

RAS 14182

**Official Transcript of Proceedings**  
**NUCLEAR REGULATORY COMMISSION**

Title: Amergen Energy Company  
Oyster Creek Evidentiary Hearing

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

Location: Toms River, New Jersey

Date: Monday, September 24, 2007

DOCKETED  
USNRC

September 27, 2007 (1:50pm)

OFFICE OF SECRETARY  
RULEMAKINGS AND  
ADJUDICATIONS STAFF

Work Order No.: NRC-1780

Pages 1-334

NEAL R. GROSS AND CO., INC.  
Court Reporters and Transcribers  
1323 Rhode Island Avenue, N.W.  
Washington, D.C. 20005  
(202) 234-4433

## 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, 200719  
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

**NEAL R. GROSS**COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

## 1 APPEARANCES:

2 On Behalf of the Amergen Energy Company, LLC:

3 DONALD J. SILVERMAN, ESQ.

4 ALEX POLONSKY, ESQ.

5 Of: Morgan Lewis &amp; Bockius, LLP

6 1111 Pennsylvania Avenue, NW

7 Washington, DC 20004

8 (202) 739-5502

9

10 On Behalf of the NRC:

11 MARY BATY, ESQ.

12 MITZI YOUNG, ESQ.

13 US Nuclear Regulatory Commission

14 Office of the General Counsel

15 Mail Stop - O-15 D21

16 Washington, DC 20555-0001

17

18 On Behalf of Citizens:

19 RICHARD WEBSTER, ESQ.

20 Rutgers Environmental Law Clinic

21 123 Washington Street

22 Newark, NJ 07102-3094

23 (973) 353-5695

24

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

TABLE OF CONTENTS

1		
2	<u>Opening Statement</u>	<u>Page</u>
3	Amergen	
4	Mr. Polonsky . . . . .	23
5	Citizens	
6	Mr. Webster . . . . .	35
7	<u>Panel</u>	
8	Michael Gallagher, John O'Rourke, Fred Polaski	
9	Hans Asher, Jim Davis, Dr. Hartzman, Tim O'Hara	
10	Arthur Salomon, Rudolf Hausler	
11	<u>EXHIBIT</u>	<u>MARK RECD</u>
12	<u>Citizens</u>	
13	64, 65	16
14	Applicant	
15	62A Dry Well Shell	21
16	62B Dry Well Shell, left quadrant	21
17	62C Dry Well Shell, right quadrant	21
18	62D Dry Well Shell, rear	21
19	62E Dry Well Shell, rear	12

20  
21  
22  
23  
24  
25



P R O C E E D I N G S

9:03 A.M.

CHAIRMAN HAWKENS: Good morning. It's 0900, 9 o'clock a.m. We'll proceed.

This is a hearing in the case of AmerGen Energy Company, Docket No. 50-0219-LR. AmerGen has applied to renew his operating license at the Oyster Creek Nuclear Generating Plant for a 20-year period. AmerGen's application is opposed by six groups that refer to themselves collectively as Citizens and those groups are one, Nuclear Information and Resource Service; two, Jersey Shore Nuclear Watch, Incorporated; three, Grandmothers, Mothers and More for Energy Safety; four, New Jersey Public Interest Research Group; five, New Jersey Sierra Club; and six, New Jersey Environmental Federation.

Citizens argue that AmerGen's commitment to take ultrasonic test measurements of the width of the dry well shell every four years during the renewal period is not adequate to ensure the shell will maintain a sufficient safety margin.

At the outset of this hearing, you'll hear opening statements from the parties that will describe the dry well shell, explain its importance and summarize their respective positions on the adequacy

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 of AmerGen's UT test program.

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

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

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

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealgross.com](http://www.nealgross.com)

1 should also mention that Judge Abramson, in addition  
2 to having a doctorate in nuclear physics, also is  
3 legally trained, authorized and licensed to practice  
4 law.

5 As I mentioned, we are a component of the  
6 Nuclear Regulatory Commission, but this Board is  
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.

11 After today's hearing in the following  
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.  
17 And their decision, in turn, can be challenged by any  
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.

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**  
COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 anticipated schedule is.

2 Before going forward, I would like to  
3 express on behalf of the Board our gratitude to the  
4 Ocean County officials for allowing us to use this  
5 hearing facility. We did use it once before, some of  
6 you may remember, for our limited appearance session  
7 several months ago and they were kind enough to let us  
8 use it again and we're very grateful for that and  
9 especially express our gratitude to Donna Flynn who  
10 has been extremely helpful to us in setting this up.

11 And finally, we'd like to extend our  
12 thanks to the Ocean County Sheriff's Department who  
13 likewise provided terrific support at the limited  
14 appearance session and is again providing support  
15 today. So thank you to them.

16 That concludes my introductory remarks.  
17 Would the parties -- Judge Abramson would like to say  
18 something as well.

19 JUDGE ABRAMSON: Just for clarification  
20 for those of you who are not familiar with our  
21 processes here, what's at issue here is the  
22 application by AmerGen. 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  
25 regulations which have recently been revised. Staff

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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,

1 starting with AmerGen.

2 MR. POLONSKY: My name is Alex Polonsky.  
3 I'm with Morgan, Lewis and Bockius, LLP. We are  
4 counsel to AmerGen.

5 CHAIRMAN HAWKENS: One interruption. When  
6 the individuals do speak, would they please ensure  
7 they speak directly into the mics to assist our court  
8 reporters. Thank you.

9 MR. SILVERMAN: My name is Don Silverman  
10 and I am also with Morgan Lewis and we are counsel to  
11 AmerGen.

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  
20 panels that the Board has asked information about.  
21 Mr. Julien Abramovici, Mr. Jon Cavallo, Scott  
22 Erickson, Michael Gallagher, Barry Gordon, Dr. David  
23 G. Harlow, Gary Harlow, John Hawkins, Edwin Hosterman,  
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.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

6 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 is that these exhibits were not attached to the email  
2 that we sent out with the rest of our exhibits. They  
3 were, however, included in the hard copy which was  
4 overnighted to both AmerGen and the staff on the same  
5 day that the email was sent out.

6 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  
10 on notice that these exhibits would be submitted and  
11 then timely received these exhibits on the Monday  
12 morning and then subsequently, neither AmerGen nor  
13 staff made an objection to those exhibits in their  
14 motions in limine.

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

17 MR. WEBSTER: We now offer them in  
18 evidence, 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.

24 CHAIRMAN HAWKENS: NRC staff?

25 MS. BATY: We obviously with respect to

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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  
4 drain system. We can show that at the appropriate  
5 time, but for the record we wanted to stipulate, and  
6 I think all the parties have agreed that there is one  
7 aspect of this model that's not entirely consistent  
8 with the as-found condition.

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  
12 brought with us and we propose that it be marked as  
13 Applicant's Exhibit 62.

14 CHAIRMAN HAWKENS: NRC staff, any  
15 objection?

16 MS. BATY: The staff has one question.  
17 Would it be better to label the photographs with a  
18 letter, 62A through C, D, to be clear about which one,  
19 perhaps someone is referring to?

20 MR. SILVERMAN: That would be fine.

21 MR. WEBSTER: If I could just add to the  
22 stipulation, I think Mr. Silverman has described the  
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

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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  
8 beginning is apparently unknown right now, so I don't  
9 think we need to get into that level of stipulation.

10 CHAIRMAN HAWKENS: This is the design.

11 MR. SILVERMAN: That is correct.

12 CHAIRMAN HAWKENS: Not the way it was  
13 found. With that understanding, do you have any  
14 objection to it?

15 MR. WEBSTER: No, Judge, no objection.  
16 Thank you.

17 CHAIRMAN HAWKENS: Do you want to mark  
18 these now so we'll know what you're referring to as  
19 you rely upon them?

