes B and E.
24	Again, those areas when you take the
25	external points, which are biased thin, their average
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. 1	is 751 and 765, which, again, are exceed the
2	uniform criteria.
3	Walking through this, we have analyzed all
4	of the external points in this bay.
5	MR. POLONSKY: Before we go too far with
6	the Board, this is Mr. Polonsky. I believe the 24
7	calc walks through each bay doing the same thing. And
8	we could for the Board walk through each bay and how
9	each point, Mr. Tamburro analyzed each point. I just
10	wanted to give you an example of how it was done.
11	JUDGE ABRAMSON: Can we go back to the
12	prior figure, the one that showed the three
13	overlapping boxes?
.14	MR. WEBSTER: Judge, may I suggest that,
15	instead of letting Mr. Tamburro do each bay, if you
16	could let us do the bays in which we allege there are
17	larger areas? And then Mr. Tamburro could rebut.
18	JUDGE ABRAMSON: Let me just ask this. If
19	you shift the bathtub ring over to pick up these three
20	squares, what happens? Will your number come out to
21	less than .751? That's what I think is at issue.
22	There's a big blanket area here. There
23	are three data points right there that look like
24	they're low.
25	MR. TAMBURRO: I haven't done that
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calculation. I don't know. It could. But the tray evaluates those three points.

3 JUDGE ABRAMSON: The tray evaluates those points, but what I think we're hearing here is an 4 5 allegation that the three-foot by three-foot tray is 6 not the only piece of the current licensing basis that if the corroded area is a shape that's, say, one-foot 7 by nine-foot, that is outside the three-foot by 8 three-foot tray and, therefore, is not within the 9 current licensing basis. And that I think is a legal 10 question, a very difficult legal question, which I was 11 12 hoping maybe we could avoid dealing with if we can look at the data and find another way to analyze it. 13 14 Have I picked up what it is you are If we take those other three 15 concerned about here? points and average the thin points, we're going to get 16 a number less than .736 here. 17 MR. TAMBURRO: That's exactly right. 18 19 MR. WEBSTER: There are two things.

That's one thing, but the other thing is that the boundaries of that tray are not well-defined. There are no data points that tell you where the edges of the tray should be. You could make the tray a foot bigger on each side.

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JUDGE ABRAMSON: What we are all missing

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519 1 here is this. The limiting analysis assumed that the 2 three-foot by three-foot tray was at the peak in the buckling wave, which meant it had to be at 3 the 4 midplane. 5 So if we really wanted to know how much 6 thinning you could take in these locations, you might 7 have a very different result. We don't have analysis of that. 8 9 MR. WEBSTER: But I suggest you will 10 recall in each bay there is actually a three-foot by 11 one and a half-foot contiguous area --12 JUDGE ABRAMSON: No. That's --13 WEBSTER: -- at the peak of MR. the 14 buckling. we look at the edges here, that As 15 represents what the assumption was, which was it 16 wasn't a contiguous area in the bay of nine square 17 feet. It was --JUDGE ABRAMSON: It's a nine square foot 18 19 square located midway between the downcomers. That's 20 the peak in the buckling wave. And that's the 21 location where this criteria was developed. And this 22 degree of thinning for that location leads to a 23 reduction in safety factor of -- Dr. Mehta, what were the numbers? Five percent? Seven percent? 24 Three 25 percent? Reducing it from .736 to .636 in the middle, NEAL R. GROSS COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W.

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1	middle square, gave a reduction of?
2	DR. MEHTA: 3.5 percent reduction in the
3	margin.
4	JUDGE ABRAMSON: And if you went to .536
5	mls, it was a reduction from?
6	DR. MEHTA: Approximately I think nine
7	percent.
8	JUDGE ABRAMSON: Nine percent. So we're
9	at 1.9, instead of 2.0, as a safety factor. And
10	that's at the midplane in the maximum in the buckling
11	wave. What happens if you move it away from the
12	midplane? Would they have a greater or lesser effect?
13	DR. MEHTA: They would have a lesser
.14	effect, Your Honor.
15	JUDGE ABRAMSON: And if we change the
16	shape of that, what would happen? If we made it a
17	long, horizontal rectangle, instead of a square, can
18	you guess what that would do to the effect on the
19.	buckling?
20	DR. MEHTA: From the analysis, if I
21	recall, the buckling wave in the sand bed region was
22	of the type of you take the sand bed height, there was
23	a wave, a buckling wave in there. So if you make it
24	rectangular, the effect maybe on the safety factor
25	would be somewhat smaller than what we have.
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1	JUDGE ABRAMSON: If you made it a less
2	vertical dimension and greater horizontal dimension,
3	it would have a smaller effect on
4	DR. MEHTA: Smaller effect on the safety
5	factor. That's my judgment call, Your Honor.
6	JUDGE ABRAMSON: But you're the only
7	expert we have here on this stuff, though. Thank you.
8	MS. YOUNG: Judge Abramson, I believe the
9	staff also has testimony on this point that was
10	JUDGE ABRAMSON: Okay. Who do we have
11	from the staff who can speak to these?
12	MS. YOUNG: Dr. Hartzman.
13	JUDGE ABRAMSON: Dr. Hartzman again. Dr.
14	Hartzman?
15	DR. HARTZMAN: Yes, sir.
16	JUDGE ABRAMSON: First of all, do you
17	agree with the three percent and nine percent
18	reductions in margin that would occur if you make
19	these rectangular tray-shaped reductions?
20	DR. HARTZMAN: I do.
21	JUDGE ABRAMSON: Okay. And what is your
22	professional opinion about what would happen if this
23	were, instead of a square, a rectangle with a shorter
24	vertical axis than a horizontal axis? What would that
25	do to the degree of reduction in
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1	DR. HARTZMAN: The factor of safety would
2	be much higher.
3	JUDGE ABRAMSON: It would have a smaller
4	effect on reduction?
5	DR. HARTZMAN: It would have a smaller
6	effect.
7	JUDGE ABRAMSON: And if we moved them off
8	the midplane, what would it do?
· 9	DR. HARTZMAN: It would have an even
10	smaller effect.
11	JUDGE ABRAMSON: Okay. Thank you. That's
12	where I would go with that.
13	Now, do you want to talk about what is
14	it you would like to add here?
15	MR. WEBSTER: Well, I think Dr. Hausler
16	can talk about why the area is actually bigger than 36
17	by 36.
18	DR. HAUSLER: I think after having
19	discussed the numbers to death, maybe we need to
20	discuss the non-numbers. What I mean by that is that
21	we are looking here at an area that has actually been
22	measured by UT measurement, but this is only a small
23	part of the total area of each bay.
24	So, in other words, you know, as we have,
25	say, in bay one an area in the contour plot which is,
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1.	you know, to derive we have seen it earlier. To
2	the left we have seen it earlier. You know, it is
3	there, but we don't know how far it extends. We don't
4	know how far it extends to the bottom and how far it
5	extends to the top.
6	And we do have, you know, other bays that
7	we have looked at in a similar manner. And there is
8	in my opinion, in my humble opinion, you know, great
9	uncertainty as to what the entire bay really looks
10	like.
11	In other words, do you think that we can
12	take the data that we have that we're looking at here
13	and can we say that this is actually representative of
14	the rest of the bay?
15.	You know, we do note that the bathtub ring
16	is not necessarily confined to the area that has been
17	monitored but might very well be extending both to the
18	left and to the right.
19	So I think we have to take into
20	consideration that there is an considerable
21	uncertainty. And one of the objectives, really, of
22	the contours was not necessarily to start an argument
23	about CLB or start an argument about Tamburro, "Mr.
24	Tamburro, did we do it wrong or did we do it right?"
25	You know, that isn't the point.
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1	The point is that there are things that we
2	currently do not know but that we do have, you know,
3	from the point of view of risk take into consider.
4	So one of the things that we have done is
5	that when you develop the contour plots, the program
6	does, in fact, develop equations, you know, behind the
7	scenes, so to speak, that are applied throughout the
8	contours within the monitored areas. But you can use
9	those equations to extend them to a certain extent.
10	MR. WEBSTER: Could I suggest at this
11	point it might be useful to look at those plots fixed
12	into the plots, Dr. Hausler?
13	DR. HAUSLER: Yes. I was just going to
14	suggest that.
15	MR. WEBSTER: Okay.
16	DR. HAUSLER: So if we go, for instance,
17	you know, from the one figure that we have seen in
18	exhibit C you know, I think it was attachment
19	what was it, attachment 1
20	MR. WEBSTER: Yes.
21	DR. HAUSLER: you know, to figure 2?
22	CHAIRMAN HAWKENS: Let's get it up on the
23	screen, Dr. Hausler. Then you can use it as you
24	MR. WEBSTER: Yes. This is just for
25	clarification. This is attachment 1 to exhibit C-1,
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1	which is the same as exhibit 61, figure 2.
2	MR. POLONSKY: Your Honor, are we going to
3	be taking a break shortly? We have had a request
4	among some people for a break.
5	CHAIRMAN HAWKENS: Dr. Hausler, with your
6	indulgence, a break has been requested. So why don't
7	you hold that thought? We'll return at 4:25.
8	DR. HAUSLER: You have absolutely no idea
9	how grateful I am.
10	(Laughter.)
11	CHAIRMAN HAWKENS: We're in recess.
12	(Whereupon, the foregoing matter went off
13	the record at 4:19 p.m. and went back on
14	the record at 4:29 p.m.)
15	CHAIRMAN HAWKENS: Okay. Counselor, I
16	believe you were getting ready to take the floor.
17	DR. HAUSLER: If we could have the slide,
18	maybe. I think we're ready to show Slide 2, maybe
19	Figure 1. Can we go to Figure 1, again? Let's see.
ż0	Can you go to the previous one? That's just to recall
21	where we are. That is, in fact, the topographical map
22	of the surface area with the boundaries that have been
23	explored by UT measurements. As I indicated just
24	before the break, the triangulation generates some
25	equations that can be used to predict what may be
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1	outside these boundaries, at least to a certain
2	extent, when you get a gully of three, four feet,
: 3	because that probably wouldn't make much sense. But
4	if we go out to the next slide, you can see that we
5	have actually gone down from plus 40 to minus 50
6	inches on the horizontal scale, and filled up in the
7	vertical direction from the bottom of the sand bed to,
8	essentially, the top, just below the vent line.
9	What you see here is now that the
10	equations, or the correlations would predict that, in
11	fact, the area below 750 mil extends over a much
12	larger area than what we had seen before in the
13	previous slide. So what that basically says is that
14	if we were willing to give some crédence to the
15	prediction, then perhaps the data tell us that the
16	corrosion might be a great deal more extensive than
17	what has been explored by the UT measurements on
18	record.
19	The next slide shows a very similar
20	situation. Here you can see that what has been
21	explored is not really a rectangle, but sort of a
22	trapezoid-type shape where the most severe corrosion
23	is
24	MR. POLONSKY: I'm sorry. What bay are we
25	looking at? Did we just switch from Bay One to
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1	something else?
2	DR.HAUSLER: Yes. Let's see. What bay is
3	that?
4	MR. WEBSTER: I think this is Bay 13.
5	DR. HAUSLER: That's Bay 13, yes. Okay.
6	So now we are we have two seriously corroded areas,
7	but really you can't quite say that this is well,
8	it is actually a bathtub ring, but it's a funny shape.
9	It's sort of like, I don't know, a bone or something
10	like that, extending from the upper right-hand corner
11	to a large area on the left-hand side. But, again,
12	here you might ask the question, well, what is
13	actually above .7, the red area on the right-hand
14	side, the top right-hand side. What is above that?
15	I'm sorry, the left-hand side, .7 with 612 mil
16	residual wall thickness, what's above there? Because
17	the fact that we do have serious corrosion might just
18	maybe suggest that that corrosion extends further to
19	the top. And so, again, we've used some predictive
20	equation, as you can see on the next slide. And,
21	again, now what comes out here is fairly extensive
22	area on the upper left-hand corner, which is less than
23	620 mils residual wall thickness.
24	Again, if you are willing to give some
25	credence to this procedure, which is not an arbitrary
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procedure, but in fact a procedure developed by one of the foremost statistical companies in the country, well then, perhaps, we might have a suggestion that the corrosion is actually more severe than have been willing to believe based on just the data that we have interpreted.

I think that is an important point, because it goes to how well do we know the extent of corrosion; and, hence, how well do we know whether the -- your dry well shell will still, in fact, meet the acceptance criteria.

MR. WEBSTER: Judge, before you put it off, could I just ask Dr. Hausler to do a little bit of work on dimensions there, just to put some dimensions around things?

