

RAS 12354

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KAREN VALLOCH, ASLBP Staff

DR. JORAM HOPENFELD

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## I-N-D-E-X

EXAMINATION

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EXHIBIT INDEXKEY

I-Identified

A-Admitted into evidence

R-Rejected

W-Withdrawn

TUA-Taken under advisement

Official Hearing Document

Disposition/

Exhibit #/letter Title

Page

(None.)

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## P R O C E E D I N G S

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CHAIR KARLIN: Good morning. We are back on the record this morning. We intend to proceeding with the witnesses presented by the Staff. And then we will have the witness for New England Coalition come up.

And at that point, as I said yesterday, we will take a break, 15 minutes, 10 minutes, something like that, where you can then submit to us, at the end of that time frame, questions that you might, supplemental questions you might suggest that we ask of any of the witnesses who have appeared.

We will then consider those and decide whether to ask either those questions, or any supplemental questions we may have thought of after having heard from the various panels.

And then we will proceed to the proprietary session. And pursue the same format, approach.

So with that, Mr. Hamrick, Mr. Turk, if you would bring your witnesses forward, we are going to just proceed with that. And thanks to whoever put the signs up in terms of the names. That is helpful.

Good morning. Let me remind you all that

1 you are still under oath, and to testify to the truth,  
2 and I'm sure you will remember that.

3 Whereupon,

4 RICHARD B. ENNIS

5 STEVEN R. JONES

6 ROBERT L. PETTIS

7 GEORGE THOMAS

8 ZENA ABDULLAHI

9 were recalled as witnesses by Counsel for the Staff  
10 and, having been previously duly sworn, assumed the  
11 witness stand, were examined and testified as follows:

12 CHAIR KARLIN: I think I may start with a  
13 few questions here. I would like to ask a few  
14 questions about the standard review plan, which is  
15 Entergy exhibit 4, I believe.

16 And walk and talk about the factors and  
17 criteria, this sort of thing, that appear at page  
18 14.2.1-7. May I ask, Mr. Ennis, who do you think, who  
19 is the best person to talk about those factors?

20 WITNESS ENNIS: It would be a combination  
21 of Mr. Jones and Mr. Pettis.

22 CHAIR KARLIN: All right, Mr. Jones and  
23 Mr. Pettis.

24 WITNESS JONES: Okay, thank you.

25 CHAIR KARLIN: And I will focus my

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1 questions to Mr. Jones and Mr. Pettis, and then if  
2 someone has some great additional point to make, you  
3 know, I would be glad to hear that, too. But I don't  
4 think it is really going to go that way.

5 So let's start with Mr. Jones. On 14.2.1-  
6 7 it has use of evaluation to justify elimination of  
7 power ascension test, right?

8 WITNESS JONES: Yes.

9 CHAIR KARLIN: And this is what we are  
10 talking about here, and what Entergy submitted, a  
11 justification to do that.

12 Now, as I understand the fourth and fifth  
13 lines of the general discussion, it says that the  
14 licensee shall provide an adequate justification for  
15 each of these normally required tests.

16 So these tests are normally required, the  
17 MSIV closure test is normally required? Is it a  
18 normally required -- that is what it says, doesn't it?

19 WITNESS JONES: It is referenced in REG  
20 Guide 1.68, it would normally be part of a startup  
21 test program. And it is listed in table 2 of the  
22 standard review plan, as a transient test applicable  
23 to power uprate, in that sense, yes.

24 CHAIR KARLIN: So the REG Guide, I'm  
25 sorry, not the REG Guide, the standard review plan

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1 refers to the MSIV closure test and the generator load  
2 rejection test as normally required power ascension  
3 tests.

4 Attached to this is an attachment 2 which  
5 has that as one of the tests, doesn't it?

6 WITNESS JONES: Yes.

7 CHAIR KARLIN: Okay. Let me go to C-2.  
8 It says, specific acceptance criteria. Now we get  
9 into the criteria. It is on the same page, C-2.

10 WITNESS JONES: All right.

11 CHAIR KARLIN: The reviewer should  
12 consider the following factors when assessing the  
13 adequacy of the licensee's justification, all right?

14 And then it goes through factors A,  
15 previous operating experience; B, introduction of new  
16 thermal hydraulic phenomena; C, D, E, F, and G, right?  
17 And these are the factors to be considered by the  
18 Staff, I guess, when making a decision on this?

19 WITNESS JONES: Yes.

20 CHAIR KARLIN: I just want to -- once you  
21 have considered those factors, what are the criteria  
22 for deciding whether to grant the elimination of these  
23 tests?

24 These are factors, what is the criterion  
25 that you use? After you have considered all these

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1 factors, how do you make your decision?

2 WITNESS JONES: As I mentioned yesterday,  
3 in REG Guide 1.68 it describes how the scope of the  
4 testing should be applied relative to the safety  
5 significance of the equipment. And I think that  
6 continues to be applied through all these criteria,  
7 depending on how important a particular system, or  
8 component, is to safe operation of the plant.

9 It would determine to what extent these  
10 criterion would be applied. Safety related equipment  
11 would need to conform to all the elements of Appendix  
12 B. Important to safety equipment, or like most of the  
13 balance of plant systems, would be somewhat of a lower  
14 threshold of review.

15 In that we are not looking for, when it  
16 mentions code application, we wouldn't be looking for  
17 a code that had been implemented, fully, in accordance  
18 to the quality assurance program, but had just been  
19 merely benchmarked to the plant.

20 CHAIR KARLIN: Okay. Well, let me just  
21 stop you there. I'm just trying to get to a very  
22 simple question which is, we have factors that are  
23 listed here, but what I'm looking for is, after you  
24 have considered the factors, is there something in the  
25 standard review plan which tells you, now that I have

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1 considered these factors, if it meets 3 out of 8, out  
2 of 10, they win; for 5, 6 out of 10, or the majority,  
3 or what is the criterion by which you end up deciding  
4 whether or not, having considered all these factors,  
5 to grant it?

6 WITNESS JONES: The standard review plan  
7 provides merely a guidance statement that states, on  
8 page 14.2.1-10, if the licensee provides adequate  
9 justification for not performing certain power  
10 ascension tests, the Staff may conclude that the EPU  
11 test program is acceptable without the performance of  
12 these tests.

13 The final finding is --

14 CHAIR KARLIN: Show me where that is,  
15 4.2.1.10?

16 WITNESS JONES: Right.

17 CHAIR KARLIN: Where are we now?

18 WITNESS JONES: Below paragraph G.

19 CHAIR KARLIN: G, yes. If the licensee  
20 provides adequate justification for not performing,  
21 the Staff may conclude that the EPU test is  
22 acceptable.

23 Okay, that is what I'm trying to ask, what  
24 is adequate justification? We just went through a  
25 bunch of factors, what is your criterion for deciding

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1 what is adequate?

2 WITNESS JONES: I mentioned that it  
3 depends on the safety significance, once you have data  
4 we are looking for --

5 CHAIR KARLIN: Is there something in the  
6 standard review plan that answers this question?

7 WITNESS JONES: Nothing beyond the  
8 references to the reg guide 1.68 and appendix B, part  
9 50.

10 CHAIR KARLIN: Does this section, on this  
11 subject, C, refer to reg guide 1.68?

12 WITNESS JONES: And in the -- let's see.

13 CHAIR KARLIN: Maybe it does. I mean, I  
14 don't know.

15 WITNESS JONES: On page 14.2.1-3, going on  
16 to page 4, it lists the acceptance criteria.

17 CHAIR KARLIN: Okay.

18 WITNESS JONES: Intended to be satisfied.

19 CHAIR KARLIN: Well, I thought these were  
20 the specific acceptance criteria that were listed  
21 here. That is a different section?

22 WITNESS JONES: That is the review  
23 procedures. I think -- excuse me?

24 CHAIR KARLIN: That is a different  
25 section? I mean, the subsection C use evaluation to

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1 justify elimination of power ascension tests. I'm  
2 looking in that section. You are --

3 WITNESS JONES: Right, it doesn't contain  
4 specific --

5 CHAIR KARLIN: -- referring to a different  
6 section?

7 WITNESS JONES: That section indicates  
8 what the Staff reviews and what we look for. But the  
9 ultimate acceptance criteria are the regulations that  
10 are cited under section 2, and --

11 CHAIR KARLIN: Right.

12 WITNESS JONES: -- as the standard review  
13 plan has, on the front page of each section, they are  
14 prepared for guidance, and they are an acceptable way  
15 of implementing the regulations, but are not  
16 requirements in and of themselves.

17 CHAIR KARLIN: Well, I understand. But it  
18 is guidance to the Staff to how to make a decision.  
19 And I just don't see any criteria in this provision  
20 that says how you make that decision, consider factors  
21 and --

22 WITNESS JONES: Right.

23 CHAIR KARLIN: I do understand that what  
24 criterion 11, in appendix B, is the ultimate criteria,  
25 and that you should be using. I just wanted to find

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1 out more about that.

2 Now, let me ask about this standard review  
3 plan. What, as a background, as I understand it,  
4 General Electric came in and asked for a generic  
5 exemption for MSIV closure testing and generator load  
6 closure testing? Who should I direct this question  
7 to?

8 WITNESS PETTIS: Maybe I can address those  
9 questions.

10 CHAIR KARLIN: Did you work on any of the  
11 requests from General Electric about this, or --

12 WITNESS PETTIS: With respect to the  
13 standard review plan I was involved in some of the  
14 initial development along --

15 CHAIR KARLIN: Okay.

16 WITNESS PETTIS: -- along with others, of  
17 course. But to set the stage for the questions that  
18 you have on the standard review plan, it might be  
19 helpful to go back and introduce the review standard,  
20 which --

21 CHAIR KARLIN: No, I would just like to  
22 focus on my question, which is, did General Electric  
23 originally ask for a generic exemption from these  
24 tests?

25 WITNESS PETTIS: I believe they did

1 because the documentation in the ELTR-1 is where the  
2 original large transient testing information was  
3 referenced.

4 And when they had changed the approach to  
5 the CPPU the Staff's position was we could not grant  
6 an exemption across the Board for every facility that  
7 might be coming in with a CPPU application, due to the  
8 uniqueness of the plants.

9 CHAIR KARLIN: So they requested a generic  
10 exemption, and you said, no we are going to do it on  
11 a -- can't do it across the board, we are going to do  
12 it case by case?

13 WITNESS PETTIS: Right. That is the final  
14 Staff conclusion on the CPPU, basically it states that  
15 we would look at it on a case by basis. Each  
16 application would come in, would make its case for  
17 exemption of the testing, and then the Staff would  
18 review it based on those merits.

19 CHAIR KARLIN: And on a case by case basis  
20 how many EPUs have been requested?

21 CHAIR KARLIN: Well, if you go back and  
22 look at the total EPU inventory of applications they  
23 break down into applications that were filed prior to  
24 the Staff's --

25 CHAIR KARLIN: Well, subsequent to the

1 issuance of this draft standard review plan how many?

2 WITNESS PETTIS: This draft standard  
3 review plan covered, primarily, about four plants,  
4 because this came out in draft form in 2002. And  
5 since then we have applied, Waterford was one, Brown's  
6 Ferry is the second one.

7 CHAIR KARLIN: What is this reference to  
8 11 plants that I have seen?

9 WITNESS PETTIS: Earlier, in yesterday's  
10 testimony there was a reference made to the NRC review  
11 standard, which is RS-001. And that plays an  
12 important role only because it defines a point in time  
13 in which the Staff's review of the EPUs followed a  
14 more prescribed programmatic process for evaluation.

15 CHAIR KARLIN: Okay. Well, are there  
16 four, or are there 11?

17 WITNESS PETTIS: There is a total of about  
18 15. Eleven were done prior to the risk development  
19 and four or so plants were done after that  
20 development.

21 CHAIR KARLIN: And how many of those have  
22 you required, on a case by case basis, large transient  
23 testing of the MSIV and the generator load rejection?

24 WITNESS PETTIS: Well, in a more --

25 CHAIR KARLIN: Is the answer none?

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1 WITNESS PETTIS: No, none.

2 CHAIR KARLIN: None. So case by case,  
3 although you didn't grant a generic exemption, you  
4 granted 15 in a row exemptions?

5 WITNESS PETTIS: Fifteen to 16.

6 CHAIR KARLIN: Sixteen, okay.

7 WITNESS PETTIS: With the Duane Arnold  
8 probably being one in which the Staff had imposed a  
9 requirement.

10 CHAIR KARLIN: So why not just do the  
11 generic exemption like General Electric asked?

12 WITNESS JONES: We have a case, right now,  
13 with Brown's Ferry, where we proposed a license  
14 condition for a large transient test for Brown's Ferry  
15 1 that would require both the MSIV closure test and  
16 the generator load rejection test within a short time  
17 after restart, achieving a full uprated power.

18 CHAIR KARLIN: Good, good.

19 ADMINISTRATIVE JUDGE RUBENSTEIN: You said  
20 the review standard formalized the experience of the  
21 review that had been ongoing in a previous large  
22 number of plants.

23 Was the substance of the review the same,  
24 was this just a standardization, and a good recording  
25 of the history of what the Staff's review was when you

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1 wrote the requirements in the review standard?

2 WITNESS PETTIS: I would say, after the  
3 development of the review standard, the Staff had a  
4 more proceduralized road map that they could use to  
5 evaluate future EPU applications.

6 Prior to that most of the reviews were  
7 performed by, say, the more experienced reviewers  
8 within the Staff that had more of a command of the  
9 information.

10 However, as the agency is growing we  
11 needed some type of historical document that could be  
12 left behind once those experienced reviewers left the  
13 agency.

14 So there was an attempt made to collect  
15 all of the information that the agency has, and put it  
16 under the umbrella of the review standard. And there  
17 were also recommendations made by the Advisory  
18 Committee on Reactor Safeguards, in meetings that we  
19 had with them, regarding CPPU and, also, the EPU  
20 process in general, to develop some type of guidance  
21 for the Staff.

22 Because prior to that it was, more or  
23 less, each EPU application was assigned to a specific  
24 branch, and those experts, in those particular areas,  
25 took that EPU application and, based upon existing

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1 procedures, and their own experience, would review the  
2 application.

3 So that is where the 11 or so EPU's came  
4 from, which were in the pre-risk era. After the  
5 review standard was developed we processed, and like  
6 I said, maybe four to six EPU's from that.

7 And the standard review plan, 14.2.1, this  
8 is a little background information, was developed as  
9 a new standard review plan. This standard review plan  
10 did not exist prior to the development of the review  
11 standard.

12 The task that the Staff had was to develop  
13 a guidance document that would cut across all of the  
14 review disciplines and basically reference, and  
15 embody, all of the existing regulations, and all of  
16 the existing procedures, and processes that the Staff  
17 has to review applications.

18 So if you look at the review standards,  
19 broken down into about 12 to 15 different areas,  
20 structural, mechanical areas, INC, testing, and each  
21 of those disciplines reviews the EPU using the  
22 guidance that is in the review standard.

23 My particular area, or branch, needed a  
24 supplemental document to specifically address the  
25 power ascension portion of the review.

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1 We did not have that written in the  
2 documentation, other than reg guide 168, which has  
3 been on the books since 1972. But reg guide 168 is  
4 for initial test programs of initial plants that the  
5 NRC was giving an operating license.

6 So for a brand new reactor in 1972 they  
7 would be using the power ascension guidance that was  
8 contained in reg guide 168. But for EPUs, for plants  
9 that had already been operating, and were coming in  
10 for an EPU, we had to develop new guidance.

11 The standard review plan 14.2.1 was  
12 developed, it became part of the review standard. And  
13 to further answer your question regarding the specific  
14 guidance, the standard review plans, and the reg  
15 guides, and all of these other Staff documents,  
16 provide guidance to the Staff.

17 And they also provide guidance to the  
18 applicants, because the applicants read the standard  
19 review plans, they see what the Staff is looking for,  
20 and they put that information in the application.

21 But the specific how-to-do cookbook, so to  
22 speak, really does not exist with respect to  
23 performing an EPU exemption. It is, basically, the  
24 standard review plan is used for guidance, and then  
25 each individual review branch follows their own

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1 existing procedures, standard review plans,  
2 information notices, generic communications, whatever  
3 they have developed in their branch, plus the, I hate  
4 to use the term skill of the craft, but there is a  
5 certain amount of expertise involved in doing these  
6 reviews.

7 And that is why most of them are given to  
8 the more senior reviewers. So the specific guidance is  
9 not in the standard review plan, and you won't find  
10 it.

11 ADMINISTRATIVE JUDGE RUBENSTEIN: However,  
12 in the case of all the reviews, they met the  
13 regulations. And this is sort of an internal document  
14 for guidance of the reviewer.

15 But the quality of reviews probably  
16 changed over the course of all the reviews. Is this  
17 true?

18 WITNESS PETTIS: Yes, they have. And  
19 simply because prior to the review standard --

20 ADMINISTRATIVE JUDGE RUBENSTEIN: I  
21 understand why.

22 WITNESS PETTIS: -- we didn't have the  
23 type of guidance --

24 ADMINISTRATIVE JUDGE RUBENSTEIN: The  
25 second question is, and there are some differences in

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1 how an individual reviewer may, earlier on, before  
2 getting the guidance, would apply how the regulations  
3 were satisfied.

4 Is that accurate? So this is a learning  
5 process which was culminated, for efficiency, in the  
6 writing, finally of the standard review plan section?

7 WITNESS PETTIS: Yes, I would say that is  
8 accurate.

9 ADMINISTRATIVE JUDGE RUBENSTEIN: Okay.

10 WITNESS PETTIS: But, again, I think the  
11 real reason was to make sure that the Staff had a  
12 living document that could be passed on throughout the  
13 review period, and anyone could pick up the review  
14 standard, whether they were a senior person, or  
15 whether they were a junior person, to EPU.

16 And they could get into the review  
17 standard and they could, at least, look at the types  
18 of documents, the types of processes and procedures,  
19 and the references made, to the regulations, like  
20 10CFR50 Appendix B.

21 CHAIR KARLIN: But if someone gets into  
22 it, anyone gets into the review standard, and I just  
23 got into it, and we went through the factors. And if  
24 they discussed the factors it wouldn't --

25 WITNESS PETTIS: No, that is the standard

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1 review plan.

2 CHAIR KARLIN: Okay, the standard review  
3 plan. It wouldn't tell me what the decision was.  
4 These factors have been discussed and considered, and  
5 I would still be uninformed as to how I should decide  
6 this matter. It would be just a judgement call based  
7 upon criterion 11.

8 I see a nod from Mr. No-Name, sorry.  
9 Please if you would address that, that is correct, is  
10 it not? Yes, Mr. Ennis?

11 WITNESS ENNIS: In the review standard one  
12 of the most important things in there is the template  
13 safety evaluation. And within that template safety  
14 evaluation it contains, for each review section, the  
15 regulatory evaluation section.

16 That is the first part of each section  
17 that tells the regulatory criteria that we are  
18 concerned about. For example, for this, it would be  
19 section, it is in the NRC Staff's --

20 CHAIR KARLIN: Well, why don't we take --  
21 can I get that exhibit, what exhibit is it?

22 WITNESS ENNIS: Exhibit 2.

23 CHAIR KARLIN: Exhibit 2. Yes, give me 2.  
24 I don't have the whole thing. Are you referring to  
25 page -- what page is it?

1 WITNESS ENNIS: Page 260.

2 CHAIR KARLIN: I'm with you, 260 of  
3 exhibit 2.

4 WITNESS ENNIS: Right in the middle of the  
5 page, under section 2.12.1, the first subsection there  
6 is regulatory evaluation.

7 CHAIR KARLIN: Right.

8 WITNESS ENNIS: That paragraph, for the  
9 most part, depending on the design basis of the plant,  
10 the licensing basis of the plant, is almost, word for  
11 word, out of the review standard.

12 And that tells you the regulatory criteria  
13 that we are interested, in this particular section of  
14 the safety evaluation, and it puts into context, for  
15 that regulatory criteria, what aspects of, for  
16 example, the appendix B criterion 11 that we are  
17 concerned about.