20 MR. SILVERMAN: Yes. I will identify each  
21 one for the record, Your Honor, as best I can. I  
22 think that the description will differentiate between  
23 the different photographs.

24 The first photograph which we'll mark as  
25 Applicant's Exhibit 62A shows very clearly in the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



1 center top portion of the picture, the words "dry well  
2 shell" and the markings at the bottom are as to other  
3 aspects of the dry well are barely visible. It's the  
4 lefthand quadrant.

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  
10 cylinder, and reactor pedestal.

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  
24 visible.

25 CHAIRMAN HAWKENS: Thank you. Having

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1       been admonished to exercise restraint in proffering  
2       objections and we will do so. We would like to be  
3       clear that to the extent that there is some issue  
4       which is not encompassed within the scope of the  
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.  
10      Silverman.

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  
18      to demonstrate by a preponderance of the evidence that  
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 NRC staff has been given the  
23      opportunity to present an opening statement. They  
24      declined. So after AmerGen, we will hear from  
25      Citizens.

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 Inside the dry well is the nuclear reactor and other  
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  
5 bulb. It is over a hundred feet tall.

6 But the only part that is the subject of  
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  
10 on the outside of the dry well shell. It is no secret  
11 that many years ago there was corrosion in the sand  
12 bed region, significant corrosion in some areas.  
13 Millions of dollars were spent at that time to  
14 identify the causes and to prevent future occurrence.

15 But the corrosion stopped in 1992. That  
16 year, the sand was removed. The exterior dry well  
17 shell surface was cleaned and the clean surface was  
18 protected with a three-layer epoxy coating system.  
19 The epoxy coating system applied then is in excellent  
20 condition today. It has the same shiny reflective  
21 surface that it had when it was applied 15 years ago  
22 and in addition, AmerGen, the owner and operator of  
23 the plant, will be performing ultrasonic testing, also  
24 known as UT, thickness measurements of the dry well  
25 shell every four years to further confirm that the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 proceedings, the ACRS scrutinized AmerGen's aging  
2 management plan for the dry well shell. It too  
3 recommended that the plant be allowed to operate for  
4 an additional 20 years.

5 So why are we here if the technical  
6 experts at the NRC and in academia have concluded that  
7 the aging management program for the dry well shell is  
8 adequate? Because six anti-nuclear groups who have  
9 banded together and now call themselves Stop the Re-  
10 licensing of Oyster Creek speculate that a significant  
11 amount of corrosion might possibly, if the stars align  
12 and reality is suspended, might occur and not be  
13 detected.

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

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

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

7 But cutting through all this baseless  
8 hypothesizing, it is important to remember that the  
9 only question at issue is the frequency of future UT  
10 thickness measurements. The locations where AmerGen  
11 will be taking these measurements it not at issue nor  
12 are the other parts, and there are many of them, of  
13 AmerGen's aging management plan for the dry well  
14 shell. Rather, the only thing at issue is whether  
15 testing every four years is frequent enough. AmerGen  
16 believes it is. The staff and ACRS have concluded it  
17 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  
21 refer to those in much more technical terms. Needless  
22 to say, there is oxygen in the ambient air. The  
23 exterior sand bed region, even though it is sheltered  
24 and protected from the elements, by being located deep  
25 inside a large concrete reactor building, it is

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



1 exposed to ambient air that is circulated through the  
2 building. So there is oxygen in there.

3 As for water, there is no water on the  
4 exterior dry well shell during normal operations.  
5 Water flowing over the exterior dry well shell while  
6 the plant is operating has never been documented in  
7 the 38 years that the plant has been operating. And  
8 condensation? Physically impossible because the metal  
9 shell is hotter than the ambient air during  
10 operations. So without water, there is no corrosion  
11 during corrosion during normal operation.

12 Now the plant does shut down every two  
13 years to refuel for an average period of around 30  
14 days. But that is 30 days every two years. During  
15 those times, the reactor cavity, which is located on  
16 the top of the dry well is filled with water and it  
17 was this reactor cavity that historically was the  
18 source of the water that flowed into the exterior sand  
19 bed region. But each time this cavity is filled with  
20 water, prior to that time, it is protected by a  
21 strippable coating and other means to prevent water  
22 from reaching the sand bed region.

23 During the last refueling outage this past  
24 fall, for example, AmerGen and the NRC staff entered  
25 the sand bed region and did not identify any water

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

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  
10 in 2006. It is in great shape. It is in its  
11 sheltered and benign environment. It can continue to  
12 protect the exterior dry well shell through the period  
13 of extended operation. And the coating's top coat is  
14 a grayish white, purposefully so that if any corrosion  
15 were to bleed through the coating it would clearly be  
16 visible on the surface.

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

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 future corrosion before arriving at the minimum  
2 uniform thickness of 736 mils. From all these facts,  
3 it is rather queer that performing routine  
4 measurements every four years is more than adequate.

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

21 But what Citizens have done is exactly  
22 that. It is statistically inappropriate to select too  
23 few people and only those that look thin when you're  
24 trying to figure the average. Using our analogy, such  
25 statistics would lead to the absurd and incorrect

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 conclusion that only thin people live here in Ocean  
2 County. Moreover, AmerGen has also demonstrated that  
3 corrosion of the interior surface of the dry well  
4 shell, which is embedded in concrete, is essentially  
5 zero and of no engineering concern.

6 The standard that applies here before the  
7 Board is not what petitioners want or desire, but  
8 rather what the governing codes and regulations  
9 require. AmerGen has demonstrated that it will meet  
10 these codes and regulations throughout the license  
11 renewal period. The Licensing Board has many paths to  
12 rule that a four year UT frequency is adequate for  
13 purposes of license renewal.

14 One, the Board can rule that 64 mils is  
15 the bounding average for any of the bays.

16 Two, even if the Board found that the  
17 bounding average was thinner, it could find that the  
18 epoxy coating won't fail.

19 Three, even if the Board found that the  
20 epoxy coating would fail, it could find that it would  
21 not fail in the area in bay 19 which has the bounding  
22 average margin, because of all of the other locations  
23 have more metal and therefore more margin.

24 Four, even if the Board found that the  
25 epoxy coating would fail in the area of the bounding

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 margin, it could find that the coating failure would  
2 not be over a large enough area to be of concern from  
3 a buckling perspective.

4 Five, even if the Board found that the  
5 coating failed over such a large enough area that  
6 happened to coincide with the area in bay 19 of the  
7 bounding available margin, it could find that there  
8 would not be any water present to cause corrosion.

9 Six, even if the Board found there would  
10 be water present in that exact location, it could find  
11 that the water would be limited to outages when the  
12 reactor cavity is filled with water, thereby limiting  
13 corrosion to brief periods of time.

14 Seven, even if the Board found that water  
15 was present all the time, it could find that AmerGen  
16 would detect the water. After all, AmerGen is  
17 checking the sand bed drains for water every three  
18 months and AmerGen would take corrective action as  
19 committed in its aging management program.

20 Eight, and finally, even if the Board  
21 found that AmerGen wouldn't detect the water and  
22 therefore wouldn't take corrective actions, it could  
23 find that the corrosion rate would be so low that a  
24 four year UT frequency would be adequate.

25 To conclude, AmerGen has demonstrated that

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.  
5 The NRC staff, the ACRS, have concurred. We believe  
6 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  
9 to reach the same conclusion. Thank you, and that  
10 concludes our remarks.