16 DR. HAUSLER: Yes. Actually, I have done 17 that, and there are, as you can see, two rectangles. 18 In the graph they go around the areas that are less than 700, or less than -- actually, more like less 19 20 than 750 mils residual wall thickness. And these are 21 fairly large areas. One of them is definitely a 30 by 22 36 inch area, and the other one is equally large, but 23 more elongated. It goes from 80 to roughly 15, 80 inch times 15 inches. So if you take it all together, 24 25 it's really a very large area.

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MR. WEBSTER: Could I just clarify that Dr. Hausler just did say, if you try to incorporate the model tray on this plot, would the -- whether the corrosion would go beyond that, the spatial envelopes of that model tray?

MS. YOUNG: Judge Hawkens, staff is going 6 7 to object to this constant sequence of questions from 8 Counsel for Citizens to Dr. Hausler. We thought this 9 was a time for the Board to ask questions, and I could understand the need maybe to clarify one point, but 10 when it becomes two or three points, we have a concern 11 in terms of why we're here for this hearing, which is 12 13 for the Board to ask us questions. In addition, in looking at Dr. Hausler's exhibit or Citizen's exhibit, 14 · 15 we just would like to note for the record that the Board and parties need to be mindful that the colors 16 17 in the contours, even if assumed to be accurate, and 18 you know our position on that, to constantly change 19 depending on the thickness depicted in the contour. 20 For example, on this chart, which is Figure 4, a 21 thickness less than 625 is in red, where on other charts thickness less than 740 was in red. 22

23 CHAIRMAN HAWKENS: Thank you. Your 24 objection is noted for the record. It's overruled in 25 this particular case. But, Mr. Webster, again, please

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1	recall that it is the Board that should be conducting
2	the questioning. Go ahead, Dr. Hausler.
3	DR. HAUSLER: I really am very sorry if
4	the NRC legal staff takes issue with the variation of
5	the colors in these various graphs. The meaning of
6	the color is very well indicated in the keys below the
7	graphs. It is rather difficult, actually, to generate
8	these graphs and maintain a unified color scheme.
9	It's almost impossible to do that, but I don't think
10'	it really takes away from the interpretation of that.
11	JUDGE BARATTA: I think, Dr. Hausler, I
12	agree. As a technical person, I understand the
13	graphs.
14	DR. HAUSLER: Thank you.
15	JUDGE BARATTA: So don't worry about that.
16	DR. HAUSLER: Thank you, Judge.
17	JUDGE BARATTA: Legal people don't they
18	don't matter, anyway.
19	MR. WEBSTER: Right. And I think the
20	issue was the spatial envelope of the tray, and
21	whether the corrosion is beyond the spatial envelope.
22	That was what staff had objected to, I think, and
23	that's what was overruled.
24	CHAIRMAN HAWKENS: No, I believe the
25	objection went to the characterization of undue
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1	contributions, coaching, questioning by counsel, and
2	that was overruled.
3	DR. HAUSLER: Yes. Well, my intention was
4	to present the data, and to, perhaps, get a broader
5	overview as to what actually has been generated by the
6	UT measurements. The second point I wanted to bring
7	out was the fact that what I tried to do was the
8	contour, topographical maps, is really nothing
9	different from what Mr. Tamburro has done. Perhaps,
10	it is a bit of a broader view, but there is really
11	basically no difference in the approach. Perhaps
12	there is a difference in setting the areas that one
13	wants to analyze. In other words, the rectangles may
14	be different from what I have done, from what he has
15	done, but the methodology is basically the same. And
16	it is based on the fact that we have within a spatial
17	area, spatial envelope some points and we have
18	averaged them.
19	Now there's a difficulty with this. I
20	recognize that. AmerGen has recognized that, and
21	staff has recognized that. If we average two points
22	that are, perhaps, four inches apart, or six inches
23	apart, say we have a point of 600 mil residual wall
.24	thickness, we have another one of 700. We say well,
25	the average is 650. We don't know what's in-between.
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1	Well, that is an absolutely correct objection.
2	However, this what we have, and this is
3	the best we can do with the data that we have. We are
4	saying that well, the area - I mean, the wall
5	thickness between these two points, hypothetical
6	points that I just mentioned, 600 and 700, and they
7	are six inches apart. Well, in between we go up to
8	736, or 750, and then we come down again. I mean,
9	that's a hypothesis, and we don't really know that
10	that's so. It hasn't been measured, and so the best
11	way we can do with these data, and the best we can
12	really project is averaging the data, and what the
13	contour plots do, is we don't average between two data
14	points, we average between all of them. In other
15	words, we have one point here, there are five points
16	around. We form the averages between this one and the
17	five points around, then we take another point that
18	has ten points around it. Then we this out, and so
19	on. And the algorithm behind the scene establishes
20	the equations, that subsequently draw the curves. And
21	the same equations, again, are used to make the
22	predictions.
23	So I think the procedure is
24	straightforward. The procedure is one that is being
25	used extensively, not just in this particular case.
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533 It is used for all kinds of multi-variable studies, et 1 2 cetera, et cetera. So I think -- what I want to point 3 out, again, is that there is still considerable 4 uncertainty with respect to whether the acceptance 5 criteria are met, or are not met. And the suggestion is that there are, indeed, areas that may be -- there 6 7 are additional areas that may be severely corroded, 8 that are not captured within the data that have been 9 so far presented. JUDGE ABRAMSON: Dr. Hausler, let me ask 10 you a couple of questions. First of all, do you know 11 12 how this computer code was written, or what the 13 constituitive equations are in this code that does this extrapolation? 14 15 DR. HAUSLER: No, sir, I don't. 16 JUDGE ABRAMSON: Were you one of the code 17 authors? 18 DR. HAUSLER: No, I was not. JUDGE ABRAMSON: Are you are a frequent 19 20 user of this code? 21 DR. HAUSLER: Yes, I am. 22 JUDGE ABRAMSON: Okay. And you believe it's in wide use, this code? 23 DR. HAUSLER: As far as I know, it is. 24 25 Yes. NEAL R. GROSS COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W. WASHINGTON, D.C. 20005-3701

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534 1 JUDGE ABRAMSON: You've used this code now 2 to extrapolate outside the existing data. Right? То 3 expand the areas, that's what you're suggesting, that because we don't know what is outside region, the data 4 5 points that you used the code to expand, to make 6 projections of what would be outside the data, the 7 area where the measurements were made. Is that 8 correct? 9 DR. HAUSLER: The code allows the experimenter to speculate outside the experimental 10 areas to a certain extent. 11 JUDGE ABRAMSON: Yes. And how far have 12 13 you extended this physically outside the area of the 14 data points? 15 DR. HAUSLER: Well, essentially, what has been done is that, as you can see, you have the area 16 from 30 to 48 on the previous slide on the horizontal, 17 it goes from 30 to 48, and the extrapolated slide goes 18 19 from minus 30 to 50, so we have, essentially, the same 20 axis on the horizontal. If you go to the next slide, 21 it's the same axis on the horizontal, the same 22 distance. And as far as the vertical is concerned, we go from here from minus 40, which was also minus 40 23 24 before, to zero, which was zero before, so what has 25 been filled in are those areas, the trapezoid in the NEAL R. GROSS COURT, REPORTERS AND TRANSCRIBERS

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1	previous slide, that were not clear of the square.
2	Okay? So, in other words, all we have done really is
3	basically make a square out of this area. And that's
4	how far the code let's you go.
5	JUDGE ABRAMSON: Do I understand that just
6	looking at this figure, that the data actually ended
7	along the line that runs vertically, kind of at an
8	angle from the left to the right, in green with a
9	brown wedge on the left? Is that where the data
10	ended?
11	DR. HAUSLER: That's correct.
12	JUDGE ABRAMSON: Okay. Now flip to the
13	next slide. You've extended you've made
14	projections of that data. Where would that line have
15	been on this graph, somewhere starting around minus
16	20, and going up to the right from there?
17	DR. HAUSLER: That's exactly right.
18	JUDGE ABRAMSON: So all the
19	DR. HAUSLER: It was
20	JUDGE ABRAMSON: About 80 percent of that
21	brown area on the left side is projection. Is that
22	correct?
23	DR. HAUSLER: That's correct.
24	JUDGE ABRAMSON: That 80 percent is
25	projections. Okay.
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1	DR. HAUSLER: That's correct.
2	JUDGE ABRAMSON: Or the term you used was
3	"speculation".
4	DR. HAUSLER: That's what I did, yes.
5	JUDGE ABRAMSON: Okay. Fine.
6	DR. HAUSLER: The reason why we have this
7	fairly large area is because there was on the right-
8	hand side, upper right-hand corner, also a rather
9	severely corroded area.
10	JUDGE ABRAMSON: No. I understand that the
11	code makes these kinds of projections, and that you're
12	able to do it with it. If I were and let's back up
13	for a minute to the prior slide, this slide. Yes. If
14	I look at this slide and try to project the total
15	surface area from this, just looking at the data, how
16	much total area, or what are the dimensions of the
17	area that the data tells us are less than 640 mils?
18	What would I get? The one on the upper right looks
19	like it's what, less than four or five inches on
20	the horizontal dimension, and 10, 12 inches
21	diagonally. Is that
22	DR. HAUSLER: Yes. It's roughly defined
23	as the Area Two, and it's 12 by 54 inches. Is that
24	correct?
25	JUDGE ABRAMSON: No. I'm just looking at
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1	the brown area on the upper right. And it looks to me
2	to be something like two or four inches along the
3	base, and diagonally something like eight or ten
4	inches.
5	DR. HAUSLER: Yes, I think that's right.
6	JUDGE ABRAMSON: Is that about right?
7	DR. HAUSLER: Yes.
8	JUDGE ABRAMSON: So a few inches
9	horizontally, and maybe a foot on the other angle.
10	And, similarly, the other brown area that I'm looking
11	at from the data, I'm only trying to understand the
12	data, on the left side of your figure might be
13	diagonally about a foot, or foot and a half, and
14	vertically a few inches?
15	DR. HAUSLER: Right. Each square in the
16	grid is two inches.
17	JUDGE ABRAMSON: Okay.
18	DR. HAUSLER: So it would be about four
19	inches, something like that.
20	JUDGE ABRAMSON: So if I were to take that
21	data and try to look at it against if I were to
22	take this view and try to look at it as against the
23	local area buckling criteria, as we understand it from
24	the CLB, which is a one foot by one foot square
25	surrounded by a one foot strip all the way around it,
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1	to wind up with a three foot by three foot square, the
2	brown area in the upper right would certainly fit
3	would seem to fit within the one foot by one foot
4	square. Is that correct? And the brown area on the
5	left might peak out over the edges of the one foot by
6	one foot square.
7	DR. HAUSLER: Yes. The very light green
8	area, or shading is less than 720 mils. All right?
9	And that is, I would say probably just barely a square
10	foot, maybe, not quite.
11	JUDGE ABRAMSON: Now do any of these brown
12	data points, were they down to 536? Were any of them
13	you say some are less than 600. Did any of them
14	get to 536?
15	DR. HAUSLER: Actually, I believe that
16	they're only less than 640, and more than 600. The
17	lowest is 602, 612 on the left-hand side in the brown
18	area, 602, and 612. These are point 7 and 7A. And
19	then in the upper right-hand corner, Point 2 is 595.
20	JUDGE ABRAMSON: 595.
21	MR. POLONSKY: Can we ask where that
22	number came from? This is Mr. Polonsky. We were
23	under the impression that the thinnest point that had
24	ever been determined in the exterior points was
25	greater than 600, so we're wondering if this number,
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1	or all of these numbers were somehow calculated down,
2	or numbers subtracted from them.
3	DR. HAUSLER: They're all given in the
4.	table, and they're all explained in the table that
5	accompanies that particular report.
6	MR. POLONSKY: I'm sorry. What table are
. 7	you referring to?
8	JUDGE ABRAMSON: Tell us where the table
9	is so we can deal with it. Yes.
10	DR. HAUSLER: It's Table 1 and Table
11	well, it's the table for Bay 1, and the table for Bay
12	13 on page 12 and 13.
13	CHAIRMAN HAWKENS: Can you identify it by
14	Exhibit number, please?
15	MR. WEBSTER: This is Exhibit 61.
16	CHAIRMAN HAWKENS: I'm with you. Thank
17	you.
18	MR. WEBSTER: While Mr. Polonsky is
19	thinking, Judge, can I just ask
20	MR. POLONSKY: Where did that table come
21	from?
22	MR. WEBSTER: That table is in our
23	testimony, Alex, as Exhibit 61. That was submitted to
24	you a few days ago.
25	MR. POLONSKY: I understand.
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. 1	MR. WEBSTER: That's where it came from.
2	MR. POLONSKY: So you photocopied this
3	directly out of the Calc 24 Rev 1?
4	MR. WEBSTER: No, if you read the table,
5	it's evident on its face exactly where it's come from.
6	MR. POLONSKY: I understand, but you're
7	citing a number that we think may be incorrect, and we
8	want to know whether this was photocopied from our's,
9	or whether there was a typing error in transferring
10	these numbers to this table.
11	MR. WEBSTER: If you read the I think
12	you'll find precisely I mean, can I read the
13	footnote?
14	MR. POLONSKY: Yes, I'm looking at it, as
15	well.
16	MR. WEBSTER: "The numbers with postscript
17	A are dated 1/11/93. And they're in part duplicate
18	measurements from the previous entry, and in part new
19	measurements. Bold numbers in italics are numbers
20	missing in the 2006 survey."
21	MR. POLONSKY: So you created a number?
22	I'm just trying to understand what
23	MR. WEBSTER: Just let me finish the
24	footnote, and then you will have your question
25	answered.
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1	MR. POLONSKY: Yes, thank you.
2	MR. WEBSTER: If you read it before, you
3	would have had your question answered, without asking
4	it. "They have, therefore, been calculated by
5	subtracting 20 mil from the 1992" ask counsel for
6	AmerGen to refrain from
7	CHAIRMAN HAWKENS: Please continue reading
8	the footnote.
9	MR. WEBSTER: "From the 1992 measurements.
10	This was necessary because otherwise, the upper right-
11	hand corner of the plot would have been grossly and
12	erroneously distorted."
13	CHAIRMAN HAWKENS: Mr. Polonsky, does that
14	answer your question?
15	MR. POLONSKY: It does, but we still think
16	that data was that data point was 722 mils, we
17	believe, in 1992, so we think there was they
18	subtracted perhaps 200
19	JUDGE ABRAMSON: All right. Let's deal
20	with in ensuing testimony. What Judge Hawkens has
21	suggested is that we'd like to hear from AmerGen on
22	this.
23	MR. WEBSTER: Could I just make one point?
24	I'd like to ask Dr. Hausler a couple of things on
25	whether the data, if you confine your analysis, your
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1	assessment to the area taken by the data that bounds
2	those thin areas properly. And, second of all, when
3	he refers to these extrapolations are speculative,
4	whether he means these are really guesses, or whether
5	he means these are the best he can do.
6	JUDGE ABRAMSON: I think, counselor, that
7	we understand fully what this code does, and how Dr.
8	Hausler has used it, and what it means by and I
. 9	don't see any advantage to us in having him respond to
10	your questions. We understand that this was done as
11	an extrapolation. We know how codes work. We've both
12	written many of them.
13	MR. WEBSTER: Is that the feeling of the
14	panel?
15	JUDGE BARATTA: I agree with Judge
16	Abramson. I think we understand that speculative might
17	be I guess it's a legal term, might be getting
18	confused here, but I think in a technical sense we
19	understand it is an extrapolation, does not represent
20	real data. But on the other hand, is well-founded and
21	accepted scientific methods. With that, I'd like to
22	hear you were going to ask AmerGen, I believe, for
23	or someone was.
24	CHAIRMAN HAWKENS: We just have heard from
25	Dr. Hausler, and I am very interested in hearing
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1	AmerGen's rebuttal response.
2	MR. POLASKI: Thank you, Your Honor. With
3	respect to the external single point readings, we do
4	not believe that they are representative of the entire
5	shell for numerous reasons, and I will go through
6	those, and then Mr. Tamburro is going to go into the
7	details on each of those topics.
8	We believe that there's too few of them to
9	be able to be representative. We do not argue with
10	Citizens, with the program that they used. We don't
11	believe it's appropriate to use it in this situation,
12	because there aren't enough data points to be able to
13	accurately contour the thickness of the dry wall shell
14	in the sand bed region. Also, part of this is because
15	the points are bias thin. We've got three significant
16	points to explain to you why they're bias thin. One
17	is the historical records that were created at the
18	time that these readings were taken that describes how
19	they were selected, and the basis for saying that they
20	were thin. We also, as you've seen previously, and
21	we'll show these again, overlay maps that show that
22	there was thicker metal physically between those local
23	data points, so that averaging between them is
24	inaccurate.
25	JUDGE ABRAMSON: Is there actual data that