18 And it also gives the reviewer a reference  
19 to, you know, what additional guidance we should be  
20 looking at in making our decision. In this case it  
21 references specific review criteria contained in  
22 standard review plan section 14.2.1.

23 CHAIR KARLIN: Right, okay. Well, let me  
24 ask you about that. Certainly criterion 11, referred  
25 to there, is the standard, the legal standard, that we

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1 all must use. You used, the Applicant used, and we  
2 would use, in trying to decide this matter, I guess.

3 And specific review criteria are contained  
4 in standard review plan 14.2.1.- That was my question,  
5 the criteria are not in there. There are factors.

6 WITNESS ENNIS: Right.

7 CHAIR KARLIN: They just discuss consider  
8 factors, but it doesn't provide a criteria, or  
9 criterion. This is the criterion, what you referred  
10 to, attachment criterion 11, that is the criterion.

11 WITNESS ENNIS: And is consider these  
12 factors and make your best judgement.

13 WITNESS ENNIS: Right. And then also from  
14 the review standard, it is part of the safety  
15 evaluation. The other main part of that is the  
16 conclusion section and after you go through this  
17 review, you look and see, can I make this conclusion?

18 That is the final that we want to be able  
19 to look at --

20 CHAIR KARLIN: Right, and I want to get to  
21 that next. I'm ready to get to that, unless you have  
22 further questions?

23 ADMINISTRATIVE JUDGE RUBENSTEIN: Well, I  
24 want a little clarification. The standard review plan  
25 is review guidance for the Staff. It defines the

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1 areas of review which should be covered, as a minimum.  
2 I want an affirmation, or negative, or a correction.

3 For the industry it says, this is how the  
4 Staff will look at these various topics, please  
5 address these topics in the safety assessment report.

6 And they really don't accept, for their  
7 source, in the beginning sentence of any given section  
8 of the standard review plan, give the regulatory  
9 origin of the basis for addressing these sections. Is  
10 this correct?

11 WITNESS PETTIS: Yes, that is correct.  
12 The acceptance --

13 ADMINISTRATIVE JUDGE RUBENSTEIN: That is  
14 all.

15 WITNESS PETTIS: -- criteria is the  
16 regulation.

17 ADMINISTRATIVE JUDGE RUBENSTEIN: Let's  
18 move on. The adequacy of the information submitted,  
19 in accord with what is potentially about to be  
20 reviewed, according to the review standard 001, or the  
21 standard review plan, stands and fails on its own, on  
22 whether or not it meets the regulations, and whether  
23 they use code, pardon me, licensing topical reports,  
24 or other documentation which had been previously  
25 accepted, and it allowed them to reference these

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1 documents. Is this correct?

2 WITNESS PETTIS: Yes.

3 ADMINISTRATIVE JUDGE RUBENSTEIN: In other  
4 words, you review the SAR and you look for  
5 completeness in the SAR, did they address all these  
6 topics in the review standard, but you have to make  
7 your judgements based on your technical knowledge, and  
8 the conformance with the regulations? Please.

9 WITNESS ABDULLAHI: If I can just bring  
10 one issue?

11 ADMINISTRATIVE JUDGE RUBENSTEIN: Please.

12 WITNESS ABDULLAHI: It is not only person  
13 dependent, reviewer dependent, only like you stated.  
14 But there is also the fact that there was a task force  
15 and the first, the second licensee that requested an  
16 exemption to the -- the first licensee that requested  
17 an exemption to the large transient test, and I think  
18 that is one of our exhibits.

19 They came up with and said we would like  
20 to get exemption from the requirement of ELTR1 and 2.  
21 And at that point there was a task force, there was a  
22 review done. And when these reviews, they went  
23 through it, and then acceptance criteria, and  
24 eventually --

25 CHAIR KARLIN: May I ask a question? Is

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1 that the task force that dealt with the generic  
2 request for a generic exemption?

3 WITNESS ABDULLAHI: That is after that  
4 piece, the CPPU was a generic request, which is  
5 another licensing topical report.

6 CHAIR KARLIN: Okay.

7 WITNESS ABDULLAHI: So there is an  
8 exhibit, the one from Exelon.

9 CHAIR KARLIN: Can I ask this question?  
10 We were talking about the standard review plan calls  
11 for the factors to be discussed. Reviewers should  
12 consider the following factors when assessing the  
13 adequacy of the licensee's justification.

14 And then there is a list of factors that  
15 need to be discussed, and the Applicant needs to  
16 discuss those factors.

17 Let's say factor B, introduction of new  
18 thermal hydraulic phenomena or identified system  
19 interactions. Let's say the Applicant had a  
20 wonderful, deep, discussion of those and said, there  
21 are many new thermal hydraulic phenomena being  
22 introduced by this change.

23 There is a tremendous amount of change,  
24 and he went into great detail. Then there is factor  
25 C, the facility conformance to limitations associated

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1 with analytical analysis methods.

2 He had a great discussion of that factor  
3 and he said, our facility doesn't conform at all, it  
4 is totally different, there are a lot of differences,  
5 it was a great discussion, it was an adequate  
6 discussion.

7 So the Applicant would have adequately  
8 discussed every factor. If they adequately discuss  
9 every factor does that mean you grant it?

10 WITNESS JONES: No.

11 CHAIR KARLIN: No.

12 WITNESS JONES: Because C --

13 CHAIR KARLIN: The adequate discussion is  
14 not the criterion for whether this is some judgement  
15 call.

16 WITNESS JONES: The standard is --

17 CHAIR KARLIN: That is all I want.

18 ADMINISTRATIVE JUDGE BARATTA: Let me ask  
19 Mr. Jones a question. You said that in the case of  
20 Brown's Ferry you made a license condition that they  
21 do the testing.

22 Looking at the factors that you are  
23 supposed to consider, which ones led you to that  
24 decision? I'm not questioning that decision, I'm just  
25 trying to get a comparison and, again, get --

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1 WITNESS JONES: This is not a final  
2 decision. What the Staff has proposed is the license  
3 condition specific to Brown's Ferry unit 1, which has  
4 an operating license, but has not operated for in  
5 excess of 25 years.

6 And then, clearly --

7 CHAIR KARLIN: So that is an initial test,  
8 or is that an EPU? That is not an EPU, is it, that is  
9 the initial test?

10 WITNESS JONES: It is both.

11 CHAIR KARLIN: Okay, different category.

12 WITNESS JONES: Well, from the aspect of  
13 an operating license, if they decided to, since they  
14 hold an operating license, if they elected to return  
15 the power to one hundred percent, and there are no  
16 changes to the plant design, there is no requirement  
17 to do any testing.

18 CHAIR KARLIN: There is no requirement to  
19 do an initial large transient test, MSIV?

20 WITNESS JONES: Unless there is a change.  
21 If there is a change, new equipment, or new --

22 CHAIR KARLIN: So has one ever been  
23 performed on it before?

24 WITNESS JONES: Yes.

25 CHAIR KARLIN: All right, so they already

1 had one?

2 WITNESS JONES: Right.

3 WITNESS ABDULLAHI: I think the key thing  
4 there was that because they shut down for some time --

5 CHAIR KARLIN: For 25 years.

6 WITNESS ABDULLAHI: Right. So you don't  
7 have operating experience in a planned integral  
8 testing. And then on top of it you are increasing the  
9 dome pressure.

10 So there was this consideration. Reviews  
11 were done, I don't know whether we should discuss it  
12 but, roughly --

13 ADMINISTRATIVE JUDGE BARATTA: That is  
14 fine. I suspected that it was the lack of operating  
15 experience, that was probably one of the main  
16 considerations.

17 WITNESS PETTIS: There were other factors,  
18 including that. And just on a generic basis, without  
19 getting into too much detail, since the review is  
20 still under -- or since the application and exemption  
21 is still under review, there were other arguments that  
22 were made by the licensee, following the standard  
23 review plan, in the area.

24 To give an example, of similarity, between  
25 Units 2 and 3, which are operating units, have

1 operating history, have experienced transients  
2 throughout their operating life.

3 And the licensee tried to make a  
4 correlation between the operating experience for those  
5 units versus unit 1, which is of the same design,  
6 although severely modified due to the 20 years of  
7 inoperation.

8 So the Staff had an opportunity to review  
9 that. The Staff had an opportunity to have extensive  
10 RAI discussions with the Applicant, and as a result  
11 came to the conclusion that Steve mentioned.

12 ADMINISTRATIVE JUDGE BARATTA: That  
13 actually leads me to my next question. I appreciate  
14 you providing that opening.

15 Yesterday, as Abdullahi, and I hope -- I  
16 pronounced your name properly, I apologize if I  
17 didn't.

18 WITNESS ABDULLAHI: That is okay, you did  
19 fine.

20 ADMINISTRATIVE JUDGE BARATTA: You made a  
21 very interesting, some very interesting statements  
22 with regards to comparing Vermont Yankee to other  
23 plants, and talking about power densities and such.

24 And you may recall that there was a  
25 summary, that was exhibit 38, I believe, from Entergy,

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1 which --

2 CHAIR KARLIN: It was 39.

3 ADMINISTRATIVE JUDGE BARATTA: -- tried to  
4 do that comparison, I think, with Brunswick, if I  
5 recall correctly. It was 38 or 39, I'm sorry.

6 Could you maybe give me some suggestions  
7 on what I should look at relative -- you know, you've  
8 said we've had this type of a transient on this plant,  
9 which is a high power density plant, and this type of  
10 transient on that plant.

11 If I were to try to do some similarity  
12 that TVA was arguing with respect to units 3 and 4, if  
13 I were to try to do that, what should I be looking at,  
14 Vermont Yankee relative to plants that have experience  
15 --

16 WITNESS ABDULLAHI: I don't really have  
17 that exhibit in front of me. But, roughly, one thing  
18 you would look at in MSIV is SRV capacity. Because --

19 ADMINISTRATIVE JUDGE RUBENSTEIN: I didn't  
20 hear that, ma'am.

21 WITNESS ABDULLAHI: Excuse me?

22 ADMINISTRATIVE JUDGE RUBENSTEIN: I didn't  
23 hear that.

24 WITNESS ABDULLAHI: One thing you would  
25 look at, I don't have the exhibit, but --

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1 ADMINISTRATIVE JUDGE RUBENSTEIN: No, I  
2 don't care about that.

3 WITNESS ABDULLAHI: So one thing you would  
4 look for is when you close the MSIV the power will  
5 peak, right? So you would want to look at SRV  
6 capacity.

7 So if you have two plants, and the amount  
8 of SRV capacity that plant has would mean how fast it  
9 will depressurize and reduce the peak, while the scram  
10 is also being affected.

11 So if you look at these two plants, and I  
12 have to confirm this, the SRV capacity for Vermont  
13 Yankee, at EPU power level, they used to have one  
14 hundred percent, I think, is 60 percent.

15 CHAIR KARLIN: I think Mr. Hamrick found  
16 the exhibit, that would be great. This is exhibit 38,  
17 this appeared at page 7 in the testimony?

18 MR. HAMRICK: Correct, Your Honor.

19 CHAIR KARLIN: Yes.

20 WITNESS ABDULLAHI: So the SRV capacity  
21 for Vermont is 60 percent, and Brunswick is 56.

22 ADMINISTRATIVE JUDGE BARATTA: And  
23 Brunswick is what?

24 WITNESS ABDULLAHI: It is 56, EPU power  
25 level. So they are relatively, they have similar

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1 capacity. The interesting thing to also look for,  
2 actually, is that Vermont, I believe, has done its  
3 analysis with one SRV out of service, and met their  
4 criteria.

5 Assuming one of their SRVs is out of  
6 service. Therefore that means that they have  
7 sufficient capacity to handle for ASME overpressure  
8 purposes, and MSIV closure case to handle the excess  
9 steam, 24 percent extreme flow increase through the  
10 EPU.

11 And this is also with a conservative  
12 assumption of the flux scram. So putting all of these  
13 together, if you are the reviewer you would say that  
14 the plant, analytically, it has been demonstrated that  
15 the plant can handle SRV, can handle ASME.

16 Now, looking at that, what you also want  
17 to look at is, I guess, the power density, which means  
18 the power over the number of bundles you have in the  
19 core. So it is power to bundle conditions.

20 And the power density, when your EPU goes  
21 out. So if you have a smaller core, and you uprate,  
22 you put more hot bundles, then your power density will  
23 go up, and so that is one thing you check, whether the  
24 similarity of the power distribution would be power  
25 levels.

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1 I would also, if you are looking at  
2 turbine trip, of course, you would look at the bypass  
3 capacity. In which case you have here, VY has 86  
4 capacity, Brunswick unit 2, I believe, had 69.

5 So they seem to have a sufficient  
6 capacity. Now, other parameters, such as the MSIV  
7 closure times, these are more tech spec values, so all  
8 plants have to meet those specific values. I wouldn't  
9 really worry about that.

10 But for ASME overpressure you would, more  
11 or less, look at are they similar, do they have a  
12 similar capacity, do they have similar power  
13 distribution, hopefully, and how relevant are they to  
14 each other?

15 And in some cases you will actually, would  
16 be able to, depending on what you are concerned with,  
17 you can look at individual core parameters that were  
18 calculated and compare them.

19 ADMINISTRATIVE JUDGE RUBENSTEIN: I have  
20 a question.

21 ADMINISTRATIVE JUDGE BARATTA: Let me just  
22 follow-up with one and I -- you know, I forget whether  
23 Brunswick has experienced an MSIV closure, or turbine  
24 trip at uprate conditions. Do you know if they have?

25 WITNESS ABDULLAHI: I believe that was

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1 Hatch. Again, I'm only referring to my notes. Hatch  
2 did. Do you want to ask a question, or do you want me  
3 to explain that comparison with Hatch?

4 CHAIR KARLIN: I believe the testimony you  
5 all presented indicates that four -- that there were  
6 four transients that occurred, well, at uprated power,  
7 but not all of them -- it is in the testimony.

8 WITNESS ABDULLAHI: Yes.

9 ADMINISTRATIVE JUDGE BARATTA: Could you  
10 do a comparison with Hatch, do you have that, a  
11 similar comparison?

12 ADMINISTRATIVE JUDGE RUBENSTEIN: Same way  
13 you just did the other one.

14 ADMINISTRATIVE JUDGE BARATTA: Yes, with  
15 Brunswick.

16 WITNESS ABDULLAHI: Compare with Hatch,  
17 okay. Again, I would need an exhibit number.

18 ADMINISTRATIVE JUDGE BARATTA: Probably  
19 39.

20 CHAIR KARLIN: No.

21 MR. TURK: Can we go off the record for a  
22 moment?

23 CHAIR KARLIN: Yes.

24 (Whereupon, the above-entitled matter  
25 went off the record at 9:44 a.m. and

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1 went back on the record at 9:47 a.m.)

2 CHAIR KARLIN: We are back on the record  
3 now. And I understand the question that was just  
4 asked has been withdrawn, or pending to be answered,  
5 perhaps later, if you can locate the exhibit?

6 ADMINISTRATIVE JUDGE BARATTA: Yes, that  
7 is correct.

8 ADMINISTRATIVE JUDGE RUBENSTEIN: I want  
9 to call your attention to the upper dome pressure, and  
10 the criteria is boiling pressure vessel code. And it  
11 has been testified, by Entergy, and your opinion, that  
12 the pressure increase is nominal.

13 Is the pressure increase nominal?

14 WITNESS ABDULLAHI: Nominal?

15 ADMINISTRATIVE JUDGE RUBENSTEIN: Small?

16 WITNESS ABDULLAHI: In the dome pressure.

17 And there won't be pressure increase, but once you  
18 close the MSIVs there will be a momentary spike of the  
19 pressure before you scram and SRV is depressurized.

20 ADMINISTRATIVE JUDGE RUBENSTEIN: The rest  
21 of my question is, in comparing, in achieving  
22 conformance that the pressure is well within the  
23 limits of the boiler and pressure vessel code, one can  
24 come at it with the calculation, one can come at it  
25 through measurements, past experience, and the

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1 pressure in the plants.

2 So give me an indication, was this a close  
3 call, was there a very large amount margin, along  
4 those lines, give me a sense of where you are at.

5 WITNESS THOMAS: When Vermont Yankee did  
6 the over-pressure analysis for ASME, the calculated  
7 percent was 499PSIG, and the limit is 1375PSIG. So  
8 there was a margin there.

9 WITNESS ABDULLAHI: And this is with  
10 assumption when SRV is out of service.

11 ADMINISTRATIVE JUDGE RUBENSTEIN: That  
12 code calculated?

13 WITNESS THOMAS: Yes.

14 CHAIR KARLIN: What about actual pressure  
15 measurements?

16 WITNESS ABDULLAHI: The actual steady  
17 state pressure measurements?

18 ADMINISTRATIVE JUDGE RUBENSTEIN: Yes.

19 WITNESS ABDULLAHI: Yes, they know what  
20 the dome pressure is and there are some sort of DP  
21 measure, or something.

22 ADMINISTRATIVE JUDGE RUBENSTEIN: And  
23 during these kinds of transients --

24 WITNESS ABDULLAHI: It can be seen.

25 ADMINISTRATIVE JUDGE RUBENSTEIN: -- they

1 were well within their limit, they were marginally  
2 within their limit?

3 WITNESS ABDULLAHI: You means the plants  
4 that experience EPU?

5 ADMINISTRATIVE JUDGE RUBENSTEIN: Yes.

6 WITNESS ABDULLAHI: The plants that  
7 experience EPU, there were some data taken. There is  
8 a data telling you where the pressure increase of the  
9 vessel is. And that dome pressure increase, the  
10 prediction always bounds the actual plant --

11 ADMINISTRATIVE JUDGE RUBENSTEIN: That is  
12 a regulatory answer.

13 WITNESS ABDULLAHI: -- conservatism that  
14 has been --

15 ADMINISTRATIVE JUDGE RUBENSTEIN: But in  
16 your professional opinion was it well below, or  
17 approaching, was it calculated, and the actual value,  
18 were they anywhere near the ASME boiler pressure  
19 vessel code stress limits?

20 WITNESS ABDULLAHI: Maybe for Vermont, or  
21 the plants that experience EPU. Sir, I would have to  
22 go plant by plant, because it depends on the core, the  
23 core reactivity, the amount of SRV capacity, you know,  
24 you would have to look at that plant, whether it is  
25 close to the margin.

1                   However, in terms of the code prediction,  
2                   I professionally, from what I have seen, am  
3                   comfortable with ODYN's peak pressure calculations.  
4                   I'm very comfortable with that.

5                   ADMINISTRATIVE JUDGE BARATTA: Just one  
6                   point of clarification. There is, NEC has suggested  
7                   that the process that was used did not identify the  
8                   stress levels in the components at EPU conditions.

9                   And particularly during these transients.  
10                  Now, from what I believe you are saying is the plant  
11                  was analyzed to be able to withstand a 1375, I mean,  
12                  does that mean, then, that these higher pressures,  
13                  which are still below 1375, would therefore produce  
14                  acceptable stresses, is that the answer to their  
15                  concern, or --

16                  WITNESS ABDULLAHI: In terms of structure,  
17                  and structural stresses, I think I will pass on to  
18                  Rick Ennis. I'm more the reactor side.

19                  WITNESS ENNIS: I'd like to point back at  
20                  the SRP 14.2.1. And if you look in the back, at the  
21                  two attachments on there, and in making a decision on  
22                  whether testing is adequate, you are not just talk  
23                  about transient testing, you are also talking about  
24                  steady state testing.

25                  And as far as anything to do with stress,

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1 or structural integrity, our guidance does not show us  
2 to look into transient testing, it is a steady state  
3 condition that you are concerned about.

4 If you look at page 14.2.1-14, the  
5 standard review plan --

6 CHAIR KARLIN: Is that part of the section  
7 that deals with justification for not doing the large  
8 transient tests?

9 WITNESS ENNIS: No.

10 CHAIR KARLIN: No, okay. I didn't think  
11 so.

12 WITNESS ENNIS: Section 2 of the SE, that  
13 is the mechanical and civil engineering analysis of  
14 the vessel, and reactor cooling pressure boundary  
15 piping.