11 CHAIRMAN HAWKENS: Thank you, Mr.  
12 Polonsky.

13 Mr. Webster, how much time would you guess  
14 you may need to make that technical correction?

15 MR. WEBSTER: I'm hoping five minutes but  
16 perhaps ten minutes would be safest.

17 CHAIRMAN HAWKENS: Why don't we do ten  
18 minutes to ensure that it is done so you won't have to  
19 have any problems.

20 MR. WEBSTER: Thanks very much, Judge.

21 CHAIRMAN HAWKENS: Ten minute recess.  
22 Thank you.

23 (Off the record.)

24 CHAIRMAN HAWKENS: If we could please  
25 seated, we will resume.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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 has been translated into two acceptance  
5 criteria. One is a criterion that concerns the mean  
6 thickness. The other concerns the local area  
7 thickness.

8 In addition, the very small areas have to  
9 be thick enough so that during the post accident  
10 condition the shell doesn't just blow out under the  
11 pressure of the steam that would be generated during  
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  
16 to areas that are two inches or less in diameter.  
17 That's .49 inches.

18 There is a dispute about the local area  
19 acceptance criterion. This is based on some GE  
20 modeling. Now, as you can see, this is AmerGen  
21 Exhibit 39, Figure 1(a). That modeling in each bay  
22 placed an area that was three feet by one and a half  
23 feet on the edge of the bay. As has been clarified by  
24 Dr. Hausman's (phonetic) testimony, that means that  
25 effectively there was a nine square foot area

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1                   So our visualization of this data, what  
2                   this data is telling us is that the most likely  
3                   scenario for the drywell is that there is a large area  
4                   much larger than four and a half square feet that  
5                   covers the whole bay, which is less than .736 inches.

6                   Thus, we believe that we are way beyond  
7                   the local area acceptance criterion.

8                   Now, AmerGen has done its own analysis to  
9                   assess this issue, and we've compared our analysis,  
10                  that is, Dr. Hausler's analysis, with AmerGen's  
11                  analysis. this is a oval A of Bay 1. This is Exhibit  
12                  61, Figure 1, Citizens Exhibit 61. Broadly, the two  
13                  are in agreement. They make the same assumptions.  
14                  Mr. Polonsky complains that we make the assumption  
15                  that the drywell in between is linearly interpolated.

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

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 that they've taken a good look at this drywell and  
2 they can figure out where the thin areas are, but they  
3 also say there's lots of general corrosion, and it's  
4 very hard to spot the thin areas.

5 And what we're saying is that the  
6 statistics suggest -- the extreme value statistics  
7 suggest that, in fact, there are going to be areas  
8 that are thinner than the very small area criterion.

9 Now, strangely, AmerGen has actually come  
10 along with this pleading and said it cannot find the  
11 margin above the local area acceptance criteria. It  
12 said it knows it's met, but it's not sure what it is.  
13 This is kind of like your doctor saying, "I think your  
14 cholesterol is fine, but I can't tell you what your  
15 cholesterol is."

16 Even if it's true, which we find unlikely,  
17 that AmerGen actually can tell whether it meets the  
18 criterion or not with an appropriate degree of  
19 certainty, that's still inadequate. At best the  
20 margin above the local area acceptance criterion is  
21 tiny. We, therefore, have to know this margin as the  
22 Board has found in order to calculate the frequency.

23 If this margin is not known, then we can't  
24 calculate the frequency, and AmerGen cannot meet its  
25 burden.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

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

17 Now, let's turn to future corrosion.  
18 There's an issue both with interior corrosion and  
19 exterior corrosion. I think everyone agrees that  
20 interior corrosion could occur if water leaks onto the  
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.

25 Exterior corrosion similarly could happen

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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  
6 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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  
6 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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 Hawken, instead of  
24       having bouncing experts, could we just pass the  
25       microphone to the people in the back?

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 where the surface of the sand was because the data  
2 indicate that the corrosion that is being observed is  
3 not like, you know, horizontal, but you know, at times  
4 it is slanted, and so it is difficult to visualize or  
5 assume, in fact, that the sandbed, you know, was in  
6 place in a horizontal fashion so that the water that  
7 drained into the sandbed subsequently, you know,  
8 formed a uniform pattern.

9 Now, you know, coming to your question,  
10 you know, we think by looking both at the internal  
11 measurements as well as the external measurement, that  
12 the majority of the corrosion was a few inches below  
13 the top of the sandbed.

14 JUDGE ABRAMSON: And is that consistent  
15 with your understanding of how corrosion processes  
16 would take place?

17 DR. HAUSLER: Absolutely.

18 JUDGE ABRAMSON: And when the sand was  
19 removed, now that the sand is gone, would you expect  
20 corrosion now to take place if there were any  
21 corrosive environment, to take place in a different  
22 location?

23 DR. HAUSLER: Well, the corrosion will  
24 take place where there is water and where the water  
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

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 load -- there's several load combinations, but there's  
2 two limiting load combinations, and the one is this  
3 refueling case we're talking about and the other is  
4 the post accident case.

5 JUDGE BARATTA: Okay. I think I  
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  
10 an exhibit to point you to?

11 JUDGE BARATTA: Okay.

12 MR. GALLAGHER: This will be Exhibit 40,  
13 AmerGen's Exhibit 40, page 24. So if you look at the  
14 last line there where it talks about post accident  
15 condition, gravity loads plus water load to elevation,  
16 seventy-four, six inches plus seismic, which is two  
17 times the design basis earthquake, that's the post  
18 accident combination, and that's the limiting load  
19 case for membrane stresses, for pressure.

20 JUDGE BARATTA: Okay. What type of  
21 accident are we referring to that would occur?

22 MR. GALLAGHER: That's basically a large  
23 break loss of coolant accident, which would -- you  
24 know, a reactor coolant line break and would  
25 pressurize the primary containment. Peak accident

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 MR. GALLAGHER: Okay. Well, your  
2 emergency cooling systems would inject to take care of  
3 the situation and use the suppression pool as a water  
4 source, and actually if you use the load combination,  
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  
11 what the level would be at under a refueling  
12 condition; is that correct?

13 MR. GALLAGHER: Yes. Well, we're talking  
14 different volumes here. This would be water inside  
15 containment. You know, it would have been injected  
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  
20 refueling cavity, the reactor cavity which is above  
21 the reactor, I can point you to an exhibit to show you  
22 that if you would like.

23 JUDGE BARATTA: If you would.

24 MR. GALLAGHER: Okay. This is AmerGen's  
25 Exhibit 4.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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  
4 about various exhibits, staff witnesses do not have  
5 the stack in front of them, and if it turns out that  
6 there's a follow-up question on that exhibit we would  
7 need to hand them the exhibit while this questioning  
8 is going on in order for them to follow what has  
9 proceeded.

10 So does the Board have any objection to  
11 staff counsel passing a book with relevant exhibits  
12 during your questioning?

13 CHAIRMAN HAWKENS: No objection.

14 MS. YOUNG: Thank you.

15 MR. GALLAGHER: Okay. Judge Baratta and  
16 Judges, if you look at AmerGen Exhibit 4, this is a  
17 cross-section of the primary containment of the  
18 drywell, and I don't know if yours is in color. Is it  
19 in color?

20 JUDGE BARATTA: Yes, it is in color.

21 MR. GALLAGHER: Okay. So the reactor  
22 cavity is the blue cross-hatched area on top of the  
23 reactor vessel, and so that's the volume that contains  
24 the water during the refueling outages, and that was  
25 the source of the water that went into this sandbed

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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  
4 point?

5 Because, you know, obviously if you have  
6 fuel damage your radiation levels in the containment  
7 may be high --

8 MR. GALLAGHER: Okay.

9 JUDGE BARATTA: -- as you mentioned. So  
10 I'm trying to understand the sequence of events that  
11 might occur during an accident.