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1	you're going to present to us to show that it's
2	thicker between these points? I think this is an
3	important point that we want to see.
4	MR. POLASKI: We have produced some maps
5	that Mr. Tamburro showed previously that shows where
6	the external points are, and the values of those. And
7	then between those external points, we have internal
8	grid readings that show that the thickness in-between
9	those external points is thicker than if you just did
10	a straight line average between the two external
11	points.
12	JUDGE ABRAMSON: And do the internal
13	points give you information that would support the
14	thinner calculation, the thinner measurements from the
15	external side? In other words, I want to make sure
16	that the two sets of measurements are not mutually
17	exclusive, or conflicting.
18	MR. POLASKI: I don't believe they're
19	not conflicting, and they're measuring the same
20	thickness, one from the outside, one from the inside,
21	using the same technique.
22	JUDGE ABRAMSON: My point is, let's say
23	you measure at a point of coordinates at an origin
24	from the inside and you get a certain number, then you
25	measure a point five inches to the right, and you get
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1	another number. Now you go to the outside and you
2	measure a point two and a half inches to the right
. 3	from the original, do you have any measurements that
4	would confirm that you would have got the same number
5	measuring from the outside at one, or at zero, or at
6	five, or is it possible we're just seeing a bias?
7	MR. POLASKI: I don't believe it is
8	possible we can say with 100 percent assurance at any
9	particular point we can find it both from the inside
10	and the outside, but we can show that if you look at
11	the entire picture of external and internal points,
12	that the assumption that you can take a linear average
13	between two external points isn't correct, because
14	we'll get information that shows that between those
15	points there is thicker material, as measured from the
16	inside.
17	And the third point is that we actually
18	have photographs that will show that when you look at
19	the external surface, and you look at the external
20	reading points, that there is thicker material in-
21	between, because it's clear from the photographs that
22	the local areas were prepared, are dished, and are
23	thinner than the surrounding area around those.
24	So the first point we would like to do is,
25	Mr. Tamburro is going to refer to TDR 1108.

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MR. TAMBURRO: Yes. TDR 1108 is AmerGen Exhibit 27. This report was developed and approved by the project team that removed the sand, and coded it. It basically describes the entire project from getting access to the sand bed, removing the sand bed, removing the corrosion byproducts, selecting the external points, and then measuring.

This report was approved by the project manager of the project, by the head structural engineer of the project, by the head metallurgist of the project, and by the corporate engineering director of the project of the former owner.

On page 16 of this report is the description of how the external points were selected, and I'd like to read you four or five sentences out of that report. Should I wait?

17 CHAIRMAN HAWKENS: The Board is ready. TAMBURRO: Okay. "It was reasoned 18 MR. 19 that since the inside surface of the vessel shell is 20 smooth and not corroded, any thin area on the outer surface should represent the minimum thickness in that 21 22 region. It was further reasoned that if six to twelve scattered spots located in the area of worst corrosion 23 24 are round smooth, and the thickness of each spot is 25 measured by UT method, we will have a high level of