16 But if you look at page 14.2.1-14, in the  
17 standard review plan --

18 ADMINISTRATIVE JUDGE RUBENSTEIN: Would  
19 you speak up? I'm having difficulty, and I'm sure the  
20 lawyers --

21 WITNESS ENNIS: Page 14 of the standard  
22 review plan, which is attachment 1, which is steady  
23 state power exemption testing, the very first item on  
24 that table says, conduct vibration testing and  
25 monitoring of reactor vessel internals, and reactor

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1 coolant systems containments.

2 And it says, the recommended initial  
3 conditions of the lowest practicable power level, it  
4 also, in the fourth column there, it references the  
5 NRC information notice 2002-26, and that is the  
6 information that was discussed along with these  
7 vibration problems that happened in Quad Cities, with  
8 the steam driers.

9 So our guidance is telling us, as far as  
10 stress and structural integrity issues go, any testing  
11 that we deem would be necessary, would be under steady  
12 state conditions, not transient conditions.

13 ADMINISTRATIVE JUDGE BARATTA: But that  
14 doesn't quote answer my question. I wasn't asking  
15 what the regulatory requirements were, as --

16 CHAIR KARLIN: Well, that is not the  
17 regulatory requirement, anyway. Criterion 11 doesn't  
18 make the distinction between steady state and non-  
19 steady state.

20 ADMINISTRATIVE JUDGE BARATTA: I was  
21 asking from a topical analysis standpoint, at one time  
22 somebody did a stress analysis at the plant?

23 WITNESS ENNIS: That is correct.

24 ADMINISTRATIVE JUDGE BARATTA: And it was  
25 done for the ASME boiler pressure vessel code, and it

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1 concluded that appropriate pressure was 1375, that  
2 that was the limit.

3 And the implication named that if you are  
4 below that pressure your stresses are okay. If you are  
5 above that pressure, they are not.

6 WITNESS ENNIS: Right.

7 ADMINISTRATIVE JUDGE BARATTA: Now, what  
8 occurred is that in plants that have had EPU under  
9 constant pressure, the pressures have remained below  
10 1375.

11 WITNESS ABDULLAHI: Yes, that is a  
12 requirement.

13 ADMINISTRATIVE JUDGE BARATTA: Number one.  
14 Number two the code predictions also say that the  
15 pressures would be below 1375. So am I to conclude,  
16 then, that the concerns expressed by NEC have been  
17 addressed?

18 Namely the pressure, as long as the  
19 pressure remains below 1375 the stress levels are  
20 acceptable?

21 WITNESS ABDULLAHI: For ASME over-pressure  
22 purposes they do meet the ASME over-pressure  
23 requirement, which ensure vessel integrity.

24 WITNESS ENNIS: I think it is a bigger  
25 issue than just over-pressure. If you look at the

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1 CCPU topical report, and our safety evaluation report,  
2 I believe it is sections 3.2 and 3.4 of that safety  
3 evaluation, it discusses an acceptable methodology for  
4 calculating the stresses, for EPU conditions, on  
5 various components.

6 And I believe it points back to some  
7 specific appendices in the ELTR1 topical report.  
8 Using that specific methodology they calculated the  
9 stresses for the ASME based load cases, and those load  
10 cases include things, you know, such as transient  
11 conditions, as well as other conditions like seismic  
12 conditions.

13 And the Staff' SC, and this is in various  
14 subsections of section 2.2 of our safety evaluation,  
15 we reviewed the methodology they used, we believe that  
16 the methodology they used was consistent with the CPPU  
17 topical report, and that the stresses would remain  
18 within acceptable limits, and structural integrity  
19 would be maintained under EPU conditions, including  
20 transients.

21 ADMINISTRATIVE JUDGE BARATTA: So what you  
22 are saying is that when NEC said that ODYN would not  
23 do a stress analysis. This is true but stress  
24 analysis was done using other acceptable methods, as  
25 outlined in the CPPU topical, or --

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1 WITNESS ENNIS: Yes.

2 ADMINISTRATIVE JUDGE BARATTA: That is  
3 basically where I wanted to get to, was -- thank you.

4 CHAIR KARLIN: I have some questions about  
5 the --

6 ADMINISTRATIVE JUDGE RUBENSTEIN: Let me  
7 go a little bit further on that.

8 CHAIR KARLIN: Okay.

9 ADMINISTRATIVE JUDGE RUBENSTEIN: Give me  
10 a second here to pull up -- I believe you wrote, in  
11 your Safety Evaluation Report, the methodology used to  
12 evaluate mechanical stresses on various components,  
13 subject to increased loading of the EPU conditions, is  
14 included in your safety evaluation for the CPPU  
15 topical report, dated March 31st, 2003.

16 Specifically section 3.2 of the CPPU  
17 safety evaluation discusses reactor pressure vessel,  
18 and its internals, and section 3.4, discusses piping  
19 systems and associated components.

20 CHAIR KARLIN: Do we know where that was  
21 in the report?

22 ADMINISTRATIVE JUDGE RUBENSTEIN: Yes, it  
23 is -- I will give it to you in a minute.

24 CHAIR KARLIN: Yes, so we can all --

25 ADMINISTRATIVE JUDGE RUBENSTEIN: Section

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1 3.2 of the CPPU.

2 CHAIR KARLIN: Of the CPPU.

3 ADMINISTRATIVE JUDGE RUBENSTEIN: Of the  
4 Safety Evaluation Report. Discusses details regarding  
5 how stresses were analyzed for the reactor pressure  
6 vessel, and its internals, other than the steam dryer.

7 In section 2.2.3, for the steam dryer, in  
8 section 2.26 for piping systems and components. Now,  
9 -- and your finding was?

10 WITNESS ENNIS: The finding was that  
11 structural integrity would be maintained under  
12 repeated conditions.

13 ADMINISTRATIVE JUDGE RUBENSTEIN: And this  
14 is based on a review of independent calculations, or  
15 based on a review of Entergy's submittal?

16 WITNESS ENNIS: Review based on Entergy's  
17 submittal, and in some cases it might have been under  
18 a request for additional information. It might have  
19 been calculations submitted.

20 We did, specially with the steam dryer, we  
21 did several audits.

22 ADMINISTRATIVE JUDGE RUBENSTEIN: I  
23 thought the steam dryer was a little separate --

24 WITNESS ENNIS: Based on its submission of  
25 information on the docket.

1 ADMINISTRATIVE JUDGE RUBENSTEIN: I think,  
2 and I can't recall exactly where, but Entergy, in  
3 discussing, in response to some questions by me, about  
4 the steam dryer, and the potential loads arising from  
5 the subject of interest, which are the two transients,  
6 testified that the time period of the load imposition  
7 was exceptionally short.

8 So are your steam dryer concerns from the  
9 MSIC, or the turbine generator loads, or are they from  
10 a long time steady state, either thermal or mechanical  
11 fatigue considerations?

12 WITNESS ENNIS: May I have a minute to  
13 take a look at the SE for a second?

14 (Pause.)

15 WITNESS ENNIS: I believe it is more of a  
16 long term fatigue related stresses, rather than  
17 impulse loads to the transient.

18 ADMINISTRATIVE JUDGE RUBENSTEIN: Did you  
19 consider this degradation which may or may not have  
20 occurred? And I think Entergy testified that they had  
21 strengthened the baffle where the incoming lines were,  
22 that this might be a concern in doing a transient  
23 calculation, considering that the initial conditions  
24 may have been degraded?

25 WITNESS ENNIS: Could you restate the

1 question, please?

2 CHAIR KARLIN: Could you speak up? Try to  
3 speak up because everyone needs to hear. Thank you.

4 ADMINISTRATIVE JUDGE RUBENSTEIN: Very  
5 simply put there is a potential for long time steady  
6 state degradation of the mechanical integrity of the  
7 steam dryer.

8 Would this be a concern going into this  
9 transient, and how do you deal with it?

10 MR. ENNIS: The analysis that was done  
11 even for the steam dryer, even though it's not an ASME  
12 component, they used ASME load cases to do the  
13 analysis.

14 And those load cases did include transient  
15 conditions.

16 ADMINISTRATIVE JUDGE RUBENSTEIN: Okay.  
17 Thank you. Just for the record, get out of the  
18 jargon, please state what an ASME condition is.

19 MR. ENNIS: Well the -- they have loading  
20 conditions that they would include --

21 ADMINISTRATIVE JUDGE RUBENSTEIN: The  
22 American Society of Mechanical Engineers standard?

23 MR. ENNIS: Right.

24 ADMINISTRATIVE JUDGE RUBENSTEIN: Okay.  
25 I'll do the testifying on that. Thank you.

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1 CHAIR KARLIN: I had a couple of questions  
2 related to the safety evaluation section that deals  
3 with SRP 14.2.1. And it starts on page 266 with Staff  
4 Exhibit 2. Who is most responsible for drafting and  
5 developing that?

6 MR. PETTIS: Probably me.

7 CHAIR KARLIN: Mr. Pettis?

8 MR. PETTIS: I think so. If it's the same  
9 page numbering I think that I have.

10 CHAIR KARLIN: I believe it's the page  
11 numbering from your exhibit number 2. Page 266, are  
12 you with me?

13 MR. PETTIS: Yes.

14 CHAIR KARLIN: Okay, great, because all I  
15 am is a lawyer, and words -- I focus on words and I  
16 try to understand what they mean. And to me what they  
17 say are important.

18 Words are important. So this section is  
19 in the middle of page 266, SRP 14.2.1 Section 3C, use  
20 of evaluation to justify elimination of power  
21 ascension tests.

22 That's what I'm focusing on. And the  
23 Staff evaluation refers to the draft SRP and says  
24 then, first paragraph, the following factors should be  
25 considered, and lists bullets, factors that need to be

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1 considered.

2 Right. Then we go to the next page 267.  
3 The NRC Staff reviewed the licensee's justification.  
4 The following factors were applied by the licensee.  
5 And then there's some bullets.

6 All right. And then the following is a  
7 brief justification provided by the licensee and some  
8 more bullets. Page 268, more bullets. Now at the  
9 bottom of page 268 there's a statement in that full  
10 paragraph, the licensee, it's the third line down, and  
11 I'm trying to understand what that means.

12 The licensee cited industry experience at  
13 ten other domestic BWRs, EPU's up to 120 percent OLTP  
14 in which the EPU demonstrated that plant performance  
15 was adequately predicted under EPU conditions.

16 Now that sentence starts with a  
17 proposition, the licensee cited industry experience,  
18 blah, blah, blah. Now the phrase plant performance  
19 was adequately predicted under EPU conditions, in that  
20 sentence is that simply a reiteration of what the  
21 Applicant said or is that what you're saying?

22 MR. PETTIS: That's a combination of  
23 information supplied by the Applicant in addition to  
24 our review of LER information.

25 CHAIR KARLIN: So you wrote that and you

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1 made the judgment call right there in that sentence.  
2 The Staff is saying that in those ten other domestic  
3 BWRs the EPU demonstrated that plant performance was  
4 adequately predicted.

5 That's the Staff's judgment or is that the  
6 citation of what the Applicant said?

7 MR. PETTIS: That may in fact be a  
8 statement that was submitted by the Applicant and its  
9 review of those --

10 CHAIR KARLIN: Right.

11 MR. PETTIS: -- events --

12 CHAIR KARLIN: So it's more --

13 MR. PETTIS: -- in their application.

14 CHAIR KARLIN: That's the way I took it.  
15 It was something the Applicant said to you.

16 MR. PETTIS: Right, because I can rest  
17 assured that I personally did not do a exhaustive  
18 review --

19 CHAIR KARLIN: Right.

20 MR. PETTIS: -- of all of this external  
21 information to come up with that.

22 CHAIR KARLIN: Right.

23 MR. PETTIS: But again --

24 CHAIR KARLIN: Okay. So I think the way  
25 I read that sentence, it's your -- the writer is

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1 telling us that the licensee cited certain experience  
2 in which certain, you know, demonstrated plant  
3 performance.

4 So you weren't making that conclusion, you  
5 were just saying that the licensee said this. The  
6 next sentence. The licensee stated that one such  
7 plant, Hatch units 1 and 2 is granted blah, blah,  
8 blah, blah.

9 Again, you're repeating what the licensee  
10 said to you?

11 MR. PETTIS: Yes.

12 CHAIR KARLIN: Right. The next paragraph  
13 on 269. The licensee also provided information  
14 regarding transient testing for the livestock  
15 facility. This is the one facility in the world, I  
16 guess, where they've done it, or at least they have  
17 done it somewhere.

18 And the one, two, three, four, five lines  
19 down, there is at the end of that line, the testing  
20 demonstrated the performance of the equipment that was  
21 modified in preparation for the higher power levels.

22 And you saying that? Is that something  
23 the licensee told you and put in his application or is  
24 that some conclusion that the Staff is making here?

25 MR. PETTIS: It was most likely a

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1 statement from the licensee in their application --

2 CHAIR KARLIN: That's --

3 MR. PETTIS: -- since they've done, you  
4 know, quite an exhaustive review --

5 CHAIR KARLIN: Right.

6 MR. PETTIS: -- of all of these events.

7 CHAIR KARLIN: Okay. In the last sentence  
8 in that paragraph, additionally the licensee indicated  
9 that in transient experience for a wide range of power  
10 levels at operating BWRs has shown a close correlation  
11 of plant transient data to the predicted response.

12 Now that is not a Staff conclusion, it's  
13 just what the licensee told you?

14 MR. PETTIS: Most likely.

15 CHAIR KARLIN: Okay.

16 MR. PETTIS: But I like to put something  
17 in context with respect to --

18 CHAIR KARLIN: Sure.

19 MR. PETTIS: -- this particular individual  
20 section. And basically we are looking in this section  
21 at the licensee's compliance to the SRP with respect  
22 to --

23 CHAIR KARLIN: Right.

24 MR. PETTIS: -- the elements of their  
25 power ascension and test plan and how it conforms with

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1 the guidance in the SRP.

2 CHAIR KARLIN: And whether they adequately  
3 discussed these factors?

4 MR. PETTIS: Yes. In addition to that my  
5 group's review is basically an overall coordinated  
6 review of the other technical branches. So what  
7 happens is in the safety evaluation, in the template  
8 safety evaluation section which has ten, twelve  
9 different disciplines, the disciplines that have input  
10 into the overall power ascension test plan we discuss,  
11 like plant systems, balance of plant and reactor  
12 systems. And collectively --

13 CHAIR KARLIN: Right.

14 MR. PETTIS: -- we use this section as a  
15 depository of the overall conclusion --

16 CHAIR KARLIN: Okay.

17 MR. PETTIS: -- with respect --

18 CHAIR KARLIN: All right.

19 MR. PETTIS: -- to the power upright.

20 CHAIR KARLIN: What I see so far is what -  
21 - in this is a recitation of the SRP and a recitation  
22 of things that the Applicant said to the NRC. Now  
23 let's go to the bottom of page 269 where we were  
24 before, and that SRP 114 specifies that, and it goes  
25 on, blah, blah.

1 Top of 270, the SRP provides guidance on  
2 that. Next paragraph, the NRC Staff review is  
3 intended to insure that performance -- so this is sort  
4 of what your intent is and what you want to do.

5 Next paragraph, energies test program  
6 primarily includes steady state. They sent a letter  
7 December 21, '04. Finally at the bottom of page 270  
8 we get to what seems to be where the Staff's  
9 conclusion is stated for the first time.

10 Based on its review of the information  
11 provided by the licensee as describe above, the NRC  
12 Staff concludes that in justifying the test  
13 limitations, deviations, blah, blah, blah, the  
14 licensee adequately addressed the factors.

15 And we talked about before you could  
16 adequately address the factors very thoroughly and  
17 find out we just totally should not be granted this  
18 thing. Right? So an adequate discussion is not your  
19 criterion for granting this.

20 So there was an adequate discussion. Then  
21 there's a sentence in the middle, and this I think as  
22 far as I can tell, this is the only judgmental  
23 sentence you all put in this whole thing, which is  
24 from the EPU experience referenced by the licensee it  
25 can be concluded, can be I guess it means you are

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1 concluding, that large transients either planned or  
2 unplanned have not provided any significant new  
3 information about transient modeling or actual plant  
4 response.

5 All right. Let me ask about that, can be  
6 concluded large transients either planned or  
7 unplanned. Now with regard to MSIVs have there been  
8 any planned MSIV closure tests at EPU by any facility  
9 that you all have regulated, planned MSIV closure  
10 tests? I think the answer is no.

11 MR. PETTIS: I'm not aware of any, but I'm  
12 not in that area of the Staff that would refer me to  
13 that --

14 CHAIR KARLIN: Well didn't we just hear  
15 there were --

16 MR. PETTIS: -- information anyway.

17 CHAIR KARLIN: -- 16 EPUs granted and no  
18 one ever required a large transient test?

19 MR. PETTIS: No.

20 CHAIR KARLIN: Okay. So there aren't any  
21 planned, at least in the United States, at MSIVs, at  
22 EPU, or generator load. Let's -- it can be concluded  
23 that large transients either planned or unplanned have  
24 not provided any significant new information about  
25 transient modeling or actual plant response.

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1 Is that true only with regard to this  
2 plant, or is it true generally? Is that conclusion  
3 based upon this plant, the Vermont Yankee plant?

4 MR. PETTIS: Well that conclusion is based  
5 on Vermont Yankee, however there is a body of  
6 information that exists within the General Electric  
7 boiling water reactor fleet, and in the CPPU topical,  
8 and in the ELTR documents --

9 CHAIR KARLIN: Right.

10 MR. PETTIS: -- that seems to carry over  
11 from application to application to application.

12 CHAIR KARLIN: Right.

13 MR. PETTIS: You will find in most  
14 applications references made to a lot of the KKL and  
15 the KKM testing, and the CPPU topical, and the fact  
16 that there's no increase in dome pressure, and the  
17 analysis is simplified, and --

18 CHAIR KARLIN: All right.

19 MR. PETTIS: So a lot of that gets carried  
20 over in the GE BWR process. So --

21 CHAIR KARLIN: So that conclusion is not  
22 unique to --

23 MR. PETTIS: That conclusion is not unique  
24 to Vermont Yankee.

25 CHAIR KARLIN: It's sort of a generic

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1 conclusion about experiences, planned, unplanned large  
2 transient?

3 MR. PETTIS: Yes.

4 CHAIR KARLIN: So it's a generic  
5 conclusion, it can be concluded that large transients  
6 either planned or unplanned have not provided any  
7 significant new information about transient modeling  
8 or actual plant response.

9 I thought this was supposed to be a plant  
10 specific exclusion. It sounds like a generic  
11 exclusion.

12 MR. PETTIS: Well it's plant specific.

13 CHAIR KARLIN: Is that true generally?

14 MR. PETTIS: It's plant specific to  
15 Vermont Yankee. It just so happens that if you look  
16 back at all of the --

17 CHAIR KARLIN: But what is plant specific  
18 about that statement to Vermont Yankee? What -- look  
19 at that statement. What is specific about that  
20 statement to Vermont Yankee?

21 MR. PETTIS: Well Vermont Yankee in its  
22 application cites in references operating experience  
23 of other similar --

24 CHAIR KARLIN: They provided you the data.

25 MR. PETTIS: -- designs that have had

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1 transients, although at the time of application, you  
2 know, VY did not experience --

3 CHAIR KARLIN: Right.

4 MR. PETTIS: -- that.

5 CHAIR KARLIN: So the unique part about  
6 this is simply that Vermont Yankee is the one that  
7 provided you the information?

8 MR. PETTIS: Well we're right --

9 CHAIR KARLIN: But the information applies  
10 generally to all -- is generic information?

11 MR. PETTIS: Pretty much.

12 CHAIR KARLIN: So and that -- is that the  
13 basis for the Staff's conclusion that this exemption  
14 should be granted? I mean that's -- let me just read  
15 this paragraph.

16 Show me someplace else within this SER --  
17 I mean the report where you say the reason why you've  
18 reached this conclusion to grant this exemption.