12 MR. GALLAGHER: Okay. I understand your  
13 question. Well, for an accident such as that,  
14 basically the design basis would be to maintain a  
15 long-term core cooling situation. So you could  
16 maintain a coolable geometry and keep the reactor cool  
17 basically indefinitely.

18 So I think what you're talking about is  
19 when we go into recovery operations, which is, you  
20 know, well beyond the design of the plant. There  
21 would be sufficient time to do careful analysis,  
22 careful planning, careful development of procedures  
23 and that type of thing to go into recovery and  
24 ultimately decommissioning.

25 So I don't think that the question would

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 be really -- you know, we would have to go into a  
2 refueling. I mean, obviously at some point if you  
3 wanted to de-fuel the vessel, you know, you would have  
4 to put water in there and we'd have to deal with that,  
5 but I think that's way beyond, you know, the design  
6 basis and what we would be required to do at this  
7 point.

8 JUDGE BARATTA: Well, what other types of  
9 unanticipated outages could occur which would require  
10 you to go into refueling mode, in other words, to --

11 MR. GALLAGHER: Oh, okay.

12 JUDGE BARATTA: I mean, that's the one  
13 that I came up with.

14 MR. GALLAGHER: Okay.

15 JUDGE BARATTA: Is there something else?

16 MR. GALLAGHER: Well, there has been in  
17 the industry some rare occurrences for, say, the non-  
18 standard refueling outages. Refueling outages are  
19 typically at Oyster Creek every two years.

20 JUDGE BARATTA: Right.

21 MR. GALLAGHER: Okay? The outage you're  
22 probably referring to is if we had to go into the  
23 interior of the vessel, if we had to, say, remove a  
24 fuel bundle, a defect fuel bundle, for instance, that  
25 was detected during operating cycle. You would

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 basically do all of the refueling procedures that you  
2 would need to do in order to access that fuel. So  
3 that happens. That has happened, but it has been rare  
4 occasions.

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

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

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

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

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 about, you know, an actual accident. I 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  
7 would maintain the drywell and insure that we do not  
8 have -- we, you know, approach safety margins. I  
9 mean, you're talking about a recovery situation, which  
10 I think is the exact procedures we used at that point  
11 was speculative, but --

12 JUDGE ABRAMSON: Let's try to clarify this  
13 a little bit.

14 MR. GALLAGHER: Okay.

15 JUDGE ABRAMSON: How many large break  
16 LOCAs have there been in the nuclear industry?

17 MR. GALLAGHER: Zero.

18 JUDGE ABRAMSON: And when you do your  
19 probabilistic risk assessment, what kind of numbers do  
20 you use for the probability of such an occurrence?

21 MR. GALLAGHER: 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.



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  
9 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.

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 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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 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  
19 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealgross.com](http://www.nealgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

6 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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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  
21 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

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  
4 I thought Dr. Hausler said earlier. Perhaps we could  
5 ask the court reporter to read back Dr. Hausler's  
6 earlier response to this. He said something about the  
7 numbers at the bottom of the trench being .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?

17 DR. HAUSLER: I'm referring to Figure 4 on  
18 page 13 in Exhibit B.

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  
22 cement where they dug down to try to get a handle on  
23 what corrosion there was in the bottom of the drywell  
24 shell, the number for thickness is something like .98-  
25 something in your view and in the Applicant's it's

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



1 somewhere between that and --

2 DR. HAUSLER: The lowest point at the  
3 bottom is .4 inches -- .94 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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

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.

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?

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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 not a 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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

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.

4 MR. POLONSKY: Okay. Mr. Pete Tamburro,  
5 Mr. Julien Abramovici, Mr. Martin McAlister, Mr.  
6 Francis Howard Ray, Dr. David Garrett Harlow, Barry  
7 Gordon, Edwin Hosterman. Behind him is John Cavallo.  
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.

11 MS. BATY: Staff has one additional  
12 witness who could be sworn at this time. Arthur  
13 Salomon is standing behind me.

14 MR. WEBSTER: Citizens has no further  
15 witnesses beyond Dr. --

16 CHAIRMAN HAWKENS: You only have a total  
17 of five witnesses?

18 MS. BATY: That's correct.

19 CHAIRMAN HAWKENS: Okay. Gentlemen, would  
20 you please raise your right hand?

21 Do you solemnly swear or affirm the  
22 statements you'll make in this proceeding will be true  
23 and correct to the best of your knowledge and belief?

24 PARTICIPANTS: I do.

25 CHAIRMAN HAWKENS: Thank you very much.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 Let the record reflect they all responded  
2 in the affirmative.

3 MR. POLONSKY: If I could pass the  
4 microphone back to Mr. Pete Tamburro, he can address  
5 this Figure 4.

6 MR. TAMBURRO: My name is Pete Tamburro,  
7 and I'm looking at the Figure 4.

8 JUDGE ABRAMSON: Mr. Tamburro, Figure 4 in  
9 which exhibit? Let's make sure we get it identified

10 MR. TAMBURRO: Citizens Exhibit B.

11 JUDGE ABRAMSON: Citizens Exhibit B,  
12 Figure 4.

13 CHAIRMAN HAWKENS: Which attachment to  
14 Exhibit B?

15 MR. TAMBURRO: The April 25th memo.

16 PARTICIPANT: No, no, no, no.

17 MR. TAMBURRO: Page 13 of the April 25th  
18 memo.

19 JUDGE ABRAMSON: We have an attachment  
20 number we can identify it by.

21 MR. WEBSTER: I believe that's Attachment  
22 3.

23 CHAIRMAN HAWKENS: Thank you, counselor.

24 MR. WEBSTER: If we're going to talk about  
25 Figure 3, there is an updated version of Figure 3

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com



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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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  
23 parties get their hands on such an exhibit, including  
24 the Judges.

25 MR. POLONSKY: Richard, could you please

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

6 JUDGE ABRAMSON: Yeah, let's make sure we  
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.

12 JUDGE ABRAMSON: Yeah, let's work through  
13 17.

14 MR. GALLAGHER: Okay. Seventeen, for  
15 instance, above the horizontal line that's noted  
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

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.  
14 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 bifocals are -- yes, internal. So that would be like  
2 a water line, if there was a water line on the inside.

3 So that's a rectangle. It goes all the  
4 way down, and you can see at the top -- and we're  
5 measuring this from the inside of the drywell. So  
6 these points are all internal measurements, and you  
7 can see there's three squares at the top of that bay,  
8 at the top of that trench. So they would be between  
9 636 and 736. The rest of them are all greater than  
10 736.

11 And as you saw from the other slide, you  
12 know, down to the bottom, it averaged -- I think this  
13 one was 986, 986 mils, and then the right would be  
14 another grid. Okay?

15 JUDGE ABRAMSON: Okay. I think we  
16 understand those. What are the green triangles  
17 indicated below the 11 foot level left of the trench?  
18 What do those tell us?

19 MR. GALLAGHER: Now, below, those  
20 individuals triangles are external, individual  
21 external points taken from when you're in the sandbed,  
22 but they are those individual UT measurements that  
23 we've been taking, and all of those just happened to  
24 be, except that one right at the lower curve line,  
25 greater than 736 mils, and it corresponds to what we

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 corrosion rate, let's wait until we want to talk about  
2 the corrosion rate because we're starting from much  
3 greater thickness than the general buckling criteria.

4 So let's say we're starting from .9  
5 inches and you've got to get to .736 to reach the  
6 general buckling criteria. Then that's a very big  
7 difference than starting at the top of the sandbed  
8 region where thickness is already in some areas  
9 corroded below that, but we may or may not have a  
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  
14 cede the floor to them.