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1	confidence that we will have identified the thinnest
2	shell thicknesses for a bed. This approach is
3	conservative since (a), we are forcing the statistical
4	bias in choosing only the thinnest areas, and (b),
5	grinding of the selected spots to obtain a flat
6	surface for reliable UT readings will remove
7	additional good metal. This conservative approach for
8	selection of UT spots was finally adopted after
9	assuring that the internal vessel wall was, indeed,
10	smooth."
11	The second exhibit that I'd like to go to
12	is Exhibit 44.
13	MR. POLONSKY: Mr. Tamburro, just for
14	purposes of illustration, since they've identified now
15	Bay 13, if you could draw the Board's attention to Bay
16	13.
17	MR. TAMBURRO: Okay. AmerGen Exhibit 44,
18	the third page in, which is titled "Bay 13-2006." For
19	example, if we look at point fifteen, which is almost
20	directly in the center of that map, that point was
21	read, was measured in 2006 at 666 mils. Almost
22	immediately above that, within inches, is a grid which
23	averaged 1,142 mils. I'd like to go then to some
24	photographs. Mr. Polaski has asked me a point on also
25	Bay 19. I'm going to stay at Exhibit 44, the fourth
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1	page, which is Bay 19-2006.
2	Again, we have the external points, and
3	overlaid on the same coordinates is the internal
4	grids. Bay 9 was measured in 2006 at 728 mils.
5	CHAIRMAN HAWKENS: Excuse me. Are we at
6	Bay 9 or Bay 19?
7	MR. TAMBURRO: Excuse me. I meant to say
8	Point Nine. I'm sorry. Grid 19B, which is an
9.	internal point where we got 49 readings, had an
10	average of 848 mils. If we move to the left, Point
11	Ten was measured at 736 mils. That clearly
12	illustrates that we have material which is much
13	thicker between those two points. If we move to the
14	left a little further, we have a grid that has a
15	thickness of 824 mils. Again, one more over to Point
16	Eleven, was 712 mils. Again, we have an area which is
17	between two exterior points which was measured to be
18	on average much thicker.
19	Finally, if we could go to Exhibit 40,
20	page 91.
21	CHAIRMAN HAWKENS: Before you do that,
22	could I ask if you have a similar representation for
23	Bay 1, the measurements taken in Bay 1, because that
24	was the Dr. Hausler was focusing on both Bay 1 and
25	Bay 13.
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1	MR. TAMBURRO: Yes, sir. Bay 1 is the
2	first page in Exhibit 44. That does provide some
3	information, but not as clear as the other two
4	examples I provided. For example, Point Five was 680
5	mils in 2006. Approximately ten inches above it, was
6	grid, internal grid, 1D, which was at 1,122 mils.
7	I'd like to go on to the pictures.
8	DR. HAUSLER: Could I perhaps ask a
9	question of clarification here? I would like to know
10	exactly what the coordinates are of the grid in
11	question, because the grid measurements are higher,
12	generally higher than the reference point for the
13	external measurements. And I don't quite understand
14	how the grids are placed in these maps at coordinates
15	that are way below the reference point.
16	MR. WEBSTER: Perhaps I could suggest that
17	this might be a good time to use the 3D model AmerGen
18	has to indicate where all the points are taken.
19	CHAIRMAN HÁWKENS: If Mr. Tamburro is able
20	to respond to that question, first.
21	MR. TAMBURRO: Yes, sir. The grid
22	coordinates were measured early on when we established
23	the program. They were put on the engineering
24	drawings, the coordinates. We simply used those
25	drawings from the mid-80 time frame, and established
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1.	coordinates to the same reference point that the
2	external points had been referenced to. So it was
3	simply geometry, and
4	JUDGE ABRAMSON: Are the grid coordinates
5	in your testimony, written testimony somewhere?
6	MR. TAMBURRO: I don't think so. We could
7	provide that to you.
8	JUDGE ABRAMSON: I think we should have
• 9	yes, if you could provide that, that would be very
10	helpful, and sooner is better than later.
11	MR. POLONSKY: Your Honor, there was an
12	exchange between counsel as to whether the base
13	information that made these coordinates available,
14	whether it was produced within the mandatory
15	disclosure process. AmerGen did confirm that the
16	documents were provided through the mandatory
17	disclosure process, so the documents that underlie
18	this analysis were available to the parties.
19	JUDGE ABRAMSON: And the grid coordinates
20	were in those documents?
21	MR. POLONSKY: I've looked at those
22	documents, and it's very clear from the documents that
ż3	you could make the analysis that the experts have made
24	here today.
25	JUDGE ABRAMSON: Perhaps you can just
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1	provide a cite to where in the documents one can find
2	that, then. Not at the moment, but
3	MR. POLONSKY: Right. We can provide the
4	parties with an OCLR number. I probably can't do it
. 5	from here, but we could do it
6	JUDGE ABRAMSON: Tomorrow morning.
7	MR. POLONSKY: at the close of the
. 8	hearing.
9	MR. WEBSTER: Oh, tomorrow - Judge, we
. 10	follow that if we could have a look at those, if
11	our expert could look at those during the hearing, I
12	think it would be far more helpful for the Board, than
13	at the close of the hearing.
14	JUDGE ABRAMSON: Well, you'll get them at
15	the end of the day today, and you can look at them
16	overnight, and take it up tomorrow.
17	MR. WEBSTER: Oh, I misunderstood. I
18	thought Mr. Polonsky was
19	MR. POLONSKY: Yes, I don't believe that -
20	- we did not bring all of the 35,000 pages, or however
21	many it is that we produced in mandatory disclosures.
22	This was not an exhibit. This was a document among
23	many documents that was produced. We have that back
24	at the office.
25	MR. WEBSTER: I find that surprising, Mr.
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1	Polonsky. I brought all those exhibits
2	JUDGE ABRAMSON: Okay. Let's not get into
3	that. That's wasting everybody's time.
4	MR. WEBSTER: All of the exhibits are
5	electronically produced.
6	JUDGE ABRAMSON: He'll give you the
7	numbers at the end of the hearing.
8	CHAIRMAN HAWKENS: It sounds, and correct
9	me if I'm wrong, Mr. Webster, that you all had an
10	agreement that that need not be submitted as an
11	exhibit. Rather, you were
12	MR. WEBSTER: Well, if AmerGen seeks to
13	rely on it, then I think they need to submit it as an
14	exhibit. We did a diligent search of those records,
15	and could not find the document that Mr. Polonsky is
16 <sup>.</sup>	referring to. As he says, there are 40,000 pages of
17	production, and going hunting for a needle in a
18	haystack is pretty hard, especially when counsel on
19	the other side knows full well precisely which OCLR
20	numbers he's referring to.
21	CHAIRMAN HAWKENS: We'll handle it this
22	way. If it's going to be part of the record, it needs
23	to be submitted as an exhibit. If it's something that
24	you believe, Mr. Webster, that they've made an error
25	in creating these particular documents, I'm going to
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1	put the burden on you to bring it to our attention,
2	please. But please provide him with cites where he
3 .	could have access to those tables.
4	MR. POLONSKY: We will certainly do our
5	best to identify them from here.
6	CHAIRMAN HAWKENS: Okay. Thank you.
7	MR. TAMBURRO: May I continue with the
8	pictures? Okay. Exhibit 40, AmerGen Exhibit 40, page
9	91, this is the ACR presentation that we provided on
10	January 18 <sup>th</sup> , 2007. The picture on page 91 provides
11	a picture of Bay 13. In the forefront, right in the
12	middle of the picture, is external Point 14, which
13	provides some indication that it has been machined,
14	centered in the surrounding areas. But a better
15	indication
16	MR. WEBSTER: I'll object. I object to
17	that. Where is the foundation for that?
18	CHAIRMAN HAWKENS: Objection is overruled.
19	Please continue.
20	MR. TAMBURRO: Thank you. A better
21	picture, a better sense for how much they're indented
22	is if you go over to the left and up by where the tape
23	measure has been placed, there's a dimple there that's
24	very clear to be indented, and much thinner than the
25	surrounding areas. That's Point 15, external Point
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1	15.
2	MR. WEBSTER: Objection; no foundation.
3	CHAIRMAN HAWKENS: We have the correct
4	diagram, but we're having difficulty following your
5	description.
6	MR. TAMBURRO: May I go and point it out?
7	MR. WEBSTER: Judge, I object. No
8	foundation to this testimony.
9	CHAIRMAN HAWKENS: Overruled.
10	MR. TAMBURRO: I have a laser pointer,
11	Your Honor. In that area right there.
12	MR. WEBSTER: Let the record reflect that
13	it's almost impossible to tell where Mr. Tamburro is
14	indicating.
15	MR. POLONSKY: Your Honor, the produced
16	copies that are in your exhibit packages are a much
17	better reproduction of the photograph, and this video
18	display clearly is not allowing you to see into the
19	photograph the way you could if you looked at the
20	paper copy.
21	CHAIRMAN HAWKENS: Could you just make
22	your point again, now that I see what you're referring
23	to, where I should be looking on the photograph.
24	JUDGE ABRAMSON: This line that runs
25	this line up here is the tape measure you're talking
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1	about?
2	MR. TAMBURRO: Yes, sir.
3	JUDGE ABRAMSON: And this is the area
4	you're talking about being indented?
5	MR. TAMBURRO: Yes, sir.
6	JUDGE ABRAMSON: I think I can see it. At
7	least I can see what you're referring to.
8	MR. TAMBURRO: And this shows the shell in
9	a profile, and you can see some you can see it's
10	indented. And in 2006 we measured that point, and it
11	was 666 mils.
12	MR. POLONSKY: Your Honor, since there's
13	been a question about foundation, even though it's
14	been overruled, I believe Mr. Tamburro has been inside
15	the sand bed region, so instead of discussing this
16	from a picture, he could probably also talk to his
17	personal experience, as could many other people in
18	this room who have also crawled into the sand bed
19	region.
20	CHAIRMAN HAWKENS: Mr. Tamburro, could you
21	share that with us?
22	MR. TAMBURRO: I was in Bay 13, Your
23	Honor, and I was able to see some of these points.
24	And they are clearly thinner than the surrounding
25	areas.
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1	JUDGE ABRAMSON: These are thinner because
2	they were ground to the UT?
3	MR. TAMBURRO: Yes, sir.
4	MR. POLONSKY: Mr. McAllister could
5	address how exactly they are grounded before
6	MR. WEBSTER: Judge, can I just clarify?
7	If these points were so obviously over-ground, why
8	couldn't AmerGen find the number of the very thin
9	points during the 2006 monitoring?
10	CHAIRMAN HAWKENS: I'll hear from AmerGen,
11.	please.
12	MR. POLONSKY: The person who could best
13.	answer the question may not be on this panel, so can
14	we have a moment just to confer who the best person
15	is?
16	CHAIRMAN HAWKENS: Yes.
17	MR. WEBSTER: Judge, while we're
18	conferring, can I just ask how long we're running
19	today?
20	CHAIRMAN HAWKENS: You may, and I'm remiss
21	because my law clerk, Debra Wolf, and I'm also remiss
.22	in not introducing her earlier. She's our right hand.
23	She suggested that at the outset of this when we
24	reconvene that we should mention how long we
25	anticipate going. We wanted to finish up this point.
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1	It's not clear that we're going to finish up this
2	topic tonight, but I think it is likely we will not
3	end before 6, but we will not go beyond 7. So that's
4	what we're looking at for the benefit of those in the
5	audience, who wish to remain.
6	MR. WEBSTER: Perhaps when AmerGen
7	finishes up, we could just take a break for a little
8	while?
9	CHAIRMAN HAWKENS: That would be fine.
10	MR. POLONSKY: Mr. Chris Hawkins
11	CHAIRMAN HAWKENS: One second.
12	MR. POLONSKY: I'm sorry.
13	CHAIRMAN HAWKENS: I want to talk to my
14	Board members for one second.
15	MR. WEBSTER: Can I ask AmerGen if Mr.
16	Hawkins was named as a witness, and has provided
17	MR. POLONSKY: Yes, he was. I'm sorry.
18	I've been calling him Chris, but John C. Hawkins.
19	MR. WEBSTER: Which panel was he named
20	for?
21	MR. POLONSKY: Probably for Panel Four.
22	MR. SILVERMAN: Panel Four and Panel Five.
23	MR. WEBSTER: Could we just I want to
24	check. So it was in rebuttal, surrebuttal, or initial
25	testimony?
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1	MR. POLONSKY: I'll believe you'll find
2	him in all of the testimony.
3	MR. SILVERMAN: He was also identified in
4	the pre-hearing session last week by name. His
5	testimony was admitted with the other parties, and I
6	believe he's been a witness since direct testimony was
7	filed.
. 8	MR. POLONSKY: Are we back on the record?
9	CHAIRMAN HAWKENS: We are back on the
10	record.
11	MR. POLONSKY: Okay.
12	CHAIRMAN HAWKENS: Do you have an
13	objection, Mr. Webster? He has been qualified as an
14	expert in Topic 4 and Topic 5. That was accomplished
15	on Thursday.
16	MR. WEBSTER: Okay. I don't see him in
17	rebuttal on Topic 5.
18	MR. POLONSKY: I'm not sure that's
19	relevant, Your Honor. I mean, the issue is that he
20	was identified as a witness. If he wasn't needed in
21	particular to respond to a particular question, then
22	he wouldn't put on rebuttal.
23	MR. WEBSTER: If he hasn't provided
24	testimony in advance, then I think we may have an
25	issue. But if he has provided testimony in advance,
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1	then there is no issue, so
2	CHAIRMAN HAWKENS: He has provided
3	testimony in advance on Topic 4 and Topic 5 at some
4	time. He was admitted as an expert witness. Let's
5	hear from him now, please.
6	MR. HAWKINS: Jon Hawkins. And I guess
7.	I think the question is, why couldn't we find some of
8	the areas that were ground to the UT thickness
. 9	readings? When we entered the bays, we had
10	coordinates from the previous examination, and they
11	were measured down from the vent header, and to the
12	left, and to the right, either one of the two. So we
13	would measure down, and would measure to the right, if
14	that was the coordinates. And usually you would see
15	a ground area right in that area, if it was one inch
16	off or whatever, but it was very, very close.
17	In some instances, we measured down 20
18	some inches, for example, and off to the left 14
19	inches, and there would not be a ground area there.
20	So we measured to the left, we measured to the right,
21	and we found one to the left, maybe. In other
22	instances, we didn't find one at all. Those were the
23	ones that have no reading, because we did not find a
24	ground area at the previous coordinates.
25	CHAIRMAN HAWKENS: And that testimony is
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1	based on your personal experience?
2	MR. HAWKINS: That's correct.
3	CHAIRMAN HAWKENS: Thank you.
4	MS. YOUNG: Judge Hawkens, I believe one
5	of the AmerGen witnesses mentioned that there were
6	other people in the room that had observed UT
7	measurements being taken on the exterior of the shell,
8	and I believe that Mr. O'Hara is one of those people.
9	He may have something to add on this point.
10	MR. O'HARA: Judge, I just wanted to say
11	that what AmerGen has said so far about observations
12	inside these bays, and taking UT readings has been
13	correct. That's what I observed. There was
14	difficulty matching up some points from prior
15	inspections. The pictures are a good depiction of
16	what's in there, though. You can see the ground spots
17	when you can find them, and you can see that there is
18	an area around them that has thicker material than the
19	spot itself.
20	MR. WEBSTER: If they're so obviously
21	ground, why couldn't you find them? That's the issue.
22	CHAIRMAN HAWKENS: Let's move on. I think
23	that's been answered. Mr. Gallagher and Mr. Tamburro,
24	was there anything else that you wanted to provide in
25	the way of response to the presentation we heard from
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1	the testimony
2	MR. POLONSKY: Just for the record, it is
3	Mr. Polaski, as opposed to Mr. Gallagher.
4	CHAIRMAN HAWKENS: I beg your pardon. I
5	beg your pardon.
6	MR. POLASKI: No, Your Honor. That
7	concludes our discussion on the validity of using, or
. 8	not using these local points to characterize the
9	overall thickness of the dry well shell.
10	JUDGE BARATTA: Considerable attention has
11	been paid to whether or not we should average, and if
12,	we did, whether or not it was taken into account the
13	confidence interval, and I wanted to start out by
14	asking the staff relative to other situations that we
15	encounter where one is doing best estimate
16	determinations of parameter, what's done there? For
17	example, I know we there are methodologies for
18	calculating line temperatures and such, and I was
19	wondering if we have anybody on the staff who's
20	familiar with the application of confidence intervals
21	in other situations that the NRC has. That's one of
22	them I'm familiar with, but I was wondering if anybody
23	has any familiarity that they could talk to us about
24	estimating margins, such a situation. Or maybe
25	another way to ask that question is, are there other
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1.	situations where a 95-95 confidence level is used?
2	MR. DAVIS: This is Jim Davis from the
3	staff. We looked into some other situations, and one
4	of them is flow accelerated corrosion, which happens
5	to be have some similarities to this, where you're
6	actually using a grid, and going back repeatedly, and
7	reproducing UT measurements. And the upper guidelines
8	for flow accelerated corrosion tell you to use the
9	average, not the 95 percent confidence level. So if
10	you follow the upper guidelines, you use the average.
11	I think there's some other instances, such as painting
12	containment, when you want to ensure you have the
13	thickness, you use an average thickness of each layer.
14	JUDGE BARATTA: Okay. I think Dr. Hausler,
15	or Citizens had some examples that they had put forth
16	where one would at least calculate a confidence
17	interval. Dr. Hausler?
18	DR. HAUSLER: For individual measurements?
19	JUDGE BARATTA: Yes.
20	DR. HAUSLER: External measurements have
21	in some instances been repeated. Now there are some
22	questions exactly how they have been repeated, but we
23	believe that the repetition was random, basically. So
24	we have, and I produced a table of that. In four
25	bays, external measurements have been repeated in
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duplicate or triplicate. Now there were essentially 1 2 two numbers were calculated, and I want to refer to 3 that perhaps a little bit in detail. You can take all the numbers that have been generated in the duplicates 4 5 on various locations, and calculate the average, and calculate the standard deviation. Now that standard 6 7 deviation or variability that you would calculate in that way, in other words, from the ensemble of all the 8 9 data points that you have, would really represent a combination of two effects; that is, the location 10 effect, as well as the effect of reproduction. 11 In 12 other words, the error, so one -- and this has 13 bothered us all along that we could not really separate out the pure error from the location effect. 14 15 And in this particular case, in these five bays, four or five bays, where duplicate measures have been made, 16 17 actually used the duplicate measures, and we 18 calculated from the duplicates or triplicates the averages and the variances, and then we pooled the 19 averages for all the -- I'm sorry, we pooled the 20 21 variances for all of the duplicate and triplicate 22 measurements for one bay, and calculated the pure error in that manner, and compared the pure error to 23 the overall variability. It is basically an approach 24 25 of analysis of variance to separate out two different