19 MR. PETTIS: On page --

20 CHAIR KARLIN: No. I'm sorry. Mr. Jones,  
21 did you have something?

22 MR. JONES: Yes, on page 273.

23 CHAIR KARLIN: Oh, wait a second, 273 is  
24 not part of the justification for exemption of this,  
25 is it? That's a different section.

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1 MR. JONES: No, it's within the same  
2 section. It's not -- it's highlighted BOP systems.

3 CHAIR KARLIN: Well let me -- let's go to  
4 that then. Let's start with 271, SRP 14.2.1 Section  
5 3D, different section. Evaluate the adequacy of  
6 proposed transient testing plans.

7 Is that focused on -- well if you're going  
8 to do a transient testing plan you've got to make sure  
9 it's an adequate one. You've already decided not to  
10 do the transient tests.

11 You just did that in the prior section, so  
12 how does this section apply? You're evaluating the  
13 adequacy --

14 MR. JONES: Well --

15 CHAIR KARLIN: -- because you've already  
16 decided not to do it. That was what the paragraph  
17 just said.

18 MR. JONES: There's a separate heading on  
19 the top of page 273.

20 CHAIR KARLIN: Two seventy-three, okay.

21 MR. JONES: It kind of separates it from -

22 -

23 CHAIR KARLIN: But you've already  
24 concluded not to do the large transient test on page  
25 270 it seems. Okay. What are we doing in 273? This

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1 is balance of plant.

2 I just want to go back to page 270 for a  
3 minute and say is that the basis -- was there anything  
4 else in that section, than that one sentence, as to  
5 your reason, conclusion, explanation of why you  
6 decided to grant this exemption, Mr. Pettis?

7 MR. PETTIS: Well that section there  
8 represents a compilation of inputs.

9 CHAIR KARLIN: Right. I know it's a  
10 compilation, but I'm looking for the final judgment  
11 call my the Staff articulated in this report that says  
12 here's why we decided to grant this exemption.

13 MR. PETTIS: That's pretty much where it's  
14 located.

15 CHAIR KARLIN: Is that it?

16 MR. PETTIS: That's pretty much where it's  
17 located. It's in that Section 212 which is the power  
18 ascension and test plan.

19 CHAIR KARLIN: OKAY.

20 MR. PETTIS: And again, that would embody  
21 the collective inputs of other technical branch  
22 reviews, if they felt that they needed to provide  
23 input with respect to the justification.

24 ADMINISTRATIVE JUDGE RUBENSTEIN: Does  
25 each section specify in this area that it meets the

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1 applicable regulation, so this summary paragraph  
2 really is saying we have met the regulations?

3 MR. PETTIS: Well yes, there's a --

4 ADMINISTRATIVE JUDGE RUBENSTEIN: Each  
5 section in the SER?

6 CHAIR KARLIN: Well, yes, sure. That's  
7 what they're saying. I'm just trying to find out why.

8 MR. PETTIS: Each section of the SRP --

9 ADMINISTRATIVE JUDGE RUBENSTEIN: SER.

10 MR. PETTIS: -- excuse me, SER provides  
11 its own conclusion at the end with respect to their  
12 technical --

13 ADMINISTRATIVE JUDGE RUBENSTEIN: And it  
14 says basically we meet the regulation. So this --

15 MR. PETTIS: Ultimately yes.

16 ADMINISTRATIVE JUDGE RUBENSTEIN: So this  
17 paragraph --

18 MR. PETTIS: Well we have another -- we  
19 have another paragraph that's part of the template  
20 safety evaluation.

21 CHAIR KARLIN: So we're at 270. This is  
22 the conclusion paragraph of the analysis of whether  
23 they've justified not having to do this test. And the  
24 only sentence I find that provides such justification  
25 is the one we've been focusing on.

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1 And that's not a site specific analysis,  
2 that's a generic statement. Why not just give them  
3 the generic exemption that GE asked for the first  
4 time? Yes, Mr. Ennis?

5 MR. ENNIS: I agree that it doesn't go  
6 explicitly into details, but I think --

7 CHAIR KARLIN: Well we who pay attention  
8 to these things find this important. What I want to  
9 understand, why, what's your judgment call on?

10 MR. ENNIS: The intro of the first  
11 sentence is based on review of the information  
12 provided by the licensee. And in the course of the  
13 review we had several rounds of requests for  
14 additional information.

15 I believe we provided those as Entergy  
16 Exhibits -- I mean our Staff Exhibits 9, 10, and 11,  
17 where we said that SRP says we should address all  
18 these criteria, we don't think you've provided enough  
19 for Vermont Yankee.

20 And they provided a lot more information  
21 there that we did review.

22 CHAIR KARLIN: Okay. They provided  
23 information, you all asked for more information, they  
24 gave you more information, you reviewed it. And all  
25 I was looking for is why you concluded that it was --

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1 should be exempt.

2 And that's the one sentence that seems to  
3 tell me the answer.

4 MR. ENNIS: As I think Mr. Jones was  
5 starting to state, is if you go all the way to the end  
6 of the section, based on the template safety  
7 evaluation we have the overall conclusion that it  
8 meets criterion 11 in --CHAIR KARLIN: Right. That's  
9 ultimately -- it's a judgment call. You've made that  
10 judgment that it is --

11 MR. ENNIS: Right.

12 CHAIR KARLIN: -- meets criteria.

13 MS. ABDULLAHI: I think --

14 CHAIR KARLIN: Ms. Abdullahi?

15 MS. ABDULLAHI: I just wanted to say, like  
16 Steve's section on input, Steve Jones, --

17 CHAIR KARLIN: Yes?

18 MS. ABDULLAHI: -- on the inputs on  
19 whether to require the generated load reject, one of  
20 his inputs and plant specific condition was all the  
21 plant modifications were already done. They  
22 experienced two transient --

23 CHAIR KARLIN: I understand, Ms.  
24 Abdullahi.

25 MS. ABDULLAHI: -- after the model. So

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1 these go into --

2 CHAIR KARLIN: Ms. Abdullahi, I understand  
3 that. All I was asking for is when I read these words  
4 I'm trying to find out what the Staff's reason was,  
5 and that's not in there.

6 MS. ABDULLAHI: Oh, maybe it's not written  
7 there.

8 CHAIR KARLIN: Yes. This is an important  
9 document. This is a Safety Evaluation Report by the  
10 Staff. It's a key document that tells us why you've  
11 reached the conclusion you did.

12 ADMINISTRATIVE JUDGE BARATTA: I think --

13 CHAIR KARLIN: And the conclusion in here  
14 is a generic reason.

15 ADMINISTRATIVE JUDGE BARATTA: I think the  
16 problem that we all had in reading this document, at  
17 least I did, is that it really does not provide that  
18 much insight into the thought processes that you went  
19 through in that it has, as Judge Karlin has adequately  
20 pointed out, a generalization based on what's there.

21 And that's what we're trying to get at, is  
22 what is -- what was the rationale? You know, where --  
23 how did you get to where you got?

24 CHAIR KARLIN: Well, I'm not -- and I  
25 think we've already gone over that ground several

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1 times.

2 ADMINISTRATIVE JUDGE BARATTA: Yes.

3 CHAIR KARLIN: But I -- when I look at the  
4 -- so we've understood and we've heard your testimony  
5 as to what your rationale was in terms of the written  
6 testimony and here today and yesterday.

7 I just -- I'm troubled by the fact it's  
8 not articulated.

9 ADMINISTRATIVE JUDGE BARATTA: Right.

10 CHAIR KARLIN: And here in fact a  
11 different reason is given in here than what you've  
12 spoken to in a sense. And it's a generic reason, not  
13 a site specific one.

14 MS. ABDULLAHI: So is the SE content.

15 CHAIR KARLIN: Yes. How it's written.  
16 And I rely on that as an important document, how  
17 you've cited it in your exhibits. Okay. That's all  
18 I have. Any more questions for -- now we did have a  
19 follow-up question for the Staff.

20 Perhaps you have that before we -- yes,  
21 Ms. Abdullahi?

22 MS. ABDULLAHI: After the break I will --

23 CHAIR KARLIN: Do you have that?

24 MS. ABDULLAHI: -- give you. I just need  
25 to maybe --

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1 CHAIR KARLIN: Well we might not have to  
2 call you back on the stand if --

3 MS. ABDULLAHI: Oh, I don't want to do  
4 that then. Let me -- Okay.

5 CHAIR KARLIN: All right. We'll take a  
6 ten recess --

7 MS. ABDULLAHI: Let me give you --

8 CHAIR KARLIN: Why don't we do this?  
9 We'll take a ten minute recess and then if you've got  
10 something you can -- we won't necessarily call  
11 everybody back but maybe you could just address that,  
12 whatever that question was.

13 MS. ABDULLAHI: Okay.

14 CHAIR KARLIN: And then give us an answer.

15 MS. ABDULLAHI: Okay.

16 CHAIR KARLIN: All right. We'll break for  
17 ten minutes, 10:30.

18 (Whereupon, the above-entitled matter  
19 went off the record at 10:29 a.m. and  
20 went back on the record at 10:30 a.m.)

21 CHAIR KARLIN: On the record.

22 (Audience interruption.)

23 CHAIR KARLIN: We will take another break,  
24 everyone gets a few more minutes while we remove this  
25 lady. Thank you.

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1 (Whereupon, the above-entitled matter  
2 went off the record at 10:31 a.m. and  
3 went back on the record at 10:39 a.m.)

4 CHAIR KARLIN: I think we only need Ms.  
5 Abdullahi to come up because our question is directed  
6 to her, so you all can step down at this point. Thank  
7 you for your testimony and your time. We may end up  
8 recalling you at some point.

9 MS. ABDULLAHI: Okay. I looked --

10 CHAIR KARLIN: Well let's just ask --

11 ADMINISTRATIVE JUDGE BARATTA: I think  
12 previously you said that for an MSIV closure the  
13 important comparison was the SRV capacity. So could  
14 you compare the SRV capacity for Vermont Yankee to  
15 that of Hatch?

16 MS. ABDULLAHI: I looked at the data right  
17 now here for -- there's the data comparing Hatch and  
18 some other plants at rated condition, not EPU.  
19 However the data contained everything you need but the  
20 SRV capacity. So I tried to go through the  
21 licensing document, G-STAR-2, which all BWRs with GE  
22 have. I couldn't find it. But what I did notice  
23 though is that Hatch would be a larger BWR.

24 It would probably have a higher power  
25 density, and so relative, Vermont would be much on the

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1 smaller side, so Hatch would probably have more SRVs,  
2 but then it's a larger core.

3 So you just have to compare the two. I  
4 can't do that right now.

5 ADMINISTRATIVE JUDGE BARATTA: You don't  
6 have enough information to do that?

7 MS. ABDULLAHI: I do not have -- however  
8 I -- I just thought, I also thought you asked about  
9 the turbine trip case. In Brunswick that's covered.  
10 We did have a turbine trip case.

11 ADMINISTRATIVE JUDGE BARATTA: Oh, okay.

12 MS. ABDULLAHI: And so --

13 ADMINISTRATIVE JUDGE BARATTA: So the data  
14 that's in that chart is --

15 MS. ABDULLAHI: Is a similarity between  
16 Brunswick and Vermont Yankee, which are much closer  
17 than Hatch and Vermont. But -- and --

18 CHAIR KARLIN: And the chart being?

19 ADMINISTRATIVE JUDGE BARATTA: Yes, the  
20 chart --

21 CHAIR KARLIN: Exhibit 38?

22 ADMINISTRATIVE JUDGE BARATTA: We were  
23 referring to it as Exhibit 38.

24 MS. ABDULLAHI: Thirty-eight.

25 CHAIR KARLIN: Yes, okay.

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1 MS. ABDULLAHI: The one that was added.

2 ADMINISTRATIVE JUDGE BARATTA: Thank you.

3 CHAIR KARLIN: Yes. Is that it?

4 ADMINISTRATIVE JUDGE RUBENSTEIN: Just to  
5 summarize, the dominant factors were SRV capacity,  
6 energy density, power density, and peak water flow  
7 capacity?

8 MS. ABDULLAHI: Yes.

9 ADMINISTRATIVE JUDGE RUBENSTEIN: Well, I  
10 thank you.

11 CHAIR KARLIN: All right. Thank you, Ms  
12 Abdullahi. You may step down. Thank you for your  
13 attention. At this point the New England Coalition  
14 has a witness.

15 You have no exhibits that you have  
16 presented, Mr. Shadis.

17 MR. SHADIS: That's correct.

18 CHAIR KARLIN: So we will just go  
19 directly.

20 MR. SHADIS: I'll be relying on Entergy  
21 and NRC exhibits.

22 CHAIR KARLIN: All right, fine. So let's  
23 have Dr. Hopenfeld --

24 DR. HOPENFELD: Yes, I'm Dr. Joram  
25 Hopenfeld.

1 CHAIR KARLIN: Dr. Hopenfeld would you  
2 please take a seat over there behind the -- in the  
3 jury box, or stand over there. That's where -- Thank  
4 you.

5 Whereupon,

6 DR. JORAM HOPENFELD

7 was called as a witness by Counsel for NEC and, having  
8 been duly sworn, assumed the witness stand, was  
9 examined and testified as follows:

10 CHAIR KARLIN: Thank you. Please sit  
11 down.

12 MR. SHADIS: Dr. Hopenfeld, would you open  
13 your materials to your testimony, please? Dr.  
14 Hopenfeld, do you have before you a prefiled, written  
15 testimony of Dr. Joram Hopenfeld, regarding Contention  
16 3, and do you have before you a declaration of Dr.  
17 Joram Hopenfeld in support of New England Coalition's  
18 response to the statements of position of Entergy and  
19 Staff?

20 WITNESS HOPENFELD: I believe I do, yes.

21 MR. SHADIS: I'm sorry?

22 WITNESS HOPENFELD: Yes.

23 MR. SHADIS: Did you prepare this  
24 testimony for submission in this proceeding?

25 WITNESS HOPENFELD: Did I what?

1 MR. SHADIS: Did you prepare this  
2 testimony for submission in this proceeding?

3 WITNESS HOPENFELD: Yes, I did.

4 MR. SHADIS: Have you prepared a statement  
5 of your professional qualifications?

6 WITNESS HOPENFELD: Yes, I did.

7 MR. SHADIS: Is your statement of  
8 professional qualifications included in your prefiled  
9 testimony?

10 WITNESS HOPENFELD: Yes, indeed.

11 MR. SHADIS: Have you any corrections or  
12 revisions to that testimony at this time?

13 WITNESS HOPENFELD: I do not.

14 MR. SHADIS: Do you adopt this written  
15 testimony as your sworn testimony in this proceeding?

16 WITNESS HOPENFELD: I do.

17 MR. SHADIS: I now move to have this  
18 direct testimony admitted into this proceeding.

19 CHAIR KARLIN: Are there any objections?

20 Hearing none the testimony will be  
21 admitted into this proceeding and entered into the  
22 transcript as if read.

23 (Whereupon, the direct prefiled testimony  
24 of Dr. Joram Hopenfeld was bound into the record as if  
25 having been read.)

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

*In the matter of*  
ENTERGY NUCLEAR VERMONT YANKEE, LLC  
and ENTERGY NUCLEAR OPERATIONS, INC.  
(Vermont Yankee Nuclear Power Station)

May 12, 2006

Docket No. 50-271

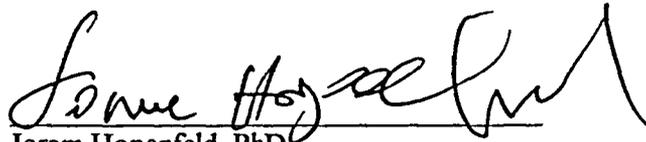
ASLBP No. 04-832-02-OLA

**AFFIDAVIT OF DR. JORAM HOPENFELD  
REGARDING HIS PREFILED TESTIMONY  
IN SUPPORT OF  
NEW ENGLAND COALITION'S CONTENTION 3**

I, Dr. Joram Hopenfeld, declare as follows:

1. My name is Dr. Joram Hopenfeld. I reside at 1724 Yale Place, Rockville, Maryland.
2. The New England Coalition has retained me as an expert witness in the above captioned matter.
3. I declare under penalty of perjury that the testimony that I have offered in the above captioned proceeding as PREFILED WRITTEN TESTIMONY OF DR. JORAM HOPENFELD IN SUPPORT OF NEW ENGLAND COALITION CONTENTION 3, is true and correct.

Executed this day, April 17, 2006 at Rockville, Maryland.

  
Joram Hopenfeld, PhD

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
Before the  
ATOMIC SAFETY AND LICENSING BOARD

In the Matter of Entergy Nuclear Vermont Yankee, LLC  
and Entergy Nuclear Operations, Inc. (Vermont Yankee  
Nuclear Power Station) (Technical Specification  
Proposed Change No. 362)

May 17, 2006  
Docket No. 50-271-OLA  
ASLBP No. 04-832-02-OLA

**PREFILED WRITTEN TESTIMONY OF  
DR. JORAM HOPENFELD  
REGARDING CONTENTION 3**

On behalf of New England Coalition, Dr. Joram Hopenfled hereby submits the following  
testimony regarding New England Coalition's Contention 3.

**Q.1. Please state your name and address.**

**A.1.** My name is Dr. Joram Hopenfled and my business address is 1724 Yale Place,  
Rockville, MD, 20850.

**Q.2. What is your educational and professional background?**

**A.2.** I have received the following degrees in engineering from the University of  
California at Los Angeles: BS 1960, MS 1962, and PhD 1967.

My major fields were in Fluids Flow, Heat Transfer and Electrochemistry.

I am an expert in the development of thermal hydraulic computer codes and  
models as they relate to the assessment of nuclear safety issues.

My resume' has been provided to the Board and to the parties as an attachment to  
a Declaration Of Dr. Joram Hopenfled Supporting New England Coalition's Response To  
Envy's Motion For Summary Disposition, December 21, 2005.

During a professional career spanning over 44 years I have:

- conceived, designed and conducted tests as well as managed national and international research programs in the areas relating to thermal hydraulics, materials/coolant compatibility and reactor safety,
- managed a major international program on steam generator performance during accidents, and
- funded research and development work at the Engineering Department of the University of Virginia, which resulted in the development of a computer code in support of measurements of pipe wall thinning from erosion/corrosion.

**Q.3. Can you cite specific examples of recognition by the scientific community?**

**A.3.**

- As described in Attachment One, PUBLICATION IN PEER REVIEWED JOURNALS ONLY, I have published 14 papers in peer-reviewed technical journals in the above areas.
- I hold eight U.S. patents and I am listed in the Engineers of Distinction published by the Engineers Joint Council and in American Men and Women in Science.
- I was a reviewer for the "A.I.A.A. Journal of Energy."
- I was the U.S. representative to the 1976 International Conference on Cavitation in Fast Breeder Reactors. I am a recipient of the ASME Blackall Machine Tool Gage Award

**Q.4. Please discuss your experience as it relates to transient testing?**

**A.4.** While working for the NRC I was responsible for a major international transient test program, MB-2, which was designed to benchmark thermal hydraulic codes for PWR

steam generators. This program required intimate knowledge of scaling laws and the understanding of instrumentation and data acquisition systems. The results were published in NUREG /CR-4751 and are being used (9, 11) to validate computer codes.

**Q.5. The above studies appear to be related to Pressure Water Reactor (PWR) issues, why is this experience applicable to thermal hydraulic issues in a Boiling Water Reactor (BWR)?**

**A.5.** The thermal hydraulic issues are common to many components both in PWRs and BWRs. For example both PWRs and BWRs use dryers to separate moisture from steam. Differences in geometry and the operating conditions would require different modeling; nevertheless the concepts of the governing equations are similar. My broad experience in various areas of thermal hydraulics qualifies me as an expert in evaluating thermal hydraulic issues in BWRs.