15 MR. POLONSKY: AmerGen can save the  
16 discussion for tomorrow's Panel 6. I just wanted to  
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  
21 tomorrow and Wednesday, but let's see where we go with  
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.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

14 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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  
18 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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  
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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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?

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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 the actual curves --

23 MR. WEBSTER: Can the witness refer to the  
24 actual curves?

25 MR. GALLAGHER: Well, for convenience,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

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?

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 JUDGE BARATTA: Yes, I will ask that  
2 question since he's not supposed to. Okay?

3 MR. WEBSTER: Sorry.

4 JUDGE BARATTA: That's fine because I'm  
5 looking 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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-

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

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 Ouaoou 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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  
9 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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 every 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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  
4 also?

5 Dr. Mehta?

6 DR. MEHTA: Yes, Your Honor. It's the  
7 code case M284 and the ASME code specified, in fact,  
8 to 2.0 for these kinds of --

9 JUDGE ABRAMSON: So how you got to .736 is  
10 really irrelevant, is that correct, because what we're  
11 after now is when you do a buckling load analysis the  
12 worst case you can tolerate and still be in compliance  
13 with the ASME code or code case, whatever that number  
14 was, is .736 uniform degradation. Is that correct?

15 DR. MEHTA: Exactly.

16 JUDGE ABRAMSON: So all this 95 percent  
17 confidence is interesting, but not relevant to what  
18 the system can handle. Is that correct?

19 DR. MEHTA: Yes, sir. It's the .736 mils  
20 all around in the sand bed region throughout the 360  
21 degree of the sand bed region.

22 JUDGE ABRAMSON: Thank you very much.

23 Dr. Mehta, have you had a chance to look  
24 at the information that the Applicant has provided to  
25 us regarding the local acceptance criteria, the one

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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?

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

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 though we model 12 inch and 6  
8 inch width, the 6 inch width is on the other side --

9 JUDGE ABRAMSON: So it's mirror image at  
10 that boundary?

11 DR. MEHTA: Mirror image.

12 JUDGE ABRAMSON: So it's three foot by  
13 three foot.

14 Is that correct?

15 DR. MEHTA: That is correct.

16 JUDGE ABRAMSON: Physically, physically  
17 what's being looked at would be a three foot by three  
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.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 JUDGE ABRAMSON: Okay, if we have one.  
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 JUDGE ABRAMSON: That's the one we saw  
11 earlier, thank you.

12 MR. WEBSTER: Judge --

13 JUDGE ABRAMSON: We've got it.

14 MR. WEBSTER: Judge, I think there's just  
15 one clarifying issue here, which is the nine square  
16 foot area, is that in one bay or is that in two bays?

17 MR. POLONSKY: Your Honor, again, can we  
18 have the parties save their questions until the end of  
19 questioning, especially if they're coming from  
20 counsel?

21 JUDGE ABRAMSON: From my perspective, this  
22 is consummately clear. When you do these analyses,  
23 you assume a reflective boundary condition which makes  
24 it mirror image, so it obviously goes into two 36  
25 degree segments and if you're trying to help me, it

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 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?

20 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,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



1 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 would 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 Reporter.

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  
8 to the various bays and testimony was provided that  
9 talked about the area being between, for example, in  
10 response to Judge Baratta's question, bays 15 and 17.

11 JUDGE ABRAMSON: I don't feel it's my job  
12 to try to explain this to the various counsel here  
13 what the engineering results show, but there are  
14 reflective boundaries on the analysis. They took a  
15 half of one of those sections. There's going to be a  
16 reflection on either side. I think it's quite clear  
17 what this analysis was.

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

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

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 bay. We don't have that.

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

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

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

15 From a stress analysis viewpoint, instead  
16 of using 36 degree sectors, you had chosen larger  
17 sectors, say 72 or something like that and have a nine  
18 square foot area located in the center of a bay which  
19 is different than where you had it, would that have  
20 been more conservative or less conservative relative  
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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 would be -- would give results which would be  
2 conservative compared to what's in the way we have  
3 actually put the area.

4 JUDGE BARATTA: Would be conservative or  
5 would be --

6 DR. MEHTA: Smaller reduction in safety  
7 factor than what is --

8 JUDGE BARATTA: Conservative thought is  
9 something --

10 DR. MEHTA: I apologize.

11 JUDGE BARATTA: It would be  
12 nonconservative, yes.

13 Thank you.

14 JUDGE ABRAMSON: So let's then turn to how  
15 AmerGen picked the three foot by three foot area which  
16 seems to be the other question. Sorry, before I go to  
17 that, staff's witness, what is the current licensing  
18 basis on this small -- what are we calling this? The  
19 small area?

20 MR. POLONSKY: Your Honor, local buckling  
21 criteria.

22 JUDGE ABRAMSON: Local buckling criteria  
23 area. I want to hear from the staff's witness what  
24 the current licensing basis is for the local buckling  
25 area criteria. What's the geometry of the area and

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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?

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701



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: Is it 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?

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 MR. ASHAR: No, sir.

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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  
5 about consistency of the other two parties.

6 CHAIRMAN HAWKENS: Well, let's hear from  
7 Dr. Hausler on consistency of application, localized  
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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealgross.com](http://www.nealgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

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 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 was an update 10 of FSAR. I think that one is a part  
2 of the testimony somewhere, but I don't remember the  
3 exhibit number exactly. But it refers to TDR 1108 as  
4 a part of the statement in the update. That  
5 particular TDR takes us to the definition of report  
6 that we talked about which is called thinned area  
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  
11 the record, the exhibits I think that were just  
12 identified AmerGen submitted relevant portions of the  
13 UFSAR for the Oyster Creek plant as AmerGen's Exhibit  
14 38. And the TDR which is a Technical Data Report that  
15 Mr. Ashar just referred to was previously submitted by  
16 AmerGen as AmerGen's Exhibit 27.

17 JUDGE BARATTA: Could you be specific in  
18 the updated UFSAR as to where it is because I'm  
19 looking for that.

20 MR. POLONSKY: I could consider that  
21 testimony, so I'll defer to Mr. Gallagher.

22 MR. GALLAGHER: Are you asking AmerGen or  
23 the staff? Would you like me to answer?

24 JUDGE BARATTA: Well, either one, because  
25 it's your document, but they reviewed it, so I think

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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      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,



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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 we found no statistical, observable corruptions.

2 JUDGE ABRAMSON: Did that have anything to  
3 do with your current licensing basis? Did it 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 some uncertainty in it.

2 DR. HARTZMAN: That is correct.

3 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?

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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?

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

9 JUDGE BARATTA: Yeah, it depends on the  
10 structure which is --

11 DR. HARTZMAN: The dead, it's the dead  
12 weight of the structure which is fairly well known.  
13 And also the dead weight of the water in the refueling  
14 pool.

15 JUDGE BARATTA: But I mean you have not  
16 actually, there has not been an actual physical  
17 measurement of the strain and stress in those, is that  
18 correct?

19 DR. HARTZMAN: Not that I'm aware of.

20 JUDGE BARATTA: The world that I come from,  
21 the submarine world, we do that. We don't just  
22 strictly count on the calculations for safety reasons.

23 DR. HARTZMAN: I would defer 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.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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  
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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

4 Because the original GE files have gotten  
5 lost. As a consequence, they had to use nominal  
6 properties for the steel, which, as you know, can vary  
7 quite a bit in the as delivered, you know, condition.

8 One of the things that particularly  
9 worried me, when I looked over the various  
10 measurements or the description of the measurements  
11 that have been made, I came across comments about UT  
12 measurements having to have been discarded because  
13 they review inclusions in the steel.