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1	effects; that is, again, the effect of location
2	because you monitor different points in different
3	locations, and you generate duplicates, and so you get
4	from the duplicates the pure error. And that has been
5	done, and it turned out that for the external
6	measurements, the pure error was actually pretty
7	large. I don't recall exactly how much it was.
8	There is another effect, and we always
9	have to keep that in mind. The error is not
10	necessarily independent of the measurement. That is
11	something that one needs to remember. In other words,
12	in those bays where the corrosion rate was actually
13	relatively small, the error from the duplicates was
14	small, as well. And those bays where there had been
15	a lot of corrosion, in fact, the residual wall
16	thicknesses varied quite a bit, and were smaller than
17	the error, the pure error unit was appropriate to
18	follow it was larger, as well. So there is a
19	actually, I think we even plotted this to show the
20	correlation of the error with the degree of corrosion.
21	JUDGE BARATTA: I believe in of your it
22	was in, I guess, your testimony, there's a NOVA table
23	that shows that. Is that what you're referring to, or
24	could you give me a specific cite where you did that?
25	MR. WEBSTER: I think the witness might
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1	want to look at Exhibit C, Attachment 1.
2	DR. HAUSLER: I'm not sure whether I put
3	that in the report.
4	MR. WEBSTER: It's Exhibit C, Attachment
5	2. It's not on it?
6	DR. HAUSLER: Well, that's the table, yes.
7	MR. WEBSTER: Oh. Okay.
8	DR. HAUSLER: That's right. That's the
9	table, which shows that the standard deviation from
10	repeat measurements actually varies with the
11	MR. WEBSTER: Do you want us to wait while
12	Judge Abramson
13	MS. BATY: Could you provide a page
14	number? Did you say the page number, Dr. Hausler, and
15	the attachment.
16	DR. HAUSLER: That's page
17	CHAIRMAN HAWKENS: We're going to, if we
18.	could, take a three minute recess until our colleague
19	returns. Thank you.
20	(Whereupon, the proceedings went off the
21	record at 5:25 p.m., and went back on the record at
22	5:29 p.m.)
23	CHAIRMAN HAWKENS: Take your seats so we
24	can get into the home stretch of today's session.
25	JUDGE BARATTA: What page were we on? Page
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1	10?
2	DR. HAUSLER: That would be page 10, yes.
3	JUDGE BARATTA: That has Table 1 and Figure
4	l on it.
5	DR. HAUSLER: We were asked to make some
6	comments about statistics for the benefit of the board
7	at this particular point.
8	And what Table 1 shows basically is, they
9	again, the separation of the pure error from the, you
10	know, overall variability.
11	So if you go, in bay 1 we have eight
12	points, and we show the average -
13	MR. POLONSKY: I'm sorry, did you say bay
14	1?
15	DR. HAUSLER: Bay 5.
16	MR. POLONSKY: Thank you.
17	DR. HAUSLER: Sorry. We have eight data
18	points, and we get - I believe this is the average
19	from the96 is the average remaining wall
20	thickness. The standard deviation with respect to the
21	barely points is point three six - eight six - three
22	eight six.
23	The pure error at this point, 017. Pure
24	error is from the repeat measurements.
25	So we have gone through this for days
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1 five, seven, 15 and 19, where in fact those were 2 duplicate measurements. If you go to Figure 5 in the 3 end of that, you will see that in D the pure error seems vary with the - let's see, what was that 4 5 standard deviation. There is a relationship between the standard deviation of the measurement and the 6 7 standard deviation of, you know, which is the overall varied data field measurements. 8 9 The point being that the standard 10 deviation in terms of the pure error is actually larger than the standard deviation that is usually 11 quoted for the instrumentation. 12 13 JUDGE BARATTA: Would you attribute this then to inability of replacement and such? Because 14 unlike the internal measurements where there's a grid 15 16 that you're actually putting the probe into - and Amergen, please feel free to correct me if - I think 17 one of the gentlemen here has actually done this -18 19 when you're doing the external measurements you are 20 trying to locate coordinates, a point, as opposed to actually having something that is there, is that true? 21 22 That tells you, X marks the spot? MR. FP: Yes, that is true. There were not 23 24 indications when we went in in 2006, where X marks the 25 spot. There was a grid grade, X/Y, waiting to get NEAL R. GROSS COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W.

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1	into an area where we could find a prepared area, and
2	then they would measure in the center of that.
3 ·	DR. HAUSLER: Perhaps at this point it
4	might be appropriate to make a comment about the
5	physical realities of actually taking those
6	measurements.
7	It is my understanding that the access to
8	the sand bed is sort of a 24-inch diameter 2-foot
9	diameter tunnel that you have to crawl into. The sand
10	bed itself has a width of 15 inches. If you compare
11	that - if you compare that with the chair you're
12	sitting in, 15 inches is less than your arm to
13	armrest.
14	That just helps visualize the reality of
15	that confined space. Then if you have actually the
16	height of the sand bed, that is 5 feet or thereabouts.
17	And the sand bed itself is actually slanted as you
18	might see in the mockup.
19	So I have had difficulties all along,
20	perhaps I can pass those difficulties on to you,
21	crawling into that space and actually making the
22	measurements is certainly no small task.
23	MR. POLONSKY: Your Honor, AmerGen objects
24	-
25	DR. HAUSLER: I wouldn't fit in there.
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1	MR. POLONSKY: AmerGen objects to this line
2	of testimony. We thought that the accuracy of the UT
3	measurements was not in question in this proceeding,
4	and that the Board had directed the parties to assume
5	that those UT measurements are accurate.
6	What this testimony appears to be going to
7	is that it's impossible or difficult to take accurate
8	readings.
9	JUDGE BARATTA: But is in question is the
10	uncertainty. It's not a question of accuracy; it's
11	rather the uncertainty.
12	CHAIRMAN HAWKENS: Based on that, the
13	objection is overruled.
14	MR. POLONSKY: Thank you, Your Honor.
15	DR. HAUSLER: So when you look at the
-16	standard deviation site in bay 19, or look at the bay
17	confidence level of the external measurements, the
18	standard deviation, the pure standard deviation, or
19	pure error for each single point, is .029 inches, 29
20	mils, which means the 95 percent confidence level
21	would be of the order of 60 mils. So if you measure
22	a point that maybe of the order of 700 mils, a good
23	bay, 760, but it could also be 640 for the same
24	region.
25	So we don't really quite know what that
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ĭ	point really is, and of course, that in turn affects
2	all the other interpretations that we have. For
3	instance -
4	JUDGE ABRAMSON: Excuse me, Dr. Hausler.
5	Do you expect that that error would always be in the
6	same direction, or would it vary from point to point?
7	MR. WEBSTER: Judge, could I ask, could Dr.
8	Hausler finish his point first, then he'll come to
9	yours?
10	DR. HAUSLER: This is a very good question
11	indeed. We don't know. The answer to that is we
12	don't know what direction the error goes. You're
13	quite right, it could in fact be higher, it could in
14	fact be lower.
15	JUDGE ABRAMSON: And does that vary from
16	point to point? You're getting the standard error by
17	looking at the distribution of a bunch of data points,
18	right?
19	DR. HAUSLER: That's correct. Again, we
20	don't know. The only way we can get out of the
21	dilemma is by in fact having a multitude of
22	measurements, and using some sort of an averaging
23	procedure.
24	And as soon as we look at averages, of
25	course, the standard deviation, or the error of the
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1	average, the mean, is much less than the error of the
2	individual data points. I think that's
3	straightforward statistics.
4	What I was going to say is that because of
5	this uncertainty that we have in the measurements,
6	plus, minus, but it is straight off the data. We
7	don't know exactly where the data point is, that
8	affects of course the interpretation of the contours
9	for instance.
10	Now we might have a contour that is
11	indicated for the outside measurements. We may have
12.	a contour that says less than 700, but it could also
13	be less than 750.
14	JUDGE ABRAMSON: And that contour was drawn
15	between a bunch of points that you use the actual
16	measurement for, and if you take each point to have
17	had a plus or a minus, then the contour may be between
18	the wrong points, is that right? Point A might have
19	been .7, and instead it should have been .64, and
20	point B, which you also used as .7, might have been
21	.76. So you're drawing a contour line between points,
22	and you don't know which way the error went from point
23	to point, so the contours could have the same problem;
24	is that not right?
25	DR. HAUSLER: Well -

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1	572
1	JUDGE ABRAMSON: You can't have it both
2	ways, right?
3	DR. HAUSLER: The argument goes in the
4	right direction, but quantitatively, I am really not
5	sure how to answer that question. Again, if we draw
6	contours between several points we go through an
7	averaging procedure, and naturally, because of that,
8	the contours would have to be more accurate, or less
9	uncertain, than the individual points.
10	But you're quite right, we at that point
11	don't know what the uncertainty is, because the
12	program that does plot data, the contours, does not do
13	a statistical analysis of the accuracy of the
14	contours, precisely because we cannot build the error
15	into the contours. In fact we tried to do that.
16	There were some duplicate measurements at the same
17	coordinates. The program would reject the duplicate.
18	So there was no way to calculate the possible error
19	that way.
20	All we had - they're not too terribly many
21	duplicate measurements. In fact those were all the
22	ones that we could find in the documentation. That's
23	all we had. But what we do know is that the pure
24	error and the UT measurements for the external
25	measurements is larger than what would be attributed
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1	to the UT measurement, to the UT instrument.
2	The standard deviation for UT measurements
3	in modern instruments is generally given as 1 percent
. <b>4</b> .	of wall thickness. And 1 percent of wall thickness
5	would be 8 mils in this particular case. And all we
6	have is 29 mils.
7	Mý point here, Judge Baratta is quite
8	correct in the sense that this does arise from how do
9	we position the instrument? Is it a little tilted?
10	Do we hit the same spot time and again?
11	JUDGE ABRAMSON: Have you ever done any of
12	these measurements yourself with this kind of
13	instrument?
14	DR. HAUSLER: Yeah, in a laboratory
15	environment. Not in this particular situation. We
16	have done a lot of similar measurements, of course, on
17	pipelines, current pipelines in the field. So you're
18	right, so the pipeline is uncovered, and of course you
19	don't properly manipulate the instrument in this
20	confined space it's a little bit more difficult.
21	MR. ABRAMSON: It seems to me a critical
22	inquiry here is accepting the idea that there is some
23	inability to replicate these, or that therefore there
24	is some error involved in using the instrument as
25	opposed to instrument error itself.
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574 You've taking a finite sample of data points, and from that developed using standard methodology a number, a numerical value for what is as you call it pure error. But we don't know which way that pure error goes. So how would we use it? How would we use that information? DR. HAUSLER: Well, I think that's - you know, that's why we do statistics. If you have a bunch of data, and you calculate the mean, the data show some sort of a distribution. And you calculate the mean. There is a certain confidence that you can have in that the mean represents the true value of the average of your data universe. But you will never know whether in fact the mean that you have calculated is above the true value or below the true value. You don't know that.

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But there is a way out of this, and that is, that you take a number of samples repeatedly, from the same universe, you get a number of means, and you approach the true mean through that way.

MR. ABRAMSON: Do you have data here that enables you to do that?