**Q.6 Could you please list the areas where you had hands-on experience with modeling?**

**A.6** I have hands-on experience with modeling in these areas:

- Transient Boiling,
- Fire propagation,
- Stratified flow,
- Natural Circulation,
- Jet mixing,
- Plenum Mixing,
- Fuel mixing in fuel bundles,
- Cavitation,

- Water – Molten Metal Interaction,
- Boundary Layer/Shock Interaction,
- Reentry Heat Transfer,
- Two Phase pressure drop in undeveloped pipe flows and
- NOx Emissions from coal fired plants.

**Q.7. What materials have you reviewed in preparation for your testimony?**

**A.7** I have reviewed Entergy and NRC documents, published papers, and certain chapters in two classic textbooks. A list of these references is provided in the Attachment Two, LIST of REFERENCES..

**Q.8. What is the purpose of your testimony**

**A.8** My purpose is to discuss why Entergy rationale for seeking exemptions from transient testing is technically unsound. This rationale is essentially based on the following unsubstantiated three propositions:

- a) “None of the plant modifications that have been or will be made for the EPU will introduce new thermal-hydraulic phenomena, nor will there be any new system interaction during or as the result of analyzed transients introduced.”
- b) “There is every reason to anticipate that the transient analysis will accurately predict the plant response to large transient events without need to perform actual tests”
- c) “The transient analysis for VY are performed using the NRC approved code ODYN”

With regard to item (a) above, Entergy provides no substantiation of this assertion. For example the steam dryer has been modified; its structural integrity could be affected by

the EPU. The 20% increase in flow velocity at EPU conditions increases turbulence and vortex shedding frequencies and loads on the dryer.

With regard to item (b), this statement is too general to deserve comment. Entergy must provide a discussion showing why their analysis can be used as a substitute for transient testing; a mere assertion to that effect is simply not acceptable. The public must be provided with the proper documentation to evaluate the risk from forgoing transient testing.

With regard to item (c) Entergy does not state that the ODYN code was benchmarked for pressurized transients nor does it discuss how the ODYN code was benchmarked for steady state operations.

In summary Entergy must provide the public an analysis of the key assumptions, which underlie their assertions that transient tests are not needed.

**Q.9. Please explain why it is important to show benchmarking of ODYN.**

A.9. Thermal-Hydraulics (T-H) computer codes attempt to represent complex physical processes during various reactor operations.

An example of such a process is two-phase flow that occurs in the reactor core where water is converted to steam. The theoretical basis for describing two-phase flow phenomena is not complete; T-H codes must therefore rely heavily on experimental data to reduce uncertainties. As shown in Reference 9, unless the T-H codes are validated with data from well-instrumented prototype components, the predictions of the codes may result in significant errors in calculating heat transfer parameters. For certain components, knowledge of this uncertainty is critical because otherwise some components may fail, especially under transient conditions.

The need to reduce code uncertainties during transient conditions is well recognized, for example, Peach-Bottom-2 transient experimental data has recently been used to validate best estimate T-H codes (16).

The coolant flow rate under EPU conditions is higher than the flow rate under 100% power. Since the core void fraction, the power generation rate and the coolant flow rate are interdependent, accurate predictions of void fractions are essential. This ability depends on the two-phase model that a particular code has adopted. Different computer codes use different models (homogeneous, drift flux) having different accuracies. If the ODYN computer code employs inaccurate models, the predicted behavior of the VY reactor during transients will include large uncertainties. For example, closure of the MSIVs, due to operator error or LOCA redirects the flow of steam into the containment suppression pool. The uncertainties in predicting loads under these conditions must be quantified at EPU flow rates.

**Q.10 Do you have concerns with regards to a specific component in particular?**

**A. 10** Yes, the steam dryer. Because of the increase in flow velocity at EPU conditions, steady state temperature and pressure fluctuations will increase the fatigue usage factor of the steam dryer. This increase in fatigue together with the increase in fatigue during transients must be taken into account to show that the cumulative fatigue factor at EPU conditions will remain below A.S.M.E. allowable limits.

A computer code of unknown accuracy, such as the ODYN, can not be used reliably for the above purpose.

**Q.11. Please discuss what Entergy should do to demonstrate that the fatigue usage factor of critical components will remain below the relevant A.S.M.E. code limits.**

**A.11.** In my opinion Entergy should proceed as follows.

1. Walk around the plant and identify those components that are most susceptible to failure by flow-induced vibrations.
2. Identify the parameters (pressure, neutronic response) that can be used to compare plant behavior during MSIVs closure and load rejections to ODYN predictions under VY- EPU conditions.
3. Compare ODYN predictions with Peach Bottom data

4. If a good agreement is not obtained in 3 above, show that transient tests are not required in spite of the differences between Peach Bottom and VY.

**Q.12 Have you previously filed testimony in support of New England Coalition Contention 3?**

**A.12** Yes, On December 21, 2005, I provided testimony in the form of my a declaration supporting New England Coalition Contention 3 and responding to an Entergy Motion for Summary Disposition.

**Q.13 Do you now wish to incorporate that testimony in this, your prefiled written testimony?**

**A. 13** Yes.

**Q.14. Please summarize your conclusions?**

**A.14.** I have concluded that Entergy's assertion that there is no need for transient testing is severely wanting.

A lack of demonstrated ability to predict loads on structural components during transients can have a major impact on public health and safety. Entergy's description of the ODYN code is blatantly general; it is impossible to scrutinize generalities. Acceptance of the Entergy unsubstantiated statements that the transient test is not needed would in essence shut the door to the public for evaluating Entergy analysis.

**Q.15. Please state what would you believe the Board should do?**

**A.115.** I believe that the Board should direct the NRC to discontinue Entergy operation above 100% power until the issues discussed in A.11 are satisfactory resolved.

**Q.16. Does that conclude your testimony?**

**A. 17.** Yes.

**Attachment One: PUBLICATION IN PEER REVIEWED JOURNALS ONLY**

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2. Continuous Automatic Detection of Pipe Wall Thinning, ASME Proceedings of the 9th, International Conference on Offshore Mechanics and Arctic Engineering. Feb. 1990
3. Iodine Speciation and Partitioning in PWR Steam Generators, Nuclear Technology, March 1990
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13. Operating Conditions of Bubble Chamber Liquids, The Review of Scientific Instruments, 34, 308-309. (1963); co-author

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## Attachment Two: LIST OF REFERENCES

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6. Transcript of 512<sup>th</sup> ACRS Meeting, May 7, 2004 Rockville, MD ML041470049  
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7. 2005/03/31 Vermont Yankee TSP Change No-263, Supplement No. 26 "Extended  
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8. 2004/01/31 VYNP TSP Change No 263. Supplement 5, EPU RAI . ML04048640  
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Convective Heat Transfer Correlations NUCLEAR TECHNOLOGY, Vol. 94,  
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10. Prototypical Steam Generator ( MB-2) Transient Testing Program, NUREG/CR-  
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11. A Sawyer et. al "RELAP5-3D Validation Study Using MB-2 Prototypical Steam  
Generator Steady State Data" NUCLEAR TECHNOLOGY Vol. 151 Sep. 2005
12. Yoshiro Asahi et. al. Analysis of BWR Turbine Trip Experiment by Entire Plant  
Simulation with Spatial Kinetics. NUCLEAR SCIENCE AND ENGINEERING,  
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Engineering and Design 224 (2003) 293-300

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
Before the  
ATOMIC SAFETY AND LICENSING BOARD

In the Matter of Entergy Nuclear Vermont Yankee, LLC  
and Entergy Nuclear Operations, Inc. (Vermont Yankee  
Nuclear Power Station) (Technical Specification  
Proposed Change No. 362)

June 14, 2006

Docket No. 50-271-OLA

ASLBP No. 04-832-02-OLA

**DECLARATION OF DR. JORAM HOPENFELD  
IN SUPPORT OF NEW ENGLAND COALITION'S RESPONSE  
TO THE STATEMENTS OF POSITION OF ENTERGY AND NRC STAFF**

Dr. Joram Hopenfeld submits the following declaration in support of New England Coalition's Response to the Statements of Position of Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc (herein, "Entergy or ENVY") and U.S. Nuclear Regulatory Commission Staff (herein, "NRC Staff").

At the request of New England Coalition, I have performed a technical assessment of the May 17, 2006 Statements of Position of ENVY and NRC Staff.

Dr. Hopenfeld addresses and rebuts key points in the ENVY and NRC Staff Statements of Position while providing a critical discussion of the technical aspects of the proposed exemption from full-transient testing.

Dr. Hopenfeld relies upon ample qualifications as an expert in the pertinent scientific and technical fields and on evidence provided by ENVY and NRC Staff to assess ENVY's proposed exemption from full-transient testing.

A list of the references drawn from ENVY and NRC Staff filings cited by Dr. Hopenfeld in his testimony precedes his Declaration.

## References

1. New England Coalition's Answer to Entergy's Statement of Material Facts Regarding NEC Contention 3 - Docket No 50-271, ASLB No. 04-832 -02-OLA
2. New England Coalition's Statement of Position - Docket No 50-271, ASLB No. 04-832 -02-OLA
3. Entergy's motion for summary Disposition of New England coalition on 3, December 2, 2005.- Docket No 50-271, ASLB No. 04-832 -02-OLA
4. Entergy's Initial Statement of Position on New England Coalition Contention 3. May 17, 2006 -Docket No 50-271, ASLB No. 04-832 -02-OLA
5. Testimony of Craig J. Nichols and Jose L. Cassillas on NRC Contention 3- Large Transient Testing, May 17, 2006- Docket No 50-271, ASLB No. 04-832 -02-OLA
6. NRC Staff's Initial Statement of Position Concerning NEC Contention 3 - May 17, 2006- Docket No 50-271, ASLB No. 04-832 -02-OLA
7. NRC Staff Testimony of Richard B. Ennis, Steven R. Jones, Robert L. Pettits Jr., A George Thomas, and Zeynab Abdullahi, Concerning NEC Contention 3 -17, 2006- Docket No 50-271, ASLB No. 04-832 -02-OL

UNITED STATES OF AMERICA  
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On behalf of New England Coalition, Dr. Joram Hopfenfeld hereby submits the following declaration in support of New England Coalition's Response to the Statements of Position of Entergy Nuclear Vermont Yankee, LLC and Entergy Nuclear Operations, Inc (herein, "Entergy or ENVY") and U.S. Nuclear Regulatory Commission Staff (herein, "NRC Staff").

**Q.1. Please state your name and address.**

**A.1.** My name is Dr. Joram Hopfenfeld and my business address is 1724 Yale Place, Rockville, MD, 20850.

**Q.2. What is your educational and professional background?**

**A.2.** I have received the following degrees in engineering from the University of California at Los Angeles: BS 1960, MS 1962, and PhD 1967.

My major fields were in Fluids Flow, Heat Transfer and Electrochemistry.

I am an expert in the development of thermal hydraulic computer codes and models as they relate to the assessment of nuclear safety issues. I have 45 years of professional experience in the fields of instrumentation, design, project management, and

nuclear safety; including 18 years in the employ of the U.S. Nuclear Regulatory Commission.

My resume' has been provided to the Board and to the parties as an attachment to a Declaration Of Dr. Joram Hopenfeld Supporting New England Coalition's Response To Envy's Motion For Summary Disposition, December 21, 2005.

**Q.3. What is the purpose of your declaration?**

A.3. At the request of New England Coalition, I have performed a technical assessment of the May 17, 2006 Statements of Position of ENVY and NRC Staff. The purpose of this declaration is to provide a critical discussion of the technical aspects of the statements of position and to provide my conclusions regarding them.

**Q.4. Please summarize your findings.**

A.4. I have examined the Statements of Position of ENVY and NRC Staff Entergy and have concluded that ENVY's position that the ODYN computer code can be used as a replacement to transient testing is completely void of any technical justification. In my professional opinion ENVY should be required to reduce power to original licensed thermal power ("OLTP or 100%") until it can demonstrate by transient testing or by a valid analysis that it is safe to operate the plant at 120% power.

In ENVY's most recent communication, a Statement of Position, May 17, 2006, ENVY averred that the ODYN code can predict only the maximum pressure in the reactor vessel and not the stresses of reactor components during transients. (Ref. 5, A 39) This represents a considerable change from ENVY's December 2, 2005 Motion for Summary Disposition in which they claimed that the ODYN code is capable of predicting plant performance during transients,

**1. The analytical tools used by Entergy will accurately predict plant performance in large transient events under EPU conditions**

The transient analyses for VY are performed using the NRC-approved code ODYN, which models the behavior of the safety- and non-safety-related systems of the plant during operational events... [Page 5]

In discussing the benchmarking of the ODYN code, ENVY provided no comparison of experimental data with code predictions nor did ENVY describe in sufficient details how the code was qualified.

In discussing industry experience, ENVY referenced several BWR reactors that have undergone transients and for which it claimed that no new phenomenon have been exhibited. However, ENVY has not provided any analysis to indicate why the above results are applicable to the VY plant at the EPU conditions.

ENVY provides no direct justification for using the ODYN code. ENVY seems to be saying that the code can predict transient behavior because they say so.

Review of the May 17, 2006 NRC Staff Statement of Position seems to indicate that the NRC basically accepts ENVY's contentions without apparent scrutiny.

The purpose of transient tests is to verify that the performance of a given plant is consistent with its design. When ENVY seeks to forgo transient testing by using analyses instead, ENVY must demonstrate that the analyses include sufficient details so that it is representative of the actual tests that are being excluded. As part of this requirement, ENVY should provide material that permits the public to quantify the effects of key assumptions. ENVY has not done so.

**Q.5. Please provide a discussion of your review of ENVY and NRC Statements of Position and your findings with respect to the issues raised in NEC Contention 3.**

A.5. In previous communications to the ASLB (references 1, 2) NEC stated that Vermont Yankee, VY, should not be allowed to operate at the 120% of OLTP without a complete revalidation of the plant ability through analysis, and both individual component and full transient testing to operate at these power levels. Entergy Nuclear Vermont Yankee (ENVY) claimed (3, 4, 5) that full transient testing is not required largely because the ODYN computer code is capable of predicting plant behavior during transients.

Since ENVY did not discuss benchmarking, I have raised the question (reference 1) of how the ODYN code was benchmarked (or not) for the type of transients that ENVY claimed to have analyzed for the EPU.

In a reply to the board regarding this issue, ENVY and the NRC stated (4, 5, 6) that the ODYN code was benchmarked against Peach Bottom and other transient data.

Neither ENVY nor the NRC provided a comparison between ODYN predictions and experimental data. Both the ENVY and the NRC state that ODYN provide conservative predictions. Review of ENVY's latest submittals (4 and 5) reveals some new information regarding ODYN, which is discussed below.

In Reference 3 ENVY stated that the ODYN code would accurately predict plant performance during large transients under EPU conditions.

From the latest ENVY submittals, we are now discovering (Ref. 5, A 39) that the ODYN code was used only to predict the peak pressure rather than stresses on various components during transients.

It is not clear to me why ENVY is referring to "plant performance" while the ODYN code is capable of predicting only the maximum pressure. On page 5 of Reference 3, ENVY stated:

1. The analytical tools used by Entergy will accurately predict plant performance in large transient events under EPU conditions.  
The transient analyses for VY are performed using NRC- approved code ODYN, which models the behavior of the safety-and non-safety-related systems of the plant during operational events.

Since ENVY did not define "plant performance" one can reasonably assume that "plant performance" refers the performance of structures, systems and components as defined in Appendix B to 10 C.F.R. Part 50 for exemptions from transient testing.

A test program shall be established to assure that all testing required to demonstrate that structures, systems, and components ("SSCs") will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents. The test program shall include, as appropriate, proof tests prior to installation, preoperational tests, and operational tests during nuclear power plant or fuel reprocessing plant operation, of structures, systems, and components. Test procedures shall include provisions for assuring that all prerequisites for the given test have been met, that adequate test instrumentation is available and used, and that the test is performed under suitable environmental conditions. Test results shall be documented and evaluated to assure that test requirements have been satisfied.

If ODYN were able to predict system performance during transient then its output would have been consistent with the requirements for exemptions from transient testing.

However, since ODYN can potentially predict only the maximum pressure its output is not consistent with Appendix B to 10 C.F.R. Part 50. Since plant safety depends on the structural integrity of key vessel components the integrity of these components must be addressed as part of system performance. The applied structural stresses and the allowable stresses, would ultimately determine whether a given component would perform satisfactorily in service. Knowledge of the maximum pressure alone is not a sufficient to assure system performance. The frequency and amplitude of the vibrations as well as the component's natural frequency, which is affected by

temperature and temperature gradients, for example, govern failure of components from vibrations.

With the newly provided understanding that ODYN can predict only maximum pressure, ENVY must in addition to describing the benchmarking of ODYN address the issues of how the stresses of SSC were calculated during transient in order to assure compliance with Appendix B 10CFR Part 50. These two issues are further discussed below.

**a. Peak pressure during transients**

According to ENVY the ODYN code is a one-dimensional code.

This characterization of the ODYN code is confirmed in the NRC Staff Statement of Position at Page 11,

*As part of its justification for not performing large transient testing, Entergy stated that the MSIV closure pressurization transient analysis (that bounds the load reject without bypass pressurization event) had been performed at Vermont Yankee for the EPU conditions using the ODYN code. The results of this analysis showed the response of the plant to this bounding transient to be acceptable. Id. at 18. The One Dimensional DYNamic Core Transient model ("ODYN") code has been qualified by comparing its predicted response to actual data. Id. at 18-20. [NRC Staff Testimony NRC Staff Testimony Of Richard B. Ennis, Steven R. Jones, Robert L. Pettis Jr., George Thomas, And Zeynab Abdullahi Concerning NEC Contention 3, May 17, 2006]*

Such codes incorporate certain simplifications that describe transient behavior therefore; their validity is limited to the cases where the code was benchmarked. For this reason, I disagree with ENVY and the NRC that the observation that the code is conservative or that it over predicts pressure also means that the code is suitable to predict all transients.

It is important to understand that a code can predict certain quantities very accurately under a certain set of boundary conditions yet it will be very inaccurate in

predicting the same parameters under different boundary conditions. It is not the amount of conservatism that is important, it is the understanding of the reasons for the discrepancy between the experimental data and code predictions. Neither Envy nor the NRC discusses the specific Peach Bottom test data that was compared to ODYN predictions nor do they explain why the predicted peak pressure exceeded the experimental data.

Perhaps the lack of transparency on part of ENVY and the NRC is due to the fact that some data may be proprietary. If that is the case, it is my opinion that ENVY and the NRC should not be allowed to hide behind a veil of "proprietary information" instead of being required to present a straightforward comparison of the experimental data with ODYN predictions.

We need not review nor need we be interested in the specific mathematical techniques or proprietary data. Instead, it would serve the record to be able to determine from information that ENVY should be supplying, for example, how accurately ODYN can predict the core exit pressure rise and pressure oscillations, and water levels during the turbine trip tests at Peach Bottom

It would also be appropriate to be able to determine from information provided by ENVY the basic assumptions regarding the coupling between neutronics and thermal hydraulic and the flow through the moisture separator.

Such information is essential in assessing the ability of the code to provide meaningful information for different transients and boundary conditions.

The board should require that ENVY list and make public all key assumptions and models that were used in ODYN. ENVY should also compare key VY plant

parameters such as flow velocities vs the parameters that were used to benchmark ODYN.

**b. Loads on key components during transients**

Transients can introduce large stresses on vessel components due to induced vibration. The EPU involves an increase of 20% in the flow velocity; this change in velocity increases the potential for flow-induced vibration both under steady state and transient conditions.

When during a transient, the frequency of the induced vibrations is close to the natural frequency of a component, that component can fail catastrophically.

This is the reason why key components such as the dryer must undergo an integrity assessment to assure that the applied stresses remain within the design limits.

**Q.6. Please provide any additional, specific comments on ENVY's Statement of Position to which you wish to draw the Board's attention.**

**A.6.** Referenced by page number and topic, I provide the following few specific comments:

**a. Page 5 - Expertise**

ENVY stated that unlike Mr. Nicholas, BSEE and Mr. Casillas, BSME, Dr. Hopenfeld has no expertise in the issues that were raised by Contention 3 because he has no operational experience at VY with large transients and other BWR plants.