14 And, you know, if we, you know, find a  
15 relatively high frequency of inclusions in the steel,  
16 and, you know, these were not just, you know, one  
17 inclusion, there were several.

18 Now, I really tend --

19 CHAIRMAN HAWKENS: May I interrupt you.  
20 Can you point to where in the record you're referring  
21 to?

22 DR. HAUSLER: I was just getting to that,  
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.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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?

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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 --

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



1 interpretation of Citizens presentation  
2 of the data. Based on your expert  
3 interpretation of AmerGen's data, what,  
4 in your expert opinion, is the current  
5 factor of safety?

6 DR. HARTZMAN: I would have to say  
7 that it's probably about two, even  
8 greater than two. For the simple reason  
9 that the criteria, and this is what we  
10 have been stressing all along. The  
11 criteria were based on the uniformly  
12 degraded shell, 2.736. Obviously, the  
13 shell, the measurements that have been  
14 shown, that have been taken, just  
15 considering the data by both Citizens and  
16 AmerGen, show that there is more than  
17 .736, on average.

18 So, we must conclude that there are  
19 thick, the shell is thicker, over most of  
20 the 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 can't tell without doing an actual  
24 calculation.

25 JUDGE BARATTA: Thank you, court reporter.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealgross.com](http://www.nealgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 Mr. Fred Polaski, who was introduced previously. Mr.  
2 Pete Tamburro was also introduced previously; Dr.  
3 David Gary Harlow from Lehigh University, AmerGen's  
4 expert in statistics.

5 To his right is Mr. Martin McAllister, who  
6 is an NDE level III. If I didn't get that right,  
7 you'll correct me, Marty, technician and training  
8 person at Oyster Creek station. He is here to answer  
9 any questions on how the UT measurements themselves  
10 are taken on the UT equipment.

11 And then behind me and slightly to my left  
12 since we ran out of seats, sitting in the first row,  
13 the pews, is Mr. Julien Abramovici, who was a  
14 contractor to AmerGen called Enercon. He also is a  
15 former employee of the prior owner and operator, GPUN,  
16 and has historic experience regarding the corrective  
17 actions, et cetera, at the sand bed region.

18 CHAIRMAN HAWKENS: Thank you.

19 MS. BATY: For the staff, NRC staff, the  
20 same panel group of witnesses for this panel, Mr.  
21 O'Hara, Dr. Davis, Mr. Ashar, Dr. Hartzman. And  
22 seated behind our row of witnesses is Mr. Salomon, who  
23 is also testifying on this panel.

24 CHAIRMAN HAWKENS: Thank you.

25 MR. WEBSTER: On this panel will be Dr.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 Hausler from First Citizens.

2 CHAIRMAN HAWKENS: Thank you. And the  
3 witnesses are all reminded once again they're sworn  
4 from earlier this morning and remain under oath or  
5 affirmation. Thank you.

6 JUDGE ABRAMSON: All right. Let me start  
7 this. For AmerGen, what is the minimum thickness you  
8 have found near the bottom of the sand bed region, the  
9 minimum data; a single data point, the smallest  
10 thickness you found near the bottom of the sand bed  
11 region?

12 MR. POLASKI: Mr. Tamburro will answer  
13 that. And we will have to look and find that number.

14 JUDGE ABRAMSON: Okay. And then let's  
15 talk about how big an area that might extend over?

16 MR. TAMBURRO: Near the bottom of the sand  
17 bed, are we talking within a foot, two feet?

18 JUDGE ABRAMSON: Well, let's talk within  
19 a foot. We may want to go lower than that, but what  
20 I'm concerned about is the following. The sand has  
21 been removed. The only place that is going to hold  
22 moisture is the floor.

23 So the question is, if we're going to have  
24 corrosion now, is it likely to be near the floor? So  
25 I am interested in how thick is it near the floor.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

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-eighths of an inch  
21 in diameter. So it's over an area less than  
22 three-eighths 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?

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 MR. TAMBURRO: That's correct, Your Honor.  
2 There is one yellow triangle below elevation,  
3 ten-foot.

4 MR. POLASKI: Your Honor, if I could add,  
5 those six triangles are up in the area up at the top  
6 of where the sand was.

7 JUDGE ABRAMSON: That's above the sand  
8 bed.

9 MR. POLASKI: Yes.

10 JUDGE ABRAMSON: So if I look at what is  
11 actually in the sand bed, the yellow triangle is  
12 somewhere between nine-foot and ten-foot. Were there  
13 no measurements down near the bottom of the sand bed  
14 in any of the regions?

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  
18 about the bay one, where we see one yellow point and  
19 two green points, which those of you who can't see  
20 this, this one is yellow. Those two are green. Is  
21 that right?

22 MR. TAMBURRO: Yes, sir.

23 JUDGE ABRAMSON: Are those the only data  
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.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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  
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  
10 of the external points in that region.

11 One thing I could -- I would like to point  
12 out, the squares are points less than 736. The  
13 triangles are greater than 736.

14 MR. POLASKI: Now, those are all single  
15 points, which correspond to the triangles on the  
16 previous map that we were looking at that had the  
17 green and the yellow on it?

18 JUDGE ABRAMSON: I am having difficulty  
19 correlating these two figures. Can you --

20 MR. TAMBURRO: This bay, Your Honor, is  
21 scaled. It's only bay one. And the one thing that I  
22 would have to point out, they are a mirror image of  
23 each other.

24 So, for example, the yellow triangle I  
25 pointed out on the previous sketch is the square at

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701



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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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 --

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

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  
6 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.

9 The scales are different. The tray is a  
10 square. However, because of the scaling, you see a  
11 rectangle. With that envelope of the tray over the  
12 points, again, the points are plotted according to  
13 their x and y coordinates from the data sheets. The  
14 tray is also modeled according to its x and y data  
15 sheet from the -- by its size.

16 We then look at the profile in two  
17 directions. So if you look at the bottom of this  
18 figure, there is an arrow saying, "Profile in figure  
19 1-4." And then if you look to the side on the right,  
20 you see "Profile in figure 1-5." We're taking a  
21 two-dimensional cut in two directions: one up and one  
22 to the left.

23 So the next figure, figure 4.1, which is  
24 page 31, plots the criteria as its position and the  
25 points which are less than 736. By showing that the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



1 attempted to do that. In order to do that, in order  
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  
6 other locations beyond that would require removal of  
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 --

18           JUDGE ABRAMSON: Let's take a look at  
19 that.

20           MR. WEBSTER: Can I just clarify one  
21 point? I think the record is quite clear that not all  
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.  
WASHINGTON, D.C. 20005-3701

1 actually in areas where there was no corrosion, just  
2 to get some readings on that. So those did not have  
3 to be ground because the surface had never been  
4 corroded.

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.

11 MR. McALLISTER: I believe that is  
12 correct. The area was corroded to a point where you  
13 could not do the ultrasonic test without surface prep.

14 JUDGE ABRAMSON: Please, Mr. Tamburro?

15 MR. TAMBURRO: The exhibit that Fred was  
16 describing is AmerGen exhibit 44. And it provides an  
17 accurate mapping of the four bays that had the worst  
18 corrosion.

19 The last page, bay 19, shows an example of  
20 how the external points lie right next to known  
21 internal grids. So if I could walk through this  
22 sketch here -- this exhibit? Excuse me. For example,  
23 external point 9, which is in the center but slightly  
24 to the right, had a thickness in 2006 of 728 mls.

25 Slightly to the left of it, within about

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

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  
6 time.

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  
15 local buckling criteria, 736 mls. Did I say local?  
16 I apologize. General buckling criteria of 736 mls.