DR. HAUSLER: No.

MR. WEBSTER: Can I just clarify?

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MR. ABRAMSON: Wait a minute, this is for

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1.	me to ask questions, and you're an expert. Please let
2	me ask .
3	MR. WEBSTER: Oh, I have no issue also.
4	I'm just suggesting, Judge, that I think what the
5	expert is alluding to is that if the emulsion
6	frequency was increased appropriately -
7.	MS. BATY: Objection.
8	MR. ABRAMSON: Don't testify for him. I
9	asked him a question. I'd like to hear the answer.
.10	MS. YOUNG: And Judge, I think the record
11	should reflect that during Dr. Hausler's previous
12	answers to you that Mr. Webster was whispering words
13	to him. And this happened throughout this proceeding.
14	And the staff would just like counsel to
15	be reminded of his role here. It's not to testify.
16	CHAIRMAN HAWKENS: Thank you. Let's move
17	on.
18	DR. HAUSLER: I would just like to answer
19	that question real briefly. I stopped him from
20	interfering with my testimony. Because I have a one-
21	track mind, and I cannot multitask, and I really have
22	to pay attention to you gentlemen up there. I can't
23	pay attention -
24	Judge Abramson, the answer to your
25	question is no, we do not have enough data points to
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1	go that deeply into the statistics. The basic
2	principle, and what I'm trying to expound on, is
3	called the sensible value theorem. And what that says
4	simply is that the means of samples from the same
5	universe are distributed more narrowly than the data
6	from the universe itself.
7	MR. ABRAMSON: The more data you have -
8	DR. HAUSLER: It is true, the more numbers
9	you have, the more accurately you know things. And we
10	do not really have measurements other than what I have
11	reported here; at least I don't know of any.
12	JUDGE BARATTA: I guess I'd like to hear
13	from AmerGen's witness - I guess Dr. Harlow would be
14	the appropriate one to comment on the statistics at
15	this point.
16	MR. HARLOW: In what regard would you like
17	me to comment?
18	JUDGE BARATTA: Well, what we've heard from
19	Dr. Hausler that he believes there is a certain
20	variability that is associated with repeatability of
21	the measurements, not just - which is different than
22	the location. I was wondering if you had any comments
23	on that or his method of determining that.
24	MR. POLONSKY: Your Honor, are you
25	referring solely to the external? Because I think the
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1	answer might be different if you are talking about
2	internal data points. Is this just about external
3	data points?
4	JUDGE BARATTA: Yes, I believe those are
5	the data points that we are talking about.
6	, MR. HARLOW: With regard to the external
7	data points, it's my understanding that AmerGen is
8	using those primarily as a point to point type of
9	consideration. So local buckling criterion is a point
10	to point thing; the pressure criterion is point to
11	point. So in that regard taking averages really isn't
12	appropriate for that data.
13	The other comment about those point to
14	point things, I do believe that in some of those
15	points there were measurements made close to the point
16	- in fact one of the tables that was just up a minute
17	ago says triplicate measurements at the same spot. I
18	think that means just close to that spot, so that
19	you're actually taking different thickness
20	measurements. It's not exactly the same spot.
21	MR. TAMBURRO: If I could add to that -
22	CHAIRMAN HAWKENS: Please identify
23	yourself.
24	MR. TAMBURRO: I'm sorry, Peter Tamburro
25	for AmerGen. If I could a little bit through the UT
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1	probe, there's a 3/8th of an inch in diameter.
2	However, half that probe sends the signal; the other
3	half receives it. So even if you were to get on the
4	exact same spot you would get a different thickness,
5	an accurate thickness but a different thickness.
6	Per bay 5, the repeat values for locations
7	were not on the exact same spots for any of these
8	bays. And what I'd like to do is go to Exhibit 16,
9	page 171, and AmerGen Exhibit 16, I'm sorry.
10	JUDGE BARATTA: Now what page was that?
11	MR. TAMBURRO: 171. This is a copy of the
12	data sheet that was attached to 24 Rev. 2. So if I
13	could walk through this data sheet, this was the 2006
14	data sheet, it provides the readings for 2006.
15	And yes, there are two, three values for
16	a particular point.
17	MR. WEBSTER: Which page are we at, Mr.
18	Tamburro?
19	MR. TAMBURRO: I'm sorry, 171.
20	So there is a 2006 value to the right
21	under comments. There are other values. For example,
22	if a point up .97 D and down .97. There's a note at
23	the bottom of the table. Note: up-down left-right
24	readings were taken one-eighth inch from reported 2006
25	value reading.
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1	So these values are not of the identical
2	spot, but of different spots, although close to each
3	other, within about an eighth of an inch.
4	So they are not repeat identical values.
5	MR. ABRAMSON: So if I'm reading, help me
6	make sure we're reading this right. Let's walk across
7	for point one. The 1992 measurement was .97. The
8	2006 value was .948. I assume that's on exactly the
9	same spot.
10	Then they went up an eighth inch and they
11	got .97, and they went down an eighth inch and they
12	got .97. Am I reading that right?
13	MR. TAMBURRO: Yes, sir. The only thing I
14	would change is, I can't tell you for certain that the
15	1992 and 2006 were on the exact same spot.
16	MR. ABRAMSON: I see. They took the 2006
17	at some spot which they thought was pretty close.
18	They got .948. They went up an eighth and got .97;
19	went down an eighth and got .97. Similarly for the
20	other data.
21	MR. TAMBURRO: Yes, sir.
22	MR. ABRAMSON: Thank you.
23	DR. HAUSLER: Sir, if I may, that is
24	precisely my point. I don't think you can control
25	your measurements that easily within an eighth of an
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1	inch if you were to go from point to point.
2	JUDGE BARATTA: Don't we - I think we have
3	somebody here that actually did those measurements.
4	MR. POLONSKY: If we could have John
5	Hawkens come back up.
6	We have two people present who performed
7	some of the UT measurements, so we'll start with John
8	Hawkens, and if the board wants to hear from another
9	person you can bring another person.
10	MR. HAWKENS: My name is John Hawkens.
11	In my role I was in the role of an
12	oversight capacity, and also helping the person that
13	was doing the UT thickness readings. So as the
14	oversight capacity I also would take his probe from
15	him and do the same exact spot he did to see if I came
16	up with the same reading. And our readings were
17	always very very close if not exactly the same.
18	But to your point, if it were at the same
19	exact point as the 1992 data, it's very difficult to
20	say, because the ground areas are approximately two
21	inches, three inches in diameter. So I don't know
22	where the 1992 data was taken.
23	MR. ABRAMSON: You were able to put the
24	probe back in the same spot he had.
25	MR. HAWKENS: That's correct.
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1	MR. ABRAMSON: Obviously within less of an
2	eighth of an inch, because you went up an eighth and
3	down an eighth, is that right?
4	MR. HAWKENS: Yes. Most of these locations
5	are either shaped like a plate or like a bowl. If
6	you're on a plate, you can scan anywhere and get
7	similar readings. But if you're in the bowl type
8	ground areas you can actually stand around and find
9	the bottom of the bowl and take the lowest readings.
10	MR. WEBSTER: Could I ask the witness how
11	they product -
12	MR. POLONSKY: Objection.
13	MR. WEBSTER: This goes to discovery, how
14	does AmerGen produce the data recorded when the scans
15	are done.
16	MR. POLONSKY: Richard, we can't answer
17	that question right now.
18	MR. WEBSTER: Let the record reflect I do
19	not recall receiving any scans beyond those in Exhibit
20	16, and would ask AmerGen the question of whether
21	those scans actually -
22	MR. POLONSKY: And the lawyers will handle
23	that after this hearing.
24	CHAIRMAN HAWKENS: Mr. Hawkens, I have a
25	question. You said there was no assurance the 2006
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1	measurement was identical to the 1992 measurement.
2	About how close do you think it was?
3	MR. HAWKENS: I would say we got, per the
4	measurements we were given on the data sheets, you can
5	see that they said 20 inches down and 14 inches to the
6	left. We measured 20 inches down and 14 inches to the
7	left, and put a mark, and measured that location. And
8 _	then we also looked around for the lowest reading in
.9	that area.
10	JUDGE BARATTA: What readings did you
11	actually record?
12	MR. HAWKENS: The lowest readings in those
13	areas.
14	JUDGE BARATTA: The lowest?
15	CHAIRMAN HAWKENS: Who else was prepared to
16	testify on this issue based on their experience?
17	MR. POLONSKY: Mr. Scott Erickson also was
18	- participated in taking UT measurements on different
19	days I believe than Mr. Hawkens, so he can testify to
20	those days that he took UT measurements.
21	CHAIRMAN HAWKENS: We would be interested
22	in hearing from you.
23	MR. ERICKSON: Scott Erickson, GE, General
24	Electric.
25	Basically I concur with what Mr. Hawkens
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1	said. We would measure to the location as given to us
2	for the 1992 data, to the best of our ability to find
3	that same point, scan that area, record the lowest
. 4	reading, and if possible, give an up-down left-right
5	if you we could.
6	JUDGE BARATTA: I don't know who can answer
7	this question. Did - were the '92 procedures for
8	taking the measurements identical to 2006 procedures?
9	MR. McALLISTER: They would have been
10	similar. I think your question is, would they have
11	scanned for the lowest area?
12	JUDGE BARATTA: Basically yes.
13	MR. MCALLISTER: Yes.
14	MR. POLONSKY: I'd just like the record to
15	reflect clearly the individuals here can testify based
16	on their personal experience what they did. There are
17	other bays that were inspected via UT by other
18	individuals, and obviously I don't think these people
19	can speak for exactly what they did.
20	JUDGE BARATTA: But they all used the same
21	procedure, correct?
22	MR. POLONSKY: I believe so, yes. Is that
23	correct, Mr. McAllister?
24	MR. McALLISTER: Compatible procedures, is
25	that correct.
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1	MR. WEBSTER: Is there a written statement
2	of the procedure?
3	JUDGE BARATTA: Is there a written
4	statement of the procedure?
5	Is there a standardized procedure is what
6	I'm asking?
7	MR. MCALLISTER: Yes, it would be done to
8	the ASME code that directs you how to develop a
9	procedure. We're developing codes now. But I can
10	think -
11	JUDGE BARATTA: Is the procedure that you
12	two were using, is that a written procedure that tells
13	them to locate the lowest point and scan around it.
14	To ensure reproducibility for different people who do
15	the measurements in different bays.
16	MR. MCALLISTER: Okay, that type of
17	direction comes out of a specification. It would
18	direct us where to take the readings. I'm not aware
19	of that, what was done in '92, but it's my expert
20	opinion that when we go out to take a fitness reading,
21	looking for a minimum is the objective.
22	JUDGE BARATTA: So you don't have a written
23	procedure that tells them to do that?
24	MR. MCALLISTER: We do for the readings we
25	take now, yes.
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1	JUDGE BARATTA: But you're not sure that
2	they had in `92?
3	MR. McALLISTER: I'm not aware.
4	MR. ABRAMSON: Was there a QA procedure
5	that covered those, do you think?
6	MR. MCALLISTER: I don't know if it's in
7	that TDR given direction. I do not know that.
8	MR. WEBSTER: Is it clear from the record
9	that 2006, did they have a written procedure or not?
10	JUDGE BARATTA: The answer that I heard -
11	would you repeat it please, Mr. McAllister?
12	MR. McALLISTER: Yes, we had written
13	specifications and procedures.
14	MS. YOUNG: Judge Baratta, did you want to
15	hear from the staff on that point?
16	JUDGE BARATTA: Yes, if you have something
17	to add, please.
18	MS. YOUNG: I don't. Mr. O'Hara.
19	MR. O'HARA: Judge, Tim O'Hara, Inspector.
20 <sup>-</sup>	I observed all the inspections that were done in the
21	fall outage of 2006. And there were written
22	procedures, and there was a specification for the
23	supervisors to use. And it was followed in all cases
24	that I observed. And I reviewed all the data sheets,
25	and everything was reported on the data sheets, as it
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1	was directed, and everything was analyzed in
2	accordance with their procedures.
3	So we were satisfied that the 2006
4	inspection was done and documented properly. We
5	didn't observe 1992 so we don't know.
6	DR. HAUSLER: Judge Baratta, could I - I
7	perhaps something to the comparison to the '92 and the
8	2006 data. We have done an extensive statistical
9	analysis, in fact an analysis of variance, because we
10	wanted to find out if there was in fact a bias between
11	the two sets of data. And we found that there is a
12	very small bias. In the first instance we did not
13	include the 2006 data that were not found, were not
14	repeated, and the bias was not statistically
15	significant.
16	In the second instance we included those
17	data but we also showed on the contours, and we found
18	that the bias was perhaps significant at barely 95
19	percent. The bias was very small. It was less than
20	20 mils. And I would say that I am personally quite
21	satisfied that within statistical accuracy the data
22	generated in `92 are exactly the same as the data
23	generated in 2006.
24	If there was a bias it might have been
25	very slight and due to instrumentation. But there is
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1	no real significance to that.
2	JUDGE BARATTA: In your contour plots, what
3	data did you use? Was it just the external data? The
· 4	internal data? Or a combination of the two?
5	DR. HAUSLER: Well, we used the external
6	data, for the reason that we really did not have the
7	elevation of the internal grids. We had it in one
8	instance, and that was bay 17 where we did a
9	comparison between the trench data, the external data,
10	and the grid data. We did have - or we thought we had
11	the elevation of the grid.
12	Otherwise we did not have accurate data or
13	accurate elevations of the grid with respect to the
14	reference point for the external coordinates.
15	JUDGE BARATTA: For the internal
16	coordinates, you mean?
17	DR. HAUSLER: The internal grades were at
18	the elevation of reduced curve, which I think was 11
19	feet. So they were always - they were there. But we
20	did not have the relationship between the location of
21	the internal grid, and the reference point that was
22	used to fix the coordinates for the external data.
23	JUDGE BARATTA: So you felt you could not
24	relate the internal locations 'to the external
25	locations. So you chose to use just the external
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1	locations?
2	DR. HAUSLER: That's correct. We played
3	around once with doing contours for the internal
4	grids, but we didn't feel like there was too terribly
.5	much information gained from that, because AmerGen
6	already identified those measurements for the internal
7	grids were, there was in fact a stratification so to
8	speak, of wall thickness in terms of the elevation.
9	That was already known, there was no really any value-
10	JUDGE BARATTA: Your purpose in using the
11	external were to try to determine if there was
12	additional information you could obtain relative to
13	the stratification in areas that are contour, the
14	thinned areas. Is that what you were trying to get
15	at?
16	DR. HAUSLER: Well, there were a number of
17	reasons why we did that. One reason was to identify
18	bathtub ring. Where is that? What shape does it
19	have? What can we learn from that?
20	And you know, we often do things that you
21.	don't know why you're doing them, and something comes
22	out of it that's perhaps important. And what I
23	thought came out of the contours for the external
24	measurement is the fact that while we talk about the
25	sand bed, and we talk about the elevation of the sand
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1	bed, we all think that's nice, it's a nice layer of
2	sand in there that is horizontal and all that sort of
3	thing, and of course it's not.
4	And the bathtub ring in some areas, you
5	know, was in fact horizontal; has to be observed. But
6	as the contour plots show, it is not that way in all
7	of the bays. You have perhaps in pockets, like in
8	bay, what was that, 13, you have made pockets of
9	corrosion down near the bottom of the sand bed. That
10	may have to do with how uniform is the sand, what is
11	the structure of the sand, does it have air pockets in
12	it, that sort of thing. We felt like maybe you know
13	we could do some thinking about the corrosion
14	mechanism, using that information.
15	But so that's another result that came out
16	of this work, but I cannot say that we actually aimed
17	at that. It's just the result that dropped out.
18	MR. WEBSTER: Can I ask, Dr. Hausler, if
19	the internal grids you thought were fully
20	representative of the full dry well in each bay?
21	DR. HAUSLER: Yes indeed. Of course you
22	know that's the other - that's the other question. We
23	wanted to find out if in fact AmerGen's insistence and
24	assurance that using internal grids for future
25	monitoring will tell us what is going to happen in the
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1	future. We didn't think that the internal grid
2	really was representative of what happened at lower
3	elevations in the sand bed.
4	But as Judge Abramson already pointed out
5	I think, that particular question has become
6	meaningful, because of the need to focus on the
7	corrosion that now happens where the water is rather
8	than where the bathroom - bathtub ring was previously.
9	JUDGE BARATTA: And the only measurements
10	that we have there - no, there are internal
11	measurements down low -
12	DR. HAUSLER: In the trenches.
13	JUDGE BARATTA: In the trenches, yes.
14	DR. HAUSLER: Right. But one day where
15	there was a trench it was really not very corrosive.
16	JUDGE BARATTA: Right, at bay 5, I think.
17	DR. HAUSLER: Bay 5, those, that I don't
18	contribute a great deal to, our understanding of
19	corrosion. And then bay 17 you know is the other
20	trench where we do have data of this kind. And they
21	of course are now on the record now being plotted.
22	JUDGE BARATTA: What bothers me about using
23	just strictly the external data is that there is no
24	doubt that the surface of dry wall on the outside
25	looks like a golf ball, and has hills and valleys on
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it. And while you're looking at these areas that have 1 been ground and such may provide an indication of 2 3 corrosion from one time to another, it's not clear to 4 me that they are fully representative of what the 5 actual thickness is. It gives you minimum thickness, but it doesn't tell you much about the extent of that. 6 7 And because of the number of points that you have 8 doing the contour plots it seems to me thee is too 9 much uncertainty there because you just don't have enough data to be able to reliable estimate that. 10 DR. HAUSLER: Yes, sir, I wholeheartedly 11 12 agree with you. It is one of the difficulties that we are confronted with here, and you are trying to find 13 out or trying to determine whether the corroded areas 14 15 still need acceptance criteria or not, because the relative paucity of data - that's what I used to call 16 17 it earlier. But for the internal grids we have the 18 same dilemma in the sense that the interim grids represent a very small area of the total bay. 19 And 20 you've got there 49 points, it's still a small area. 21 The average may be fairly accurate because we have 49 22 data points, but that doesn't really help us in 23 projecting what the corrosion might be away from the grids. 24