**Reply**

Since ENVY relies on the ODYN code as a replacement to transient testing, the main expertise that is required in this regard is an in depth knowledge of thermal

hydraulic (T-H) modeling and code verification. Dr. Hopenfeld has experience and knowledge in this area.

Scientists who are familiar with the various T-H theories and numerical schemes write T-H codes. Experience with transients at VY, or other BWR plants, does not appear to be a prerequisite for the development of T-H codes. Very few if any, of the code developers have been project managers at nuclear facilities also the field of thermal hydraulics is not subdivided into PWR or BWR branches.

Although Dr. Hopenfeld has not been working at VY, he has published in peer reviewed journals several papers on complex problems in T-H and material coolant interaction, his experience include,

- Hand on modeling T-H phenomena and testing
  - two phase flow in channels,
  - transient boiling,
  - fire behaviour and propagation.
  - Radioactivity transport following SG tube rupture
  - Steam Explosions
- A US representative to an International Conference on Cavitation,
- Project Manager for the development of major (T-H) computer codes such as COBRA.
- Project Manage for a major international program on transient testing of prototypical steam generators (MB-2).
- Supervised the use of the RELAP code for the calculations of temperatures during PWR transients.

The above background qualifies Dr. Hopenfeld to address the issues, which relate to the assessment of the ODYN code as a substitute for transient testing.

In contrast, Mr. Nicholas and Mr. Casillas have not demonstrated in depth knowledge of T-H by any publication in the open literature. Their resumes give no indication that they have been involved in code development or code verifications. Mr. Nicholas does not even appear to have any significant educational background in T-H since his degree is in electrical engineering.

It may be that Mr. Nichols and Mr. Casillas have some experience with T-H analysis but the level and complexity of that experience is not specified. Mr. Nichols' and Mr. Casillas' resumes do not reflect an in-depth knowledge of T-H modeling development or testing. T-H computer codes validation is a complex task. Mr. Nichols' and Mr. Casillas' training and discipline do not appear to meet professional standards for assessing T-H computer codes.

**b. Page 8 - Generalities**

**Item 8**

ENVY states that,

ODYN code has been benchmarked against all significant plant transients including turbine trip (equivalent in its effects to generator load rejection test) and MSIV closure events.

The turbine data were obtained from Peach Bottom and KKM and the MSIV data were obtained from the Hatch plant

**Item 9**

ENVY states,

The results of the ODYN's bench mark assessment demonstrate the ability of the code to accurately predict plant performance during transients. The current version of the ODYN code continues to accurately predict the over power magnitude and slightly over predict the overpressure magnitude.

**Item 10**

Envy states.

...it is reasonable to assume the ODYN code of VY behavior during large transients at EPU operations accurately predict the actual plant response to those transients because the ODYN model is qualified for the analysis of this type of a transient.

**Reply**

The above information is too general as to be of any use in evaluating ENVY's analysis or determining if ENVY is qualified exemption to the requirement for transient testing.

It is my professional opinion that, at a minimum, Energy should be required to plot the measured plant parameters such as pressure and flow velocities vs. code predictions and explain the reasons for any differences between code predictions and experimental data.

ENVY should be required to explain in detail how the code was qualified for transients under EPU conditions.

**c. Pages 9 – 10, Items 12-32 – Industry Experience**

ENVY discusses several BWR reactors, Hatch 1&2, Brunswick 2, Dresden 3 and KKL where transient have occurred at various power level and the ODYN code was used to compare system performance. Since it is claimed that no new related phenomena were observed at these plants, ENVY concluded without analyses that the same results would be obtained at VY.

**Reply**

System performance can only be predicted by considering the stresses on key reactor components during the transients.

To make a valid comparison between the above reactor experience and what is expected to occur at VY under transient conditions, ENVY must show by actual analysis, including stresses on key components, that the above reactor experience is sufficient relevant to forgo transient testing.

If ENVY chooses to use statistical consideration alone, (which apparently appeared to be their approach) to conclude that based on reactor experience one can eliminate transient testing than ENVY should elaborate on the validity of their statistical sampling.

**Q.7. Please provide any additional, specific comments on NRC Staff's Statement of Position to which you wish to draw the Board's attention.**

**A.7.** NRC Staff's position regarding the use of ODYN and its benchmarking can be summarized by referring to pages 11 and 12 of Reference 6.

Page 11

As part of its justification for not performing large transient testing, Entergy stated that the MSIV closure pressurization transient analysis (that bounds the load reject without bypass pressurization event) had been performed at Vermont Yankee for the EPU conditions using the ODYN code. The results of this analysis showed the response of the plant to this bounding transient to be acceptable. *Id.* at 18. The One Dimensional Dynamic Core Transient model ("ODYN") code has been qualified by comparing its predicted response to actual data. *Id.* at 18-20.

Page 12

The facts show that the ODYN code has been properly benchmarked for modeling EPU operations and is appropriate for use in demonstrating reasonable assurance that SSCs will perform satisfactorily in service.

**Reply**

There is nothing that links even remotely the NRC conclusions on page 12 with the discussion of Reference 7 a on pages-18-20.

First, the NRC has not reviewed the benchmarking of ODYN for the Hatch and the KKL plants:

Secondly, The staff has not demonstrated the comparison of ODYN with Peach Bottom and with RELAP-3B data.

From the discussion provided by the NRC one must conclude that the NRC evaluation was limited to the ability of the ODYN code to predict general system performance, like maximum system pressure for example. NRC is silent about the ability of ODYN to such parameters which are required to asses stresses and integrity of SSCs. during transients.

As already discussed above, overall predictions of system performance is not sufficient to assure that SSCs will perform satisfactory one must ensure that the applied stresses do not exceed allowables. The purpose of transient testing is to do just that: provide confirmation that the system will perform as designed.

When one seeks to substitute actual integral testing with analytical tools he must use analytical tools that can predict those parameters that are relevant to the stress of the SSSc. Pressure, temperature and flow variations with time are required for such analyses.

NRC has not demonstrated (and therefore it is only speculating) that that the ODYN code has properly been benchmarked to ensure that the “ SSCs will perform satisfactory in service” and comply with Appendix B to 10 C.F.R. Part 50.

**Q.8. Have you anything further?**

**A.8** I offer the following conclusion:

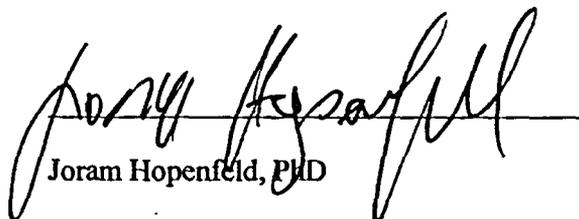
Based upon my examination and professional assessment of the ENVY and NRC Staff Statements of Position, I conclude that ENVY has yet to provide technically defensible justification for avoiding full transient testing; and that the sum total of information to be gained from consideration of ENVY's proposed computer code-(s), individual component testing, and very limited applicable industry experience is insufficient to displace the information to be gained from full transient testing.

Therefore, it remains my professional opinion that adequate assurance of public health safety cannot be determined from the license application in this case.

Nothing in the ENVY and NRC Staff Statements of Position has altered my professional opinion that Atomic Safety and Licensing Board should examine the issue of full transient testing (per NEC Contention 3) in the context of a full hearing before making a final decision on the Vermont Yankee EPU application.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this day, June 12, 2006, at Rockville, Maryland.

  
Joram Hopenfeld, PhD

1 CHAIR KARLIN: Dr. Hopenfeld, good  
2 morning, we are going to ask you some questions.

3 WITNESS HOPENFELD: Good morning.

4 CHAIR KARLIN: And if there is a question  
5 which is unclear, you don't understand, please let us  
6 know and we will try to rephrase it or speak more  
7 clearly.

8 If there is a point where you need a break  
9 let us know that as well.

10 WITNESS HOPENFELD: Thank you.

11 CHAIR KARLIN: And, again, if there is an  
12 exhibit that you think would help your testimony by  
13 referring to it, please let us know, or access that  
14 exhibit, so that would focus your testimony and our  
15 understanding of this matter.

16 We ask, if we ask for your opinion, that  
17 is fine. But otherwise we are looking for what you  
18 can testify to, factually. We understand you are a  
19 PHD, so we would appreciate your testimony.

20 And, with that, I turn it over to my  
21 colleagues for asking you some questions.

22 ADMINISTRATIVE JUDGE RUBENSTEIN: Good  
23 morning, Dr. Hopenfeld. In your May 17th testimony  
24 you focused on three areas where you felt concern that  
25 inadequate analysis had not been done.

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1                   You focused on new thermal hydraulic  
2 phenomena, transient analysis, and its accurate  
3 prediction of plant response to large transient  
4 events, and transient analysis for Vermont Yankee  
5 using the code ODYN.

6                   CHAIR KARLIN:     Please speak up, Dr.  
7 Hopenfeld, we --

8                   WITNESS HOPENFELD:   I'm sorry, can you  
9 hear me now better?

10                  CHAIR KARLIN:    Yes.

11                  ADMINISTRATIVE JUDGE RUBENSTEIN:  Yes.  In  
12 establishing the basis for the contention Mr.  
13 Gunderson also cited a number of other items.  Are we  
14 going to discuss those items, or should we stick to  
15 the three items that you preferred in your testimony?

16                  WITNESS HOPENFELD:  Three items are fine,  
17 but I don't quite understand which other items you are  
18 referring to.

19                  ADMINISTRATIVE JUDGE RUBENSTEIN:  Well, he  
20 had four items.

21                  WITNESS HOPENFELD:  Who had, I'm sorry?

22                  ADMINISTRATIVE JUDGE RUBENSTEIN:   Mr.  
23 Gunderson.  But, okay, we will stick to yours.

24                  WITNESS HOPENFELD:  Who had four items?

25                  ADMINISTRATIVE JUDGE RUBENSTEIN:   Mr.

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1 Gunderson, in the original proffering of the  
2 contention for admission.

3 WITNESS HOPENFELD: I'm not familiar with  
4 that. Oh, I see what you are saying. No, I'm not, I  
5 skimmed through them, but I'm not familiar with them.

6 ADMINISTRATIVE JUDGE RUBENSTEIN: I won't  
7 question you on those items.

8 WITNESS HOPENFELD: Please do not, I'm not  
9 prepared to talk about that.

10 ADMINISTRATIVE JUDGE RUBENSTEIN: Of the  
11 three items, let me first address thermal hydraulic  
12 phenomena. We've heard testimony, yesterday, and  
13 perhaps today also, on the alleged thermal hydraulic  
14 phenomena which might take place during one of the two  
15 transients. Do you have any observational basis for  
16 your concern for new thermal hydraulic phenomena? Can  
17 you cite a plant where this was observed?

18 DR. HOPENFELD: I cannot cite the plant  
19 that this has been observed, but I can cite my  
20 reasoning for why --

21 ADMINISTRATIVE JUDGE RUBENSTEIN: No,  
22 please. We'll get to that.

23 DR. HOPENFELD: Okay.

24 ADMINISTRATIVE JUDGE RUBENSTEIN: And we  
25 have read your testimony in that regard.

1 DR. HOPENFELD: Yes.

2 ADMINISTRATIVE JUDGE RUBENSTEIN: And I  
3 feel fully satisfied. Perhaps one of the other Judges

4 --

5 DR. HOPENFELD: The answer is no. I  
6 cannot cite a plant where this has been observed.

7 ADMINISTRATIVE JUDGE RUBENSTEIN: Are you  
8 aware of any calculations which would support your  
9 concern, specific calculations from thermal hydraulic  
10 or mass loads?

11 DR. HOPENFELD: Not calculations, but  
12 general observations, yes.

13 ADMINISTRATIVE JUDGE RUBENSTEIN: No --

14 DR. HOPENFELD: No calculations.

15 ADMINISTRATIVE JUDGE RUBENSTEIN: By  
16 observations you mean --

17 DR. HOPENFELD: General, from the physics  
18 of the problem.

19 ADMINISTRATIVE JUDGE RUBENSTEIN: Not in  
20 a specific sense?

21 DR. HOPENFELD: Correct.

22 ADMINISTRATIVE JUDGE RUBENSTEIN: And in  
23 any plants? Remember I asked Entergy specifically  
24 based on the instrumentation in their plant or in all  
25 the other plants anywhere were any of the phenomena

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1 observed.

2 And that's what I was getting at. Do you  
3 have any knowledge of any abnormal thermal-hydraulic  
4 phenomena which would have compromised the limiting  
5 conditions for operations or the other safety limits  
6 for the plants?

7 DR. HOPENFELD: There's a potential for  
8 it. I don't have a knowledge that it had happened.  
9 This is a new situation.

10 ADMINISTRATIVE JUDGE RUBENSTEIN: So what  
11 we have before us is your hypothesis, and -- but  
12 you're not offering any experimental or calculation in  
13 support?

14 DR. HOPENFELD: I did not do experimental  
15 or calculation.

16 ADMINISTRATIVE JUDGE RUBENSTEIN: I think  
17 I'm going to move on to the steam dryer structural  
18 integrity question. And you asserted that the steam  
19 dryer structural integrity could be affected by the  
20 EPU because of the increased flow velocity at EPU  
21 conditions, increased turbulence, and vortex shedding  
22 frequency and loads on the dryer.

23 DR. HOPENFELD: Correct.

24 ADMINISTRATIVE JUDGE RUBENSTEIN: You  
25 think -- is this a stead state concern?

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1 DR. HOPENFELD: Correct. That's a steady  
2 state and a transient concern, both.

3 ADMINISTRATIVE JUDGE RUBENSTEIN: And what  
4 is the transient concern?

5 DR. HOPENFELD: Okay. The steady state  
6 concern is --

7 ADMINISTRATIVE JUDGE RUBENSTEIN: No, the  
8 transient concern. I understand the steady state  
9 concern.

10 DR. HOPENFELD: I want to give the base.  
11 The steady state -- the transient concern that you  
12 would excite resonance vibrations of high amplitude  
13 through this very, very short period of time, which if  
14 the component's already weakened, they have used up  
15 their fatigue cycle, they already at their endurance  
16 limit or there was stress corrosion and the components  
17 are cracked already, that resonant vibration would  
18 cause potential problem or it would not fulfill the  
19 requirement that SSSCs are -- meet their design  
20 requirement.

21 ADMINISTRATIVE JUDGE RUBENSTEIN: Is this  
22 based on your experience and expert opinion?

23 DR. HOPENFELD: Yes, it is.

24 ADMINISTRATIVE JUDGE RUBENSTEIN: But is  
25 there any evidence in a BWR that during a transient

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1 these have been exacerbated or these occurred?

2 DR. HOPENFELD: There is evidence that  
3 oscillation that could excite resonant vibration exist  
4 during the transient, yes.

5 ADMINISTRATIVE JUDGE RUBENSTEIN: Okay.  
6 The operative word being could.

7 DR. HOPENFELD: If you ask me whether  
8 actual vibrations were there, I don't know. And EPU  
9 I don't know who measured that.

10 ADMINISTRATIVE JUDGE RUBENSTEIN: Now on  
11 the value of doing a large transient test, you  
12 included in your testimony an excerpt from the  
13 advisory committee on reactor safety, Mr. Seibert, and  
14 I'm going to ask you at the end, I'll read it first,  
15 if you adopt this as part of your own understanding of  
16 the phenomena.

17 Mr. Seibert's comment on hangers and  
18 stubbers strikes home in as much as while Entergy  
19 Nuclear's Vermont Yankee is running at 120 percent of  
20 original thermal license power without benefit of full  
21 transient testing.

22 And you go on a little bit in this area.  
23 And what he says is that the value of the test would  
24 be not to challenge the reactor control system because  
25 the reactor control system is often challenged and in

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1 all cases it's been shown to perform, in other words  
2 the plant scrams, the pressure relief valves are --  
3 can be opened.

4 While the spring safety relief valves have  
5 not been challenged it is likely they would perform.  
6 So he says the value would be to walk down the plant  
7 after the transient and see if there had been any  
8 structural response damage to the balance of the  
9 plant.

10 He basically says there's no concern for  
11 the reactor cooling system and the only potential  
12 concern would be a little mechanical response damage.  
13 Is -- how do you deal with that in adopting his  
14 information from the ACRS?

15 DR. HOPENFELD: Okay. I do not agree that  
16 that's the only consideration. I think there is  
17 another consideration, and that has to do with the  
18 ability of the ODYN code to predict the decreasing  
19 margins that the EPU provides.

20 By increasing the power you decrease the  
21 margins to our safety. And that --

22 ADMINISTRATIVE JUDGE RUBENSTEIN: So --

23 DR. HOPENFELD: -- has to be predicted and  
24 you have to have a code to do that.

25 ADMINISTRATIVE JUDGE RUBENSTEIN: We're

1 going to get into ODYN's capabilities.

2 DR. HOPENFELD: Well you asked me, I just  
3 gave you an answer to your question.

4 ADMINISTRATIVE JUDGE RUBENSTEIN: You  
5 knocked me a little off track. So if one stays on  
6 that, we have three components of the value of the  
7 test. One would be to determine structural damage.

8 The second component would be to determine  
9 if the reactor control systems continue to work. And  
10 the third component would be a holistic integral  
11 thing, did everything work as planned.

12 In doing the test, one comes now to the  
13 ODYN code, and you have some concerns with the code's  
14 capability to calculate.

15 How do you contrast with the testimony of  
16 Entergy and the Staff where they say they relied very  
17 lightly, if at all, on the ODYN code, but they look --  
18 we just had testimony that the cogent factors are the  
19 three parameters we just discussed, SRV capacity,  
20 power density, and free water flow capacity.

21 So what role do you see the ODYN code in  
22 the licensing decision basis? And we'll get to the  
23 deficiencies, or -- that you point out for the code,  
24 and I'll let -- be happy to let Judge Baratta explore  
25 those areas.

1 DR. HOPENFELD: First of all you quoted  
2 three items. I would like to add another one. And  
3 that is observations, not just of general damage, but  
4 during the transient.

5 There may be no damage, but during the  
6 transient you may experience violent resonance  
7 vibrations. Now there is experience in power plants,  
8 but this reactor, but there has been experience.

9 And it's not in evidence, but it has been  
10 experienced that during an event it's possible and it  
11 happens that you can get into a resonant situation  
12 where you have violent vibrations.

13 And that's what is the fourth option. And  
14 again, if you had a plant that is brand new, and we  
15 all know it doesn't experience any stress corrosion,  
16 it doesn't experience any flowing use vibrations, well  
17 then I don't think, you know, it's throughout it's  
18 life, throughout the design life, these phenomena are  
19 not going to be there.

20 Each component will be just perfect just  
21 the way it was put in, then I don't care about -- that  
22 much about the vibration.

23 ADMINISTRATIVE JUDGE RUBENSTEIN: And the  
24 valve observation, did that --

25 DR. HOPENFELD: I'm sorry.

1 ADMINISTRATIVE JUDGE RUBENSTEIN: Was the  
2 valve back oscillations, were they specific to any  
3 component --

4 DR. HOPENFELD: That, which valve?-

5 ADMINISTRATIVE JUDGE RUBENSTEIN: -- or  
6 was damage, specific damage observed on a given  
7 component?

8 DR. HOPENFELD: In which one are you  
9 talking about?

10 ADMINISTRATIVE JUDGE RUBENSTEIN: The  
11 valve back that you just cited.

12 DR. HOPENFELD: I didn't say valve back.  
13 I said there is -- generally there have been  
14 observations in power plants where during an event,  
15 and it has nothing to do with BWRs even, where during  
16 the accident, during the event the plant had  
17 experienced very severe vibrations.

18 ADMINISTRATIVE JUDGE RUBENSTEIN: Okay.  
19 Give me a second to look at your testimony a minute.  
20 I think I'm done. Judge Baratta, Judge Karlin?  
21 Whoever.

22 CHAIR KARLIN: Well, just a couple of  
23 questions, Dr. Hopenfled. Yesterday we asked some  
24 questions of the Staff and of the Entergy witnesses.  
25 And I have a couple of the same questions, perhaps,

1 for you. There is this thing called a  
2 MSIV test, closure test. And then there's also  
3 something called an MSIV unplanned transient.