17 JUDGE ABRAMSON: Okay. Dr. Mehta, if I  
18 may, when GE does the analysis and builds finite  
19 elements, the finite elements were three by three. Is  
20 that correct?

21 DR. MEHTA: Yes, Your Honor.

22 JUDGE ABRAMSON: And am I correct in my  
23 belief that when one does finite element analysis, one  
24 has to have a set of properties assigned to each  
25 element? And, therefore, there would be a thickness

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 assigned to that element as a whole? So each three by  
2 three element has a thickness assigned to it and other  
3 physical properties, structural, et cetera?

4 DR. MEHTA: And each one when we did the  
5 sensitivity analysis, other than the thickness, the  
6 properties of the elements were the same.

7 JUDGE ABRAMSON: Okay. So for each  
8 three-inch by three-inch element, it had uniform  
9 properties?

10 DR. MEHTA: It had the uniform properties.

11 JUDGE ABRAMSON: Okay. Across that  
12 three-inch by three-inch?

13 DR. MEHTA: Yes, sir.

14 JUDGE ABRAMSON: Now, if you were going to  
15 do structural analysis, would there be any basis to  
16 use anything other than the average properties for  
17 that three-inch by three-inch element?

18 In other words, would one get more  
19 representative results in a finite element analysis if  
20 one used the thinnest measurement in that three by  
21 three or the thickest? What would give you the most  
22 representative buckling analysis?

23 DR. MEHTA: Well, Your Honor, when we use  
24 shell analysis, there is a parameter called square  
25 root of radius times thickness. It is a

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 representative of how far any local events will  
2 travel.

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

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

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

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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 buckling?

25 DR. MEHTA: Your Honor, the parameter,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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  
15 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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 of the buckling. We're not talking about  
2 conservative. We're talking about the best estimate  
3 of what safety margin is remaining for buckling.

4 How would you think is the best way to  
5 take these, let's say, 7 by 7, these 49, data points,  
6 these 49 data points, and from them generate the  
7 physical property, the thickness that one should use?  
8 Do you want to talk about that?

9 DR. HAUSLER: All right. The 49 data  
10 points, Your Honor, refer to the internal grids. In  
11 other words, that's -- and those are very small areas,  
12 you know, with respect to the rest of the bay. So we  
13 have to keep that in mind that this, you know, even  
14 though they are 49 points, they're still representing  
15 a relatively small area.

16 I mean, just the mere fact that we make a  
17 lot of measurements doesn't really, at least to my  
18 mind, mean that we now have assessed a large area. We  
19 still have only assessed a small area.

20 Then to come a little bit closer to your  
21 question, we have 49 points and what do we do with  
22 them, well, if, in fact, those points are distributed  
23 according to, say, you know, Gaussian distribution,  
24 I'm thinking it would probably be all right to  
25 calculate an average and say that this average

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 represents this particular area.

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

12           You know, looking at the six by six-inch,  
13 seven by seven-inch area, I don't think you can do  
14 very much more than just calculate an average. And,  
15 you know, compare that to a criterion. I think --

16           JUDGE ABRAMSON: Mr. Webster, if you are  
17 going to ask him questions, let's ask them openly,  
18 please. If you are going to ask him to respond to  
19 something, don't just stick a paper under his nose.  
20 Everybody is trying to do this in the open. If you  
21 want to prompt him, let's prompt him and hear what he  
22 has to say.

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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  
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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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  
10 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  
24 would be one foot by one foot if we drew a --

25 MR. TAMBURRO: Yes, sir. Yes, sir.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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  
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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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.

1 DR. HAUSLER: Well, the area that we're  
2 talking about is, at least according to this graph,  
3 36-inch by 44 or maybe 36 by 42, which is more than 9  
4 square feet. And the average thickness is less than  
5 700, which according to again the current licensing  
6 basis local wall thickness buckling criteria would not  
7 fit that criteria.

8 JUDGE ABRAMSON: Dr. Hausler, help me  
9 understand this. 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 dimension. So that adds up to nine square feet.

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

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

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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  
13 the spatial envelope of the tray, it is our legal  
14 assertion it, therefore, goes beyond the CLB.

15 JUDGE ABRAMSON: Well, you are certainly  
16 free to make that argument in your proposed findings,  
17 sir.

18 MR. WEBSTER: Well, in order to do that --

19 CHAIRMAN HAWKENS: May I interrupt,  
20 please? I would like to hear AmerGen's response to  
21 that, please.

22 MR. POLASKI: Mr. Tamburro will respond to  
23 that.

24 MR. TAMBURRO: We disagree.

25 CHAIRMAN HAWKENS: That's the short

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1           So, therefore, we are contending on day  
2 one of relicensing the plant will be beyond the CLB  
3 because the CLB requires the corroded areas to be  
4 contained by the spatial envelope of the trays.

5           And if the corrosion on day one 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. I  
10 think we are into an academic question because I think  
11 if our panel could be allowed to attack each of these,  
12 we would be able to demonstrate that there are no  
13 current areas that are greater than 36 inches by 36  
14 inches that are less than 736.

15           The way that Mr. Tamburro has analyzed the  
16 data in his various calculations has been extremely  
17 overly conservative. He has assumed in some cases  
18 only the thinnest points were present and ignored the  
19 thicker points and has also assumed at times that the  
20 remainder of the shell outside of that is at 736.

21           I mean, those are all so overly  
22 conservative. And we have data, real hard data, that  
23 we know the areas between those points are thicker  
24 than that.

25           JUDGE ABRAMSON: This may be actually a

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 calculation. I don't know. It could. But the tray  
2 evaluates those three points.

3 JUDGE ABRAMSON: The tray evaluates those  
4 points, but what I think we're hearing here is an  
5 allegation that the three-foot by three-foot tray is  
6 not the only piece of the current licensing basis that  
7 if the corroded area is a shape that's, say, one-foot  
8 by nine-foot, that is outside the three-foot by  
9 three-foot tray and, therefore, is not within the  
10 current licensing basis. And that I think is a legal  
11 question, a very difficult legal question, which I was  
12 hoping maybe we could avoid dealing with if we can  
13 look at the data and find another way to analyze it.

14 Have I picked up what it is you are  
15 concerned about here? If we take those other three  
16 points and average the thin points, we're going to get  
17 a number less than .736 here.

18 MR. TAMBURRO: That's exactly right.

19 MR. WEBSTER: There are two things.  
20 That's one thing, but the other thing is that the  
21 boundaries of that tray are not well-defined. There  
22 are no data points that tell you where the edges of  
23 the tray should be. You could make the tray a foot  
24 bigger on each side.

25 JUDGE ABRAMSON: What we are all missing

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701



1 here is this. The limiting analysis assumed that the  
2 three-foot by three-foot tray was at the peak in the  
3 buckling wave, which meant it had to be at 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  
8 of that.

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 MR. WEBSTER: -- at the peak of the  
14 buckling. As we look at the edges here, that  
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 --

18 JUDGE ABRAMSON: It's a nine square foot  
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  
24 the numbers? Five percent? Seven percent? 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.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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 --

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.  
20 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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 credence 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealgross.com](http://www.nealgross.com)

1 procedure, but in fact a procedure developed by one of  
2 the foremost statistical companies in the country,  
3 well then, perhaps, we might have a suggestion that  
4 the corrosion is actually more severe than have been  
5 willing to believe based on just the data that we have  
6 interpreted.