Now I understand that the difficulty was

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-1	that the interim grids had to be placed where they
2	, were placed because that's where there was a cut out
3	in the curve, that's where you could access corroded
.4	spots in the sand bay. But that doesn't - you just
5	don't get past this difficulty of the data set that
6	doesn't really allow us to, at least in my opinion,
7	project what the rest of the area space looks like.
8	MR. WEBSTER: Can I just also ask if Dr.
9	Hausler wants to also have a look at the visual - the
10	reports of the visual inspections from the past just
11	to supplement that answer?
12	JUDGE BARATTA: I think we'll get to that
13	when we do the epoxy coating we'll be talking about
14	some of the visual inspections and such.
15.	MR. WEBSTER: Yeah, I was thinking about
16	the ones that were done before the epoxy coating was
17	put on.
18	CHAIRMAN HAWKENS: Dr. Hausler wants to
19	discuss them, you say?
20	MR. WEBSTER: I would like to ask him if he
21	would like to discuss them.
22	DR. HAUSLER: Well, it has been said time
23	and again that the UT, the locations for UT
24	measurements have been selected visually as the
25	thinnest areas, thinnest remaining areas.
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I did have a problem how one can select a thin area by looking at the surface, particularly in this confined area. So I personally don't believe that we can use the argument that has been put forth, namely, we have selected the thinnest areas, and therefore, the rest of the bay must be thicker than the areas that we have UTED.

And so what I'm saying is, you look at the 8 9 surface that's corroded and you decide that well, here 10 is the thinnest spot. How can you do that? You that unless you actually measure 11 cannot do the You cannot determine just on the surface. 12 thickness. And the way I would explain this is that 13 14 you can have the surface that is very little corroded but has some deep pits in it, and so it does look 15 corroded, but the recess of the surface is very small. 16

Similarly, you could have actually quite big general corrosion, but you have no pitting. So where is the thinnest spot? How do you decide where the thinnest spot is in that situation?

I'd like to perhaps remind the audience that we have reports from Hamilton to the effect that - from Hamilton Consultants to the effect that corrosion was uniform corrosion. So we do know of course from the interpretation of the data that there

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1	was no uniform corrosion, that in fact there was quite
2	a bit of localized corrosion.
3	And what we don't quite know is whether
4	this localized corrosion extended over one inch, two
5	inch, three inch, four inch. We don't quite know
6	that.
7	The inspector who looked at the situation,
8	he said in general except in bay 13 the thin spots are
9	not readily apparent. Well, I would agree with that.
10	MR. ABRAMSON: Okay, we've got your point,
11	Dr. Hausler. Let's not flog this horse anymore. If
12	you have something to add that's new, or that we
13	haven't seen in written testimony, tell us. But
14	remember the purpose is not for anybody here to get on
15	a soapbox. We want to hear new stuff, and want to ask
16	you questions.
17	So I understand that Mr. Webster asked you
18	to go there, and you've gone. Do you have anything -
19	DR. HAUSLER: I apologize, Judge. One
20	should never let me get started.
21	MR. ABRAMSON: Let me rest this part of the
22	proceeding back to what we are about. This panel is
23	supposed to deal with available margin. And I've
24	heard a nice academic esoteric discussion of the
25	uncertainty in all this data, and the paucity of data,
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1	and how it has - may lack statistical significance.
2	But in the end, in the end, this agency
3	had to look at the data that it had and try to decide
4	whether the measurements indicated that it was or was
5	not in compliance with the current licensing basis, so
6	it compared that, and the applicant compared the data
7	it had to both the uniform degradation test and the
8	localized degradation test.
9	What would you have us take away from all
10	that you've been saying for the last two hours. What
11	do you think this data tells anybody about the current
12	state of the liner. Because without information about
13	the current state of the liner, we can't determine how
14	much margin there is.
15	So can you summarize for all this nice
16	academic discussion in two minutes? I'll give you two
17	and a half.
18	DR. HAUSLER: I'll try to do it in a
19	sentence. I think due to the uncertainty the
20	deterioration of the shelf is very likely. There is
21	a high likelihood that it is below acceptance
22	criteria.
23	MR. ABRAMSON: Currently?
24	DR. HAUSLER: Currently.
25	MR. ABRAMSON: And that's because you
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1.	believe that the data is uncertain and you would take
2	a conservative view of which way that uncertainty
3	works?
4	DR. HAUSLER: That's part of it, yes. The
5	other part is that I think I have demonstrated that
6	the contour plots are not fantasy of any sort, but in
7	fact real correlations based on the actual data that
8	had been supported.
9	MR. ABRAMSON: I'm worry, let me interrupt.
10	We looked at the contour plots, and we understand I
11	think what you are postulating from that.
12	But are you saying that those contour
13	plots, without extrapolation beyond the data itself,
14	but just the contour plots of the existing data,
15	without extrapolating beyond the boundaries of the
16	data, those contoured plots demonstrate that there is
17	no margin, that this liner currently fills the current
18.	licensing basis?
19	Let him answer the question, counselor.
20	MR. WEBSTER: Judge, I think I've said
21	though repeatedly before he answers the question that
22	he doesn't really understand what the current
23	licensing basis is. He said in testimony that he
24	would like to see a good statement of the current
25	licensing basis.
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1	DR. HAUSLER: I don't think we actually
2	needs that. Because AmerGen has stated themselves in
3	print that if the contour plots are correct the safety
4	factor is below two. It is 1.9. And I think we take
5	that statement, we all know that we have a problem.
6	MR. ABRAMSON: That's not the question I'm
7	asking though. I'm asking, are you telling me that
8	the data as you see it and as you interpret it, tells
9	you that the liner in its current condition fails
10	either the general degradation criteria or the local
11	degradation criteria. And if it fails one, which one
12	do you think it fails? If it fails both, tell me it
13	fails both?
14	DR. HAUSLER: Sir, it doesn't fail the
15	general. It doesn't fail the general criterion. It
16	fails the localized criterion. I believe it also
17	fails, at least in one point, comes very close to
18	failing, the pressure criterion as well.
19	MR. ABRAMSON: So to me it's quite clear
20	that those are questions about whether it meets the
21	current licensing basis or not. And I don't see how
22	we can - certainly we can't deal with that question
23	now, but it is a fundamental question for whether or
24	not there is available margin to deal with in the
25	future.
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. 1	JUDGE BARATTA: Well, it would seem to be
2	a question that if there isn't available margin, then
3	we'd have to draw certain conclusions relative to the
4	license agreement. Is that what you're saying out of
5 <sup>.</sup>	curiosity, because I'm confused now.
6	MR. ABRAMSON: I don't see that there is
7	any room for confusion in what I said. If there is no
8	available margin, then there is nothing left to
9	degrade for future license. And what that would tell
10	us is, there has to be no corrosion in the future. It
11	doesn't say you can't relicense it. It says under
12	those circumstances you couldn't have any future
13	corrosion.
14	However, saying that the safety margin is
15	less than 2.0 does not tell me there is no available
16	margin, and I think we heard from the staff that that
17	is not their view of it either.
18	But the question is, maybe let me come
19	back to this one more time, Dr. Hausler, does the data
20	tell you that there are areas of this shell where
21	there are eroded troughs which have a one square foot
22	area eroded to or below .536 mils? Does the data
23	tell you that?
24	DR. HAUSLER: No. But I'm not sure that's
25	the criterion either.
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1	MR. ABRAMSON: That's not what I asked you
2	though. I just asked you what the data tells you.
3	And it's up to us to figure out whether the data
4	decides that there is available margin or not, and we
5	have criteria to deal with, and I understand Mr.
6	Webster's challenge to what that criteria means, and
7	that may be something we all unfortunately have to
8	come to grips with.
9	MS. YOUNG: The record should reflect again
10	that Mr. Webster whispered to Dr. Hausler before he
11	gave his last answer.
12	DR. HAUSLER: No, he did not.
13	CHAIRMAN HAWKENS: Thank you.
14	DR. HAUSLER: Honestly, he did not. I was
15	totally focused on you, paying you attention.
16	MR. ABRAMSON: I am satisfied with your
17	answer, thank you, Dr. Hausler.
18	CHAIRMAN HAWKENS: Does AmerGen and the
19	staff have enough energy to go for about 20 more
20	minutes to ask some questions on this point? I don't
21	believe we will completely exhaust all the questions
22	on this topic, although we may. But if we don't,
23	we'll be able to finish them up then very quickly
24	tomorrow.
25	MR. FP: We are prepared to continue, Your
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1	Honor.
2	CHAIRMAN HAWKENS: All right, two points.
3	I heard Dr. Hausler was saying - I'll
4	start off referring this question to AmerGen - there
5	is concern whether the internal measurements, the
6	grids taken, are really on a large enough scale to be
7	representative of - for determining whether it exceeds
8	the general buckling corrosion, although I think he
<b>`</b> 9	concedes that he does not believe that is exceeded,
10	but he is concerned that the localized buckling
11	criteria is exceeded.
12	And I want to hear your views on whether
13	in fact the scope of internal grids are sufficient.
14	Second he said that in his view the
15	external points were not unduly biased then, and I
16	want to hear your response to that.
17	MR. TAMBURRO: Yes, the first question,
18	would you repeat it so I can understand it completely.
19	CHAIRMAN HAWKENS: He was saying in his
20	judgment you just don't know how far the corrosion
21	goes based on the internal measurements. AmerGen, I
22	understand, has reached a different conclusion. Why
23	is that?
24	MR. TAMBURRO: We've reached a different
25	conclusion because of the work we did up front early
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1	in discovering this degradation. In the mid-'80s we
2	performed extensive UT inspections from the inside
3	before we could get access to the sand. And we
4	performed over 1,000 UT readings of the accessible
5	areas, and honed in on these grid areas.
6	So it's not like we picked these grid
7	areas at random. We did some homework, and went in
. 8	and investigated where the thin areas were. We came
9	up with representatives grids what some corrosion -
10	one grid in each bay. Those bays we have since
11	tracked, and since inspected on a periodic basis.
12	Did that answer your question, sir?
13	CHAIRMAN HAWKENS: I believe it does. Does
14	anyone from AmerGen want to supplement that or add
15	anything to it? Or does anybody from the NRC staff?
16	MR. FP: I think the other point to make is
17	that before that investigation was done in the 1980s,
18	before the sand ring was removed, that Mr. Tamburro
19	said was extensively 360 degrees around in elevation,
20	that then they also excavated through trenches, and
21	determined that the worst corrosion was occurring in
22	the upper parts of the sand bed ring. And then later
23	after the sand was removed, and readings had been
24	taken and visual observations on the outside, and you
25	see on some of the maps that have shown where the bias