4 DR. HOPENFELD: Yes.

5 CHAIR KARLIN: And during an unplanned  
6 transient, as I understand it, the reactor, the  
7 company will gather data about what happened during  
8 that unplanned transient --

9 DR. HOPENFELD: Yes.

10 CHAIR KARLIN: -- afterwards, and they  
11 will study it and they will assess whether things went  
12 according to Hoyle and that sort of thing. So in an  
13 unplanned transient, MSIV closure, there's data  
14 gathered.

15 DR. HOPENFELD: Yes.

16 CHAIR KARLIN: Now you're asking, and NEC  
17 is asking that a transient test be performed --

18 DR. HOPENFELD: Yes.

19 CHAIR KARLIN: -- a MSIV closure test be  
20 performed. And my question is was there any  
21 additional data gathered when you do a test planned  
22 versus what you would gather in a unplanned event?

23 MR. SHADIS: I think I would like to  
24 answer, if I may, in two parts of your question. If  
25 I understand it correctly, one question is why do the

1 test? We know that somewhere down the line there's  
2 going to be an event.

3 And we're going to get data. And then  
4 we're going to take that data and we're going to see  
5 what our -- go to our toolbox and see whether this  
6 computer, this computer works.

7 Well I spent some time at sea, and we  
8 would once a week or whatever, go and lower the  
9 lifeboats just to make sure they work. Now each time  
10 you lower a lifeboat you will, you know, you stress  
11 the cables a little bit, not much, but you stress  
12 them.

13 I never heard a captain say well look,  
14 let's not do that, let's not do this thing. When  
15 there's going to be a fire aboard we're going to get  
16 those boats down anyway.

17 Now I realize, sir, that knowledges are  
18 very, very dangerous in this environment, and I'm not  
19 good at them. My point is if the issue -- and that is  
20 the question, if it's a trade off, if the issue is of  
21 sufficient importance, if there is a safety concern,  
22 then the answer is I'm not going to wait to some  
23 unspecified event which I haven't defined.

24 But again, if it's a trade off, it's a  
25 judgment, and it's my judgment in this particular

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1 a very mild event you're not going to get anything  
2 anyway.

3 CHAIR KARLIN: Okay. Let me ask -- focus  
4 on this question. We heard testimony from Entergy and  
5 the Staff that one reason -- why shouldn't we do this  
6 test? Well, one of the answers is it will be an  
7 undesirable transient cycle. Can you tell me what  
8 that is?

9 DR. HOPENFELD: Well, obviously I mean I  
10 can see their concern, and I would be -- I equally  
11 would be concerned. It's a question of trade off. What  
12 are you trading off?

13 It's better not to run a test, if I had my  
14 choice, but the concern is we have introduced  
15 something new. As you said before we don't have many  
16 -- a lot of experience with MSIV events at EPU level.

17 We have very little if any. And I hope I  
18 can get -- give me the opportunity to talk about that  
19 too. But the answer is, to this, it's better not to  
20 perform it, but given the situation we are -- we have  
21 it in front us, what's before the bar here, you should  
22 perform, definitely.

23 CHAIR KARLIN: What is the risk of not  
24 performing the test?

25 DR. HOPENFELD: I think I would -- can I

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1 give you a little bit lengthy answer to this?

2 CHAIR KARLIN: Well, keep it as short as  
3 possible.

4 DR. HOPENFELD: Okay. Let me say it  
5 short. It can be done. The -- we rely to a large  
6 degree on a computer -- on computer codes. We can  
7 measure very few things.

8 We don't have x-rays to tell us what the  
9 thermal hydraulics doing in those channels. We don't  
10 know what it is. We calculate it. So now we have  
11 done something to the plant which reduces the margin  
12 of safety.

13 It maybe reduces very, very little, maybe  
14 it'sy-bitsy, but it may reduce more. And the only tool  
15 we have is some kind of a computer code that will tell  
16 us that. And that would be the value of running the  
17 test.

18 CHAIR KARLIN: I'm sorry. The value of  
19 running the test is?

20 DR. HOPENFELD: The value of running the  
21 test, and maybe I would consult my notes, one, it  
22 would be the --

23 CHAIR KARLIN: To validate the computer --

24 DR. HOPENFELD: One --

25 CHAIR KARLIN: -- model and to test the

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1 system as a whole against unexpected phenomena?

2 DR. HOPENFELD: Let me just list those  
3 because I would like to be -- one would be to meet  
4 regulations. The regulations is one.

5 CHAIR KARLIN: Okay.

6 DR. HOPENFELD: The 10-CFR Part 50,  
7 Appendix B, going by memory, I think it's criteria --

8 CHAIR KARLIN: Are you referring to a  
9 document that's in an exhibit?

10 DR. HOPENFELD: No, I'm referring to  
11 10CFR, Part 50, criteria 19, which you have mentioned  
12 this morning.

13 CHAIR KARLIN: Criteria in 11, you mean?

14 DR. HOPENFELD: Yes, 11, correct.

15 CHAIR KARLIN: Yes, okay.

16 DR. HOPENFELD: That's what -- and this is  
17 not in order of importance. Two, to validate the  
18 computer code, the ODYN computer code, because we  
19 rely, that's what we're using.

20 This is the bread and butter. Each time  
21 you go to a reload you use this.

22 CHAIR KARLIN: Right.

23 DR. HOPENFELD: So this is what we have.  
24 Now if we for some reason had really good  
25 instrumentation and we knew what happens in all these

1 channels, I don't think you would have to do that  
2 because --

3 CHAIR KARLIN: Okay.

4 DR. HOPENFELD: -- you may have a notice  
5 in advance. You want to verify that the maximum  
6 pressure does not exceed 1,230 because that was the  
7 original criteria.

8 CHAIR KARLIN: Okay.

9 DR. HOPENFELD: You want to determine  
10 whether transients can initiate severe component  
11 vibration. You're not going to -- I'm not interested  
12 in putting strain gauges, acoustics, or everything to  
13 see whether I'm getting any cracking.

14 I'd just like to know whether the  
15 transient induces vibration, resonance vibration in  
16 the pipes, in the hangers, --

17 CHAIR KARLIN: Okay.

18 DR. HOPENFELD: -- all that.

19 CHAIR KARLIN: Got you.

20 DR. HOPENFELD: And the fifth one is what  
21 was discussed here yesterday, and that is general  
22 component functionality, and that is, is my actuator  
23 working, I believe that that, by itself would not be  
24 a justification for the test.

25 I mean, I'm sure that you have tested the

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1 control rods, you have confidence, I hope you do. So  
2 that would not be the justification. Actuators,  
3 sensors, hard to operate, it is not the  
4 justifications.

5 But ODDYN code is the problem here.

6 CHAIR KARLIN: Could you give us a bit of  
7 your reasoning about the thermal hydraulic of why you  
8 were concerned about that?

9 WITNESS HOPENFELD: Okay.

10 CHAIR KARLIN: I know you don't have  
11 observational or experimental data.

12 WITNESS HOPENFELD: Correct.

13 CHAIR KARLIN: I didn't ask, but what is  
14 your reasoning?

15 WITNESS HOPENFELD: Okay, that is good,  
16 thank you very much for the --

17 CHAIR KARLIN: Sure, sure.

18 WITNESS HOPENFELD: In order to get the  
19 EPU, what was done, the number of maximum power,  
20 bundles, has been increased. Also the average power  
21 has been increased.

22 What that did, it increased the void  
23 fraction that you operate with. I don't know by how  
24 much. The bottom line is that it decreased the margin  
25 towards getting into transition boiling during the

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1 transient.

2 It decreased that. And that is what you  
3 want to avoid. You don't want to get into transition  
4 boiling, no matter what you, the trickle power ratio,  
5 that is what is of main concern, and that is part of  
6 the thermal design basis.

7 You have to assure yourself that no more  
8 than .1 percent, or whatever, I don't remember, I  
9 think it is .1 percent, a number of pins get into that  
10 transition boiling.

11 Now, you have done something. And, again,  
12 please I cannot quantify it, I haven't seen it, hardly  
13 anybody has. These are all calculations. So you have  
14 done something that here we are operating today. And  
15 by going to EPU you went a little bit away from the  
16 safety.

17 Now, if you had gone the other way you  
18 wouldn't need the test. But they haven't shown that.

19 CHAIR KARLIN: All right. Are you  
20 familiar with the standard review plan 14.2.1 that the  
21 Staff uses to review these requests for justification  
22 to not have to do the test?

23 WITNESS HOPENFELD: I reviewed it, I  
24 honestly don't have that standard review plan in front  
25 of me.

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1 CHAIR KARLIN: Okay, well. One of the  
2 factors in that is factor E, margin reduction and  
3 safety analysis results for anticipated operational  
4 occurrences. Do you know whether Entergy discussed  
5 that in its request for this?

6 WITNESS HOPENFELD: Okay. The SER, the  
7 answer is yes but not in the context of the large  
8 transient test. It was discussed in the context of  
9 the reactivity coefficient.

10 CHAIR KARLIN: Okay.

11 WITNESS HOPENFELD: And the question came  
12 up because of that issue. Also it was a little more  
13 complicated, it had to do with the void of the bypass,  
14 too.

15 But the question came up, and  
16 surprisingly, it didn't come up in the context of  
17 testing, of the MSIV and the turbine trip testing. It  
18 came up in an entirely different section part of the  
19 SER.

20 CHAIR KARLIN: Okay.

21 WITNESS HOPENFELD: Different people  
22 probably.

23 CHAIR KARLIN: Thank you.

24 ADMINISTRATIVE JUDGE BARATTA: I think  
25 what we have learned from the Staff is that they

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1 appear to have placed less emphasis on the computer  
2 results than on past experience. And I do understand  
3 what you are saying about getting closer to CHF and  
4 boiling, and such.

5 However, looking at exhibit 38, which is  
6 that chart that compares Vermont Yankee to Brunswick -  
7 -

8 CHAIR KARLIN: Mr. Shadis, do you have  
9 that exhibit, can we give Dr. Hopenfeld -- Ms.  
10 Carpentier, do you have that?

11 WITNESS HOPENFELD: If you could just  
12 please refresh my memory I should be able to minimize  
13 the --

14 (Pause.)

15 CHAIR KARLIN: Yes, Ms. Carpentier has a  
16 copy.

17 WITNESS HOPENFELD: You are talking about  
18 the ODYN code prediction of --

19 ADMINISTRATIVE JUDGE BARATTA: No. What  
20 I'm leading up to is that the Staff appears to place  
21 more emphasis with the experience with actual  
22 transients under operating conditions at other  
23 facilities.

24 And in that table, exhibit 38, which gave  
25 you -- if you notice, at the top of that, it has a

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1 comparison for the power density, which is the energy  
2 per assembly, or megawatts per assembly for Vermont  
3 Yankee versus Brunswick.

4 And we just heard, a few minutes ago that  
5 Brunswick did, in fact, experience turbine trip at  
6 uprate conditions. And the power density, I think, is  
7 one of the parameters that tells you something about  
8 the potential for going to transition boiling.

9 And the two are identical. Does that  
10 address any of your concern about the possibility of -  
11 - since apparently there was no fuel damage --

12 WITNESS HOPENFELD: I think it is a very  
13 good question. It partially, yes, but very, very  
14 partially. I tell you why. Just the fact that power  
15 density is identical to what it is at Vermont Yankee  
16 that, by itself, is not sufficient to answer that  
17 question.

18 However, I have not seen any discussion of  
19 a detailed uncertainty study of the differences  
20 between these two plants. What you really should be  
21 doing, what you should take is a computer code, it  
22 doesn't have to be OLYN, something, do the analysis on  
23 Brunswick.

24 Taking that 5.2, I don't know the  
25 distribution was the same, it is not only the average,

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1 it is also the fuel design, how many spaces you have  
2 there, that affects the transition boiling.

3 There are other parameters in there. And  
4 if you look at the basic equation you can see what we  
5 are talking about. I mean, a lot of things come into  
6 play here. The difference in the dryer, for example,  
7 that affects the heat balance, too.

8 So all these things, if you take all of  
9 these major ones, I'm not taking every little, put it  
10 in that ODYN code, after you made sure that it is  
11 applicable, that you benchmark, and you make sure that  
12 it is self-consistent with other plants that you have  
13 tested at, and you apply that to Brunswick, and the  
14 computer code predicts what happened there with, under  
15 these conditions.

16 And then you make an assessment with  
17 regard to Vermont Yankee. And you say, that  
18 assessment falls within that uncertainty bank. Then  
19 you have a confidence that what happened at Brunswick  
20 is directly applicable.

21 But I haven't seen that done. All I -- I  
22 was sitting here yesterday, I heard the NRC says,  
23 basically they said, we have accepted whatever Entergy  
24 provided us, and we agree to it.

25 I didn't see any analysis. They said that

1 is what they said, we agree.

2 ADMINISTRATIVE JUDGE BARATTA: All right.  
3 What would be your criteria, considering that it did,  
4 in fact, adequately, the ODYN code adequately  
5 represented what occurred?

6 We have heard that it has some  
7 conservatisms in it, and we have seen, already,  
8 comparisons with Peach Bottom turbine trip analysis,  
9 that it overpredicts the pressure, at least for that  
10 case.

11 WITNESS HOPENFELD: Can I answer now?

12 ADMINISTRATIVE JUDGE BARATTA: Yes,  
13 please.

14 WITNESS HOPENFELD: Please refer to table  
15 1. It is item 04NEC3. NED 241 --

16 CHAIR KARLIN: Dr. Hopenfeld, table 1?

17 WITNESS HOPENFELD: Table 1. I'm reading  
18 the documents where that table is.

19 CHAIR KARLIN: All right.

20 WITNESS HOPENFELD: It is marked item 01.  
21 First of all the title of my -- Entergy index document  
22 provided in response to the Board request.

23 CHAIR KARLIN: What are you reading from?

24 WITNESS HOPENFELD: RAI. I'm reading from  
25 -- what was provided by Entergy, the summary of those

1 documents, and the numbering was item 04, and then I  
2 think they changed that thing to number 26 yesterday.  
3 It is table 1 that was discussed yesterday.

4 CHAIR KARLIN: I have, attached to their  
5 testimony, at the end of their testimony; Entergy's  
6 testimony, a document called table 1, Vermont Yankee  
7 equipment modifications implemented at EPU. That is  
8 not what you are referring to?

9 WITNESS HOPENFELD: No, that is not the  
10 document.

11 ADMINISTRATIVE JUDGE RUBENSTEIN: Is this  
12 in the RAI?

13 WITNESS HOPENFELD: The document that I'm  
14 talking about, that Entergy provided in response to  
15 your request. They provided us a set of documents.  
16 There are two documents which summarize the ODYN code.

17 CHAIR KARLIN: These are the supplemental  
18 exhibits?

19 WITNESS HOPENFELD: It is in the  
20 supplemental, correct.

21 CHAIR KARLIN: That we requested. Okay.

22 WITNESS HOPENFELD: And I'm reading what  
23 was provided in that supplemental, and I believe it  
24 was provided on June 14th.

25 CHAIR KARLIN: Well, just wait for a

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1 second so that we can see if we understand what  
2 document that is. Please just hold for a moment, Dr.  
3 Hopenfeld.

4 MR. SHADIS: It looks like it is Entergy  
5 24.

6 CHAIR KARLIN: Entergy exhibit 24?

7 MR. SHADIS: I believe that is what it is.

8 WITNESS HOPENFELD: Item 04, and the  
9 counsel yesterday referred to the same table I'm  
10 talking about. I believe it is the same table I'm  
11 talking about.

12 CHAIR KARLIN: Mr. Shadis, why don't you  
13 go over and see if you can verify what Dr. Hopenfeld  
14 is referring to?

15 MR. SHADIS: Thank you.

16 CHAIR KARLIN: It would help us, for the  
17 record.

18 (Pause.)

19 MR. SHADIS: Yes, this is NEDO 24 --

20 CHAIR KARLIN: That is Entergy 26, I  
21 believe, was what we must be referring to. All right,  
22 so I think you are referring to Entergy exhibit number  
23 26?

24 WITNESS HOPENFELD: Yes, that is exactly  
25 what it is. Let me read the title of that document.

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1 It is page 1, table 1, and it is rebuttal testimony of  
2 C. J. Nichols, and Jose Casillas, on NEC Contention 3,  
3 large transient testing exhibit 3.

4 And I would like to answer the question,  
5 first, in the context of this table.

6 MR. TRAVIESO-DIAZ: In the interest of  
7 expediting matters, I believe that he is referring to  
8 what has been introduced into evidence as Entergy  
9 exhibit 23, which was the exhibit 1 to the rebuttal  
10 testimony of Mr. Nichols and Mr. Casillas. It is the  
11 same document, like this.

12 CHAIR KARLIN: I think he is referring to  
13 rebuttal testimony, exhibit 1? So it is 23.

14 MR. TRAVIESO-DIAZ: Exhibit 23.

15 CHAIR KARLIN: All right.

16 WITNESS HOPENFELD: In the --

17 CHAIR KARLIN: Thank you.

18 WITNESS HOPENFELD: -- middle of the page  
19 there is a statement by Entergy that the table below,  
20 table 1, which is -- which I will discuss later, is  
21 the justification for using the ODYN code for Vermont  
22 Yankee at EPU conditions.

23 What they are saying, that these  
24 parameters that you see in this table, cover the EPU  
25 operational parameters. That is what this statement

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1 says.

2 So now, if this is true, they do not  
3 provide any backup to this, this is an extremely  
4 important statement. There is no backup to this. I  
5 believe they are mistaken. And I would like to point  
6 out to you why they are mistaken.

7 But before I go into this table and  
8 discuss the parameters that they are talking about,  
9 and what the outcome of the table, I would like to  
10 give you, if I may, a little bit feel for the actual  
11 data in person.

12 Because as it was -- okay. If you go, now  
13 please, to the exhibit which, again, on my  
14 nomenclature here, it is item 03, NED241454-A, volume  
15 2. Please take a look at pages 327, 330, 325, 331,  
16 360. I will summarize it to you.

17 CHAIR KARLIN: Please stop for a minute.  
18 I believe that is exhibit --

19 MR. TRAVIESO-DIAZ: I believe that is  
20 exhibit 27 he is talking about now.

21 CHAIR KARLIN: That is what I have, okay.

22 WITNESS HOPENFELD: It is item 03 on my --

23 CHAIR KARLIN: Yes, okay.

24 WITNESS HOPENFELD: If you look at this,  
25 this is an example, a snapshot of the comparison of

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1 the data. The data does not compare very well with  
2 the actual test at Peach Bottom. But that is not very  
3 important.

4 What is important is to understand what is  
5 the difference and you mentioned conservatism. The  
6 fact that something is higher doesn't mean that it is  
7 conservative.

8 So the word conservative is kind of very  
9 touchy. Originally General Electric, and I'm going  
10 back to 1979 or something, or '80, General Electric  
11 claimed that the ODYN code was conservative.

12 NRC looked, and there was a bunch of very,  
13 very professional technical people, because I happen  
14 to know some of them, and their names, that evaluated  
15 the code, and they made an assessment. And they said,  
16 this is not conservative. These differences are in  
17 error. This is not a conservative code.

18 Forty five years later we get a statement,  
19 from the NRC, where they say this code, or they  
20 implied, they don't say exactly, they were told by a  
21 reactor operator, that the code is very, very  
22 conservative, and it predicted some few data, a few  
23 power plants, conservatively.

24 So the word conservative, I'm bringing it  
25 up because one has to be conservative, you have to be

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1 careful. The important thing, when you don't have an  
2 agreement, first of all, define what are the  
3 parameters we are interested.

4 They, in those graphs that I mentioned to  
5 you, compared the pressure, and you can see the dome  
6 pressure, the pressure, they compared the steam line  
7 pressure, they compared the power, and in all cases  
8 ODYN provides higher values.

9 Well, that is okay if you can explain it.  
10 It doesn't matter, it doesn't have to agree. But if  
11 you can explain it by a good uncertainty analysis, and  
12 they can put confidence on X number of signals on the  
13 confidence of the data, then if you take that, and  
14 apply it to another plant, I would have confidence in  
15 it.