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

12 MR. WEBSTER: Judge, before you put it  
13 off, could I just ask Dr. Hausler to do a little bit  
14 of work on dimensions there, just to put some  
15 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  
19 than 700, or less than -- actually, more like less  
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  
24 inch times 15 inches. So if you take it all together,  
25 it's really a very large area.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

6 MS. YOUNG: Judge Hawkens, staff is going  
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  
10 understand the need maybe to clarify one point, but  
11 when it becomes two or three points, we have a concern  
12 in terms of why we're here for this hearing, which is  
13 for the Board to ask us questions. In addition, in  
14 looking at Dr. Hausler's exhibit or Citizen's exhibit,  
15 we just would like to note for the record that the  
16 Board and parties need to be mindful that the colors  
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  
22 charts thickness less than 740 was in red.

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealgross.com](http://www.nealgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 It is used for all kinds of multi-variable studies, et  
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  
6 is that there are, indeed, areas that may be -- there  
7 are additional areas that may be severely corroded,  
8 that are not captured within the data that have been  
9 so far presented.

10 JUDGE ABRAMSON: Dr. Hausler, let me ask  
11 you a couple of questions. First of all, do you know  
12 how this computer code was written, or what the  
13 constitutive equations are in this code that does  
14 this extrapolation?

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.

19 JUDGE ABRAMSON: Are you are a frequent  
20 user of this code?

21 DR. HAUSLER: Yes, I am.

22 JUDGE ABRAMSON: Okay. And you believe  
23 it's in wide use, this code?

24 DR. HAUSLER: As far as I know, it is.  
25 Yes.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 JUDGE ABRAMSON: You've used this code now  
2 to extrapolate outside the existing data. Right? To  
3 expand the areas, that's what you're suggesting, that  
4 because we don't know what is outside region, the data  
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  
10 experimenter to speculate outside the experimental  
11 areas to a certain extent.

12 JUDGE ABRAMSON: Yes. And how far have  
13 you extended this physically outside the area of the  
14 data points?

15 DR. HAUSLER: Well, essentially, what has  
16 been done is that, as you can see, you have the area  
17 from 30 to 48 on the previous slide on the horizontal,  
18 it goes from 30 to 48, and the extrapolated slide goes  
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  
23 go from here from minus 40, which was also minus 40  
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  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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 Hawken 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

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

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

17 CHAIRMAN HAWKENS: The Board is ready.

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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 HAWKENS: 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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  
23 you could make the analysis that the experts have made  
24 here today.

25 JUDGE ABRAMSON: Perhaps you can just

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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?

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealgross.com](http://www.nealgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 duplicate or triplicate. Now there were essentially  
2 two numbers were calculated, and I want to refer to  
3 that perhaps a little bit in detail. You can take all  
4 the numbers that have been generated in the duplicates  
5 on various locations, and calculate the average, and  
6 calculate the standard deviation. Now that standard  
7 deviation or variability that you would calculate in  
8 that way, in other words, from the ensemble of all the  
9 data points that you have, would really represent a  
10 combination of two effects; that is, the location  
11 effect, as well as the effect of reproduction. In  
12 other words, the error, so one -- and this has  
13 bothered us all along that we could not really  
14 separate out the pure error from the location effect.  
15 And in this particular case, in these five bays, four  
16 or five bays, where duplicate measures have been made,  
17 we actually used the duplicate measures, and  
18 calculated from the duplicates or triplicates the  
19 averages and the variances, and then we pooled the  
20 averages for all the -- I'm sorry, we pooled the  
21 variances for all of the duplicate and triplicate  
22 measurements for one bay, and calculated the pure  
23 error in that manner, and compared the pure error to  
24 the overall variability. It is basically an approach  
25 of analysis of variance to separate out two different

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 10?

2 DR. HAUSLER: That would be page 10, yes.

3 JUDGE BARATTA: That has Table 1 and Figure  
4 1 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 the - .96 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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  
4 seems vary with the - let's see, what was that  
5 standard deviation. There is a relationship between  
6 the standard deviation of the measurement and the  
7 standard deviation of, you know, which is the overall  
8 varied data field measurements.

9 The point being that the standard  
10 deviation in terms of the pure error is actually  
11 larger than the standard deviation that is usually  
12 quoted for the instrumentation.

13 JUDGE BARATTA: Would you attribute this  
14 then to inability of replacement and such? Because  
15 unlike the internal measurements where there's a grid  
16 that you're actually putting the probe into - and  
17 Amergen, please feel free to correct me if - I think  
18 one of the gentlemen here has actually done this -  
19 when you're doing the external measurements you are  
20 trying to locate coordinates, a point, as opposed to  
21 actually having something that is there, is that true?  
22 That tells you, X marks the spot?

23 MR. FP: Yes, that is true. There were not  
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.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealgross.com](http://www.nealgross.com)

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.

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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 -

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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  
4 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 My 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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1           You've taking a finite sample of data  
2 points, and from that developed using standard  
3 methodology a number, a numerical value for what is as  
4 you call it pure error. But we don't know which way  
5 that pure error goes. So how would we use it? How  
6 would we use that information?

7           DR. HAUSLER: Well, I think that's - you  
8 know, that's why we do statistics. If you have a  
9 bunch of data, and you calculate the mean, the data  
10 show some sort of a distribution. And you calculate  
11 the mean. There is a certain confidence that you can  
12 have in that the mean represents the true value of the  
13 average of your data universe. But you will never  
14 know whether in fact the mean that you have calculated  
15 is above the true value or below the true value. You  
16 don't know that.

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

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

23           DR. HAUSLER: No.

24           MR. WEBSTER: Can I just clarify?

25           MR. ABRAMSON: Wait a minute, this is for

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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. Hawken, I have a  
25 question. You said there was no assurance the 2006

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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. Hawken, 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. Hawken

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



1 it. And while you're looking at these areas that have  
2 been ground and such may provide an indication of  
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,  
6 but it doesn't tell you much about the extent of that.  
7 And because of the number of points that you have  
8 doing the contour plots it seems to me there is too  
9 much uncertainty there because you just don't have  
10 enough data to be able to reliably estimate that.

11 DR. HAUSLER: Yes, sir, I wholeheartedly  
12 agree with you. It is one of the difficulties that we  
13 are confronted with here, and you are trying to find  
14 out or trying to determine whether the corroded areas  
15 still need acceptance criteria or not, because the  
16 relative paucity of data - that's what I used to call  
17 it earlier. But for the internal grids we have the  
18 same dilemma in the sense that the interim grids  
19 represent a very small area of the total bay. 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  
24 grids.

25 Now I understand that the difficulty was

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 I did have a problem how one can select a  
2 thin area by looking at the surface, particularly in  
3 this confined area. So I personally don't believe  
4 that we can use the argument that has been put forth,  
5 namely, we have selected the thinnest areas, and  
6 therefore, the rest of the bay must be thicker than  
7 the areas that we have UTED.

8 And so what I'm saying is, you look at the  
9 surface that's corroded and you decide that well, here  
10 is the thinnest spot. How can you do that? You  
11 cannot do that unless you actually measure the  
12 thickness. You cannot determine just on the surface.

13 And the way I would explain this is that  
14 you can have the surface that is very little corroded  
15 but has some deep pits in it, and so it does look  
16 corroded, but the recess of the surface is very small.  
17 Similarly, you could have actually quite big general  
18 corrosion, but you have no pitting. So where is the  
19 thinnest spot? How do you decide where the thinnest  
20 spot is in that situation?

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.

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 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.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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  
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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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 representative 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

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?

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)



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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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 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

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

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.)  
20  
21  
22  
23  
24  
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](http://www.nealrgross.com)

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 Hearing

Docket Number: 50-0219-LR; 06-844-01-LR

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.



James Salandro  
Official Reporter  
Neal R. Gross & Co., Inc.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)