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1	points were from the external, they were in the
2	bathtub ring, not in the lower region.
3	So all of the data aligns that the worse
4	corrosion was in the upper part of the sand bed
5	region, which aligns with those internal grids.
6	MR. POLONSKY: If the Board is interested
7	in the mechanism of why that might be the case, panel
8	six I think can address that issue.
9	CHAIRMAN HAWKENS: Does the NRC staff have
10	anything to add to that?
11	MS. YOUNG: I believe the answer is no.
12	CHAIRMAN HAWKENS: The answer is no. Well,
13	AmerGen, then if you could answer the second question.
14	I believe Dr. Hausler was saying it's difficult to
15	observe visually what the low points are for taking
16	external readings, so therefore the external readings
17	may not in fact be biased thin.
18	MR. POLONSKY: Your Honor, I thought we
19	have provided the testimony for that previously. But
20	I guess Mr. Tamburro could walk through it again if
21	you would like.
22	CHAIRMAN HAWKENS: Just summarize it for
23	me.
24	MR. TAMBURRO: Again, the reports generated
25	by the people who were there step us through the
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1	procedure which they take. They went into the
2	drywall. They cleaned it off. They removed the
3	corrosion byproducts. They identified six to 12 areas
4	in each bay which were the thinnest. Then they went
5	and ground a good majority of those areas even thinner
6	so that they could get proper UT measurements. That
7	report was authored by the entire project team, and I
8	have no reason to believe that it's not true.
9	CHAIRMAN HAWKENS: And your response to an
10	assertion that it's difficult to visually determine
11	what area is actually thin would be what?
12	MR. TAMBURRO: I was in bay 13, bay 1, and
13	another bay which I don't recall having seen the
14	surface, I could point out six to 12 of the thinnest
15	locations.
16	MR. FP: Your Honor, I'd also point out
17	that in all fairness there is nothing in our
18	assertions that say that the engineers and the
19	technicians in there absolutely identified the
20	thinnest locations. But the thinner locations, and
21	selected enough of them biased thin that they were
22	representative of the thinnest locations.
23	But there is no guarantee that they
24	absolutely found the thinnest. But we've got a lot of
25	data that shows that the ones they did were
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1	representatives of those thin areas.
2	And then after you grind them, you lose
3	maybe as much as 100 mils additional thickness that
4	takes away from what you're measuring.
5	MR. WEBSTER: Objection on the 100 mils; no
6	foundation.
7	CHAIRMAN HAWKENS: Would you like to
8	provide a foundation for that, please?
9	MR. FP: I have seen some data, and I can't
10	quote the exact number.
11	MR. WEBSTER: Objection.
12	MR. FP: If you could help me -
13	MR. POLONSKY: Mr. Polaski, please answer
14	the question first.
15	MR. FP: Wherever the areas were prepared,
16	and in at least one bay, micrometer readings were
17	taken in those areas to the depth of that prepared
18	surface area versus the surface that had not been
19	prepared, and determined those numbers. And I believe
20	Mr. Tamburro is going to be able to find those in the
21	24 Calc.
22	MR. TAMBURRO: Yes, in the 24 Calc we have
,23	for the 1992 external points that were less than 636
24	they performed a series of micrometer readings where
25	they inserted a micrometer within the depression and
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1	measured that insertion relative to the areas around
2	that. A micrometer is basically a straight edge. It
3	has a little pin that goes through.
4	MR. FP: It was a depth micrometer.
5	MR. TAMBURRO: Depth micrometer. In
6	approximately 20 locations they measured those depths,
7	and most of them were in the .1 to .2 range at 100 to
8	200 mil range. Those measurements are in the 24 Calc
9	for each bay, and if you want I can cite to you the
10	pages.
11	CHAIRMAN HAWKENS: That's fine, thank you.
12	The objection is overruled.
13	MS. BATY: Your Honor, can you say which
14	version you were using, AmerGen Exhibit 16, clarify
15	excuse me.
16	MR. TAMBURRO: AmerGen Exhibit 16.
17	MR. ABRAMSON: I would like to just have
18	one follow up question for Dr. Hausler.
19	Dr. Hausler you just noted earlier that we
20	should be concerned about what's going on at the
21	bottom of the sand bed region now.
22	Does any of the data that you looked at
23	give you any insight into the current remaining wall
24	thickness at the bottom of the sand bed region? Your
25	bathtub ring and all the areas of serious degradation
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1	seems to me were well above the bottom. Is that
2	accurate?
3	DR. HAUSLER: Not - a few exceptions.
4	MR. ABRAMSON: Would you use the microphone
5	please, so we can get it in the record.
6	DR. HAUSLER: Ronnie Hausler. There are a
7	few exceptions, and I'm not sure whether it's only
8	one. But yes we have actually observed some rather
9	deep corrosion at the bottom of the sand bed, near the
10	bottom of the sand bed. I think we looked at one of
11	them in either bay 1 or -
12	MR. ABRAMSON: And your contour plots
13	however that we were looking at, most of those
14	seriously degraded areas were quite a ways off the
15	floor; is that right, the brown areas and red areas in
16	the various contour plots were pretty far above the
17	floor?
18	DR. HAUSLER: Yes, sir, that is quite
19	correct. However, as I just pointed out, there are
20	some brown spots.
21	MR. ABRAMSON: Yes, I understand. And when
22	you looked at that data did any of it advise you of
23	the surface area degradation, how much surface area
24	was degraded? Or did any of it extend to a square
25	foot down anywhere near 536 mils?
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1	DR. HAUSLER: Sir, if you have one
2	measurement, say, of 650 mils residual surface area,
3	and you have additional measurements like a foot or
4	two foot away from that, all you will see is a very
5	small area that is -
6	MR. ABRAMSON: Three points, I understand,
7	okay. Thank you.
8	CHAIRMAN HAWKENS: We are going to take a
9	recess and resume tomorrow at 9:00 o'clock.
10	I believe that we will probably have the
11	witnesses on this panel sit for a little bit longer
12	tomorrow morning, and we will finish that up, because
13	I believe that we do have a few more questions on this
14	topic.
15	MR. POLONSKY: Your Honor?
16	CHAIRMAN HAWKENS: Yes.
17	MR. POLONSKY: AmerGen would certainly be
18	willing to start earlier than 9:00 o'clock if the
19	parties and the Board would agree.
20	CHAIRMAN HAWKENS: NRC staff is always
21	agreeable.
22	We were wondering if you'd be able and Dr.
23	Hausler would be able to arrive at 8:00 o'clock
24	tomorrow?
25	MR. WEBSTER: The question is what time
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1	will we finish, Judge. Because I think if make it too
2	long of a day, there is a danger that we are going to
3	start this at the end of the day?
4	CHAIRMAN HAWKENS: We are going to be fresh
5	in the morning. We're going to have to determine when
6	we finish tomorrow.
7	MR. WEBSTER: I guess I'm saying if we have
8	an eight-hour time limit for testifying, then we'd be
9	willing to start at 8:00.
10	CHAIRMAN HAWKENS: I think that's
11	reasonable. I'm not going to provide any assurances
12	now. But believe me, I'm fully on board with that
13	goal and perhaps even less.
14	MR. ABRAMSON: Let me just speak for
15	myself, and I known I don't speak for my colleagues
16	here. But if we can finish tomorrow, we should finish
17	tomorrow.
18 <sup>.</sup>	MR. WEBSTER: I agree. I fully concur,
19	Judge, it'd be very nice to finish tomorrow. But we
20	need to make sure the quality of the testimony is also
21	good.
22	CHAIRMAN HAWKENS: That's paramount in our
23	mind as well.
24	Tomorrow morning we will reconvene at 8:00
25	o'clock, at quarter till 8:00. To the extent that any
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1	party has additional questions on the topics we have
2	covered thus far, principally linked to the line of
3	questioning that was asked today, please provide them
4	to Ms. Wolfe. Any questions on that? If you could
5	provide four copies to her, we'd be grateful.
6	Are there any questions?
7	MS. BATY: One question about the questions
8	they submit, will they need to be typed?
9	CHAIRMAN HAWKENS: Mr. Webster, any further
10	questions, anything?
11	MR. WEBSTER: No, sir.
12	CHAIRMAN HAWKENS: Mr. Silverman, any
13	questions, anything else?
14	MR. SILVERMAN: No, Your Honor, not at this
15	time.
16	CHAIRMAN HAWKENS: Thank you. We are in
17	recess.
18	(Whereupon, the proceedings went off the
19	record at 6:33 p.m.)
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## CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission in the matter of:

Name of Proceeding: Amergen Energy Company

Oyster Creek Evidentiary

Hearing

50-0219-LR

Docket Number:

Location:

Toms River, New Jersey

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken by me and, thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings.

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