16 CHAIR KARLIN: So essentially what you are  
17 saying is that, you would like, you question the large  
18 deviation that occurred, and the pressure is higher,  
19 and they could be getting the right answer for the  
20 wrong reason?

21 WITNESS HOPENFELD: That is part of it.  
22 But I say, I'm not that much concerned about that,  
23 because they have done a good analysis, and they told  
24 me where and how I can use the code. And I would like  
25 to go back to table 1, if I may?

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1           If you look at the table 1, you have two  
2 predictions. One of comparison. This is uncertainty  
3 that was done on all the data. Now, the parameters  
4 that they are talking about, in this table, and that  
5 was the original intent of the code, to predict that  
6 parameter, is the CPR, or the delta critical power.

7           Critical power ratio for those that may be  
8 of interest, its a power at which one point, at some  
9 point of the bundle you get into transition boiling,  
10 divided by the average power of the bundle.

11           It is a calculated value. As I said, it  
12 is not something that you measure, but it is a very  
13 important criteria. Now, why is it important?  
14 Because once you get into that transition boiling, you  
15 want to stay away from it, like away from cancer.

16           Because once you get there you will have  
17 potential for a melt. So it is important, and it is  
18 a safety, and what we have done here, we have  
19 decreased the margin, towards getting to that  
20 transition boil.

21           So if you look at this table it has only  
22 one criteria at this point. We are interested in  
23 other criteria. We are interested in the pressure.  
24 And, as I said before, we also are interested in the  
25 frequency of oscillations of that pressure, because

1 that is a potential excitation force for resonance  
2 vibration.

3 Now, if you look at the comparison nowhere  
4 is ODYN code even getting close of predicting the  
5 vibration frequency. So as far as the vibration  
6 frequency, it doesn't predict it.

7 Now, it does predict pressures, it also,  
8 is my understanding, but I understand that it is some  
9 proprietary information which we haven't seen, and I  
10 don't understand why, there is a comparison with the  
11 level.

12 Now, level is a very important parameter.  
13 And --

14 CHAIR KARLIN: Well, let me stop you  
15 there, Dr. Hopenfeld. In terms of the proprietary  
16 information. You were entitled to see that  
17 proprietary information if you just signed a non-  
18 disclosure agreement.

19 So when you say you don't understand why,  
20 I think you should understand why, which is you are  
21 entitled to see it, and you declined to --

22 WITNESS HOPENFELD: Well, sir, I don't  
23 know if it is proper for me, and you know everybody  
24 has his own life experiences. And I don't know if it  
25 is appropriate for me to go and reflect on my own

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1 experience. And I used to work for NRC.

2 CHAIR KARLIN: No, I don't want to hear  
3 that. I just want to say, you were entitled to see it  
4 if you had just signed a non-disclosure agreement.

5 WITNESS HOPENFELD: I cannot sign that.

6 CHAIR KARLIN: All right. You are  
7 entitled not to sign it.

8 ADMINISTRATIVE JUDGE BARATTA: I  
9 understand your concerns about the, I'm trying to  
10 think how to say this nicely. I understand your  
11 concerns about disagreement between the predictions  
12 and I also understand your concerns about lack of an  
13 explanation of why that is, okay?

14 However, I'm also looking at what appears  
15 to be another principled reason for not doing the  
16 testing, at least in the minds of, I believe, the  
17 Staff and also based on some of the testimony of  
18 Entergy, at least, is that -- okay, putting the ODYN  
19 code aside, we have to have a number of events at  
20 other plants which in a variety of ways are  
21 comparable.

22 And we have not seen any behavior that  
23 deviates from what was anticipated. I mean, just  
24 looking at the events on a very, just fundamental  
25 physics and such, could you comment on that argument?

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1 WITNESS HOPENFELD: I was going there,  
2 sir. But I would like to complete my explanation.  
3 Because the heart to your question sits in this table,  
4 as I see it.

5 And I would like to, so I could  
6 communicate properly and explain what my concerns,  
7 explain some of those terms. You can see here, you  
8 see here that there are two parameters. One is called  
9 C, and one is the velocity.

10 And you can see they are bound by  
11 uncertainty. It is important to understand what those  
12 parameters are. One represents the distribution, the  
13 void distribution in a channel, when you have a two-  
14 phased flow there is a distribution.

15 The other one, VJ, represents the drift  
16 velocity. It is not the same velocity that was  
17 changed at Entergy. Because when they say, well, that  
18 is within these parameters, I don't know, maybe they  
19 mean it is within this velocity.

20 This velocity is not the velocity they  
21 have changed. This is a drift velocity, it is an  
22 experimental parameter. But that C parameter, and  
23 that subzero are experimental parameters which GE  
24 spent a lot of money to generate those, for conditions  
25 which they believe are relevant.

1           There are a lot of those numbers in the  
2 literature. They were obtained under steady state  
3 conditions. What we have here, we don't have a steady  
4 state condition, we have a transient situation, the  
5 temperature rise on the surface of the clad, is going  
6 to be affected by the heat generation.

7           So it is going to be different under EPU  
8 than it is under normal operating conditions. The  
9 temperature rise, if you go back to your boiling curve  
10 and, especially transient kind of information, you  
11 will find that that temperature rise would affect,  
12 could affect the mechanism void, it could affect the  
13 heat transfer mechanism.

14           So you have to analyze, you have to see  
15 whether these things are the same. Now, they lump  
16 everything in here and they say, well that covers  
17 everything.

18           So to answer your -- to go back now,  
19 partially, I'm not done with this table because for  
20 the following reason. This table only showed one  
21 parameter. Later on, a year or two after this table  
22 was generated, NRC said well, they've done some  
23 calculations that say, well we can also use this for  
24 pressure.

25           And they put some numbers in there. But

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1 they have not provided their rationale for doing that.  
2 They just said we can also use it for pressure. So  
3 that is the justification.

4 Now, going back to taking this experience  
5 in different plants, the only way I know to make the  
6 thing, to formalize this experience, is to take a  
7 computer, and these are complex, if these plants were  
8 simple, if they were just like a fuel tank sitting  
9 here, you don't need a computer code, I can tell you  
10 how fast the fuel go down.

11 But these are complex animals. And each  
12 one has differences. It is not the same design. So  
13 you have to do, analyze the case, you have to do the  
14 analysis in each case.

15 And in order to do the analysis in each  
16 case you have to use the computer, some kind of a  
17 computer code. Now, we heard testimony, yesterday,  
18 that observations from all these plants show that  
19 there are not abnormalities between these plants.

20 Well, first, when you say there are no  
21 abnormalities, and I'm talking about the observation  
22 from different plants, you have to define what it is,  
23 what abnormality is.

24 Then you have to describe how it was  
25 measured. For example if, an abnormality for me, for

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1 example a normal situation would be if an enormous one  
2 hundred percent power, only one fuel pin goes in  
3 transition boiling, and under EPU conditions ten fuel  
4 pins go into transition boiling, that would be an  
5 abnormality.

6 So first you have to define what you are  
7 talking about. Because, otherwise, such a general  
8 statement to say, I haven't seen anything here, and  
9 anything here, therefor it is okay. I don't know how  
10 to address that.

11 An engineer would look at, would have some  
12 kind of a model, and would put an uncertainty study on  
13 each one. Now, let me say something about the model,  
14 about how you take a model and make sure that --

15 CHAIR KARLIN: Can we stop for just a  
16 minute, Dr. Hopenfeld?

17 WITNESS HOPENFELD: Yes.

18 CHAIR KARLIN: I have forgotten what the  
19 question was. Could we have an understanding of what  
20 the question is, is there any question you have  
21 remaining?

22 WITNESS HOPENFELD: I was answering how do  
23 you --

24 CHAIR KARLIN: Well, we want to know what  
25 the question was.

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1 ADMINISTRATIVE JUDGE BARATTA: I  
2 understand what you are saying, because the drift flux  
3 model, both of those are parametric fits. And they  
4 are done under limited conditions, and it is very  
5 difficult to do transient heat transfer studies.

6 So you take these with a grain of salt, so  
7 to speak. Now, that said, though, that the truth, to  
8 me, and I believe Staff, was in the other cases where  
9 this has occurred. And they haven't seen any fuel  
10 failure, they haven't seen any component damage.

11 And that seems to indicate, at least,  
12 apparently they have had four or five of these  
13 occurrences, that under similar uprate conditions  
14 there isn't a problem. That is what I'm really trying  
15 to focus on here.

16 WITNESS HOPENFELD: I understand, that is  
17 why I'm trying to answer the question, abnormality,  
18 they haven't seen any problem. That is why I'm using  
19 the word abnormality.

20 You see abnormality, and what is the  
21 problem? I mean, you don't measure fuel boiling.

22 ADMINISTRATIVE JUDGE BARATTA: No, but you  
23 do measure fuel damage, right?

24 WITNESS HOPENFELD: Well, you do, but  
25 there was no description in our presentation, anywhere

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1 in here, whether there was, and what the degree of  
2 fuel damage was. And what are the differences between  
3 this plant and that plant.

4 Just, as I said before, just the energy  
5 density is not, by itself, sufficient. There are  
6 other parameters.

7 ADMINISTRATIVE JUDGE BARATTA: There are  
8 other parameters, that is quite true, I agree, that  
9 you need to look at.

10 WITNESS HOPENFELD: I will give you an  
11 example, maybe this plant is different. I don't know,  
12 I haven't gone to each one. Plus there is a  
13 difference in vibration, because maybe they haven't  
14 gotten any resonance vibration over there, but maybe  
15 you will get it here.

16 Now, let me tell you why. Because maybe  
17 the natural frequency of the dryer at Brunswick, of  
18 the stiffness of the dryer, divided by its mass is  
19 entirely different than the one at Vermont Yankee.

20 So if these two are different you are  
21 going to have a different resonance vibration. So you  
22 have to take a look at each case. Now, I don't know,  
23 I haven't done the calculations. But you can't say,  
24 just because this has a dryer, plus the dryer at  
25 Vermont has been modified. And I think they modified

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1 for the EPU.

2 I don't know, but they increased the  
3 diameter, I guess. And the dryer does come in, in the  
4 heat balance calculation --

5 ADMINISTRATIVE JUDGE RUBENSTEIN: To  
6 follow-up on Judge Baratta's question on the potential  
7 of an OPWR type, I won't call it DNV, I will call it  
8 CPR, critical power ratio exceedence. Is there any  
9 evidence, anywhere, have you looked at Licensee Event  
10 Reports, the analysis of the transients in all the  
11 other BWRs which are operating at EPU?

12 WITNESS HOPENFELD: I have. I have seen -  
13 -

14 ADMINISTRATIVE JUDGE RUBENSTEIN: Have you  
15 seen any evidence of fuel failure?

16 WITNESS HOPENFELD: No.

17 ADMINISTRATIVE JUDGE RUBENSTEIN: Not in  
18 the LERS, they don't talk about -- no xenon, nothing  
19 like that?

20 WITNESS HOPENFELD: No.

21 ADMINISTRATIVE JUDGE RUBENSTEIN: So in a  
22 physical sense the thermal hydraulic effects have not  
23 resulted in fuel damage?

24 WITNESS HOPENFELD: They have not resulted  
25 in those plants. It is not sufficient to say that it

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1 is not going to result --

2 ADMINISTRATIVE JUDGE RUBENSTEIN: Well,  
3 these are multiple BWRs, which are operating at EPU  
4 conditions, multiple numbers of transients. I don't  
5 know what the number of plants times the number of  
6 transients are, the transients of concern in this  
7 hearing.

8 But there has been no evidence of fuel  
9 damage and no reporting of the safety limit, minimum  
10 critical power ratios exceedences. Is that true?

11 WITNESS HOPENFELD: Well, I said, each  
12 plant is different.

13 ADMINISTRATIVE JUDGE RUBENSTEIN: I'm  
14 talking about observations.

15 WITNESS HOPENFELD: You are talking about  
16 the observation that there was no plant, there was no  
17 fuel melt. The fact that there wasn't fuel melt here,  
18 I don't know how to take --

19 ADMINISTRATIVE JUDGE RUBENSTEIN: No, I  
20 didn't say anything about fuel melt --

21 WITNESS HOPENFELD: -- Vermont Yankee.

22 ADMINISTRATIVE JUDGE RUBENSTEIN: I could  
23 ask you, have you seen xenon ratios in the coolant,  
24 but I'm not going to do that kind of stuff.

25 WITNESS HOPENFELD: No.

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1 ADMINISTRATIVE JUDGE RUBENSTEIN: But  
2 there is no evidence of perforation in the fuel rods.

3 WITNESS HOPENFELD: No.

4 ADMINISTRATIVE JUDGE RUBENSTEIN: Judge  
5 Baratta?

6 CHAIR KARLIN: Any more questions?

7 ADMINISTRATIVE JUDGE BARATTA: No.

8 CHAIR KARLIN: All right, thank you Dr.  
9 Hopenfeld. You may step down. Thank you, sir. At  
10 this point it is about 20 of, by my official clock  
11 back there.

12 We are going to proceed, as we discussed  
13 earlier, which is we will take a 15 minute break. At  
14 the stroke of noon we will reconvene. And at that  
15 point I will hear from you, if any of the counsel, or  
16 pro se representatives have any suggested supplemental  
17 questions we should, you think we might ask of any  
18 party, any witness I'm sorry, the witnesses that have  
19 appeared here.

20 We will be following, essentially, the  
21 same rule as 10CFR2.1207, there is a process for doing  
22 this sort of thing. And you, obviously, previously  
23 submitted questions to us, suggestions for us to  
24 propound to witnesses.

25 You can do it one of two ways. You can do

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1 it in a written form, which the other parties won't  
2 see until after this proceeding is over with, and then  
3 it will be put into the record for everyone to see.  
4 Or you can just tell us in open court, and stand up  
5 and say, we think you ought to enquire into the  
6 following areas.

7 Either way I understand it won't be a nice  
8 pretty piece of paper if you want to do it in writing.  
9 It might be handwritten, but put your name on top of  
10 it, and your party identification, and your signature  
11 at the bottom of it as whoever is submitting this.

12 I prefer them to be just orally presented  
13 on the transcript. But if you want to do it in  
14 writing, fine. And then we will break for lunch, we  
15 will think about the questions you have asked, or  
16 suggested, we will think about any further questions  
17 we have, and then if appropriate, and we think it is  
18 necessary, we will reconvene such witnesses as we want  
19 to ask some follow-up questions to.

20 Thank you. We will be adjourned until  
21 noon.

22 (Whereupon, the above-entitled matter  
23 went off the record at 11:45 a.m. and  
24 went back on the record at 12:00 p.m.)

25 CHAIR KARLIN: Mr. Travieso-Diaz, we will

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1 start with you. Do you have any suggested  
2 supplemental questions?

3 MR. TRAVIESO-DIAZ: Well, Mr. Chairman, I  
4 have two items. First item is a question for Mr.  
5 Nichols that was left pending yesterday, as to the  
6 details, I think it was your question, time and  
7 details of the startup testing initially at the plant.  
8 And I believe that question should be asked as a  
9 follow-up.

10 CHAIR KARLIN: All right.

11 MR. TRAVIESO-DIAZ: My second item is a  
12 question to the Board. I understand there is going to  
13 be a proprietary session after lunch?

14 CHAIR KARLIN: Yes.

15 MR. TRAVIESO-DIAZ: I would like to  
16 reserve the opportunity to propose additional  
17 questions after the proprietary session, to the  
18 witnesses that testify in that session, if  
19 appropriate.

20 CHAIR KARLIN: Well, we are going to go  
21 through the same procedure in the proprietary session,  
22 which will be, we will hear the witnesses, and then we  
23 will stop and decide whether we want to ask them any  
24 further questions. So the same process will occur in  
25 the proprietary.

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1 MR. TRAVIESO-DIAZ: That is fine, then.

2 ADMINISTRATIVE JUDGE BARATTA: Have you  
3 written out your question that you are recommending  
4 for Mr. Nichols, or --

5 MR. TRAVIESO-DIAZ: No, it is only one  
6 question, and I --

7 CHAIR KARLIN: Okay, so your question is  
8 that we ask him to address the startup transient  
9 testing?

10 MR. TRAVIESO-DIAZ: Yes, because it was  
11 left open yesterday.

12 CHAIR KARLIN: Yes, all right, thank you  
13 Mr. Travieso-Diaz. Staff, Mr. Hamrick, Mr. Turk any  
14 questions you suggest?

15 MR. TURK: I think we do have two  
16 questions, Your Honor, that we have identified so far.  
17 Let me preface, normally under subpart G, when we go  
18 to hearings, every night we meet with witnesses, and  
19 we talk about any redirect that is necessary, or any  
20 questions to ask of the witnesses.

21 I know this is the first informal hearing  
22 that is being held at NRC.

23 CHAIR KARLIN: Right.

24 MR. TURK: I think it is useful if we are  
25 allowed to have a little more time to discuss

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1 testimony than just a little short 15 minute session.  
2 Because when you get into a room with ten people there  
3 is a lot of talk that doesn't get you to the bottom  
4 line of let's identify the question.

5 So for future reference if it is possible  
6 to get more time?

7 CHAIR KARLIN: Right. I think in addition  
8 NEC has the shortest turnaround, because they just  
9 finished their witness. You had maybe an hour before  
10 it, so I understand that. So we just need to proceed,  
11 so --

12 MR. TURK: At this point, Your Honor, the  
13 only questions we would suggest would be to Staff  
14 witnesses. And the first would be whether they agree  
15 that -- with the suggestion that all they did here was  
16 simply review what the Applicant gave them, and  
17 reached the one line conclusion that appears in the  
18 SE. Do they agree with that characterization of what  
19 the review consisted of.

20 CHAIR KARLIN: Okay.

21 MR. TURK: And the second question we  
22 have, again it would be for a staff witness, would be  
23 to explain the justification for requiring condensate  
24 feedwater testing here, as distinct from deciding not  
25 to require testing of the MSIV closure and load

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1 rejection.

2 CHAIR KARLIN: Okay. Did we get those  
3 questions? Okay. Any other questions that you would  
4 propose that we consider asking?

5 MR. TURK: Not at this time.

6 CHAIR KARLIN: All right, thank you. Mr.  
7 Shadis, for New England Coalition?

8 MR. SHADIS: Thank you, Your Honor. I  
9 have a list of 15 questions, and then one additional  
10 question which I have not translated into readable  
11 type, but only have it as a note.

12 And I don't know if you would, because of  
13 the number of questions, if you would now prefer to  
14 simply have them written, and the one question stated  
15 orally? Or shall I go through them and give them all  
16 to you orally?

17 CHAIR KARLIN: Well, it is somewhat of  
18 your call. I mean, you can -- I think it would be  
19 preferable for us if you just told us verbally, here,  
20 what your questions were, and we will try to take them  
21 down slowly, or whatever, and alternatively, if you  
22 don't want to state them in open court, you can give  
23 us the piece of paper, handwritten as it is.

24 MR. SHADIS: That is not an issue in terms  
25 of stating. I would be pleased either way.

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1 CHAIR KARLIN: Yes, please, would you do  
2 it? And tell us who the question is addressed to,  
3 this panel, that sort of thing.

4 MR. SHADIS: Thank you. The first 11,  
5 actually, are for the Entergy panel, for the  
6 Applicant's panel.

7 And I will just read them. And if the  
8 prose is too dense, maybe you can --

9 CHAIR KARLIN: We probably won't use your  
10 exact words, anyway.

11 MR. SHADIS: Thank you. Can you describe,  
12 in quantitative terms, how the so-called mild  
13 transient tests, with all relief valves open, would  
14 vary as to pressure versus time, power changes versus  
15 time, and level changes versus time?

16 CHAIR KARLIN: Pressure, power, and level  
17 changes versus time?

18 MR. SHADIS: Versus time. And the second  
19 part of that is the other extreme.

20 CHAIR KARLIN: Wait a second, is this  
21 another part of the question?

22 MR. SHADIS: Well, it is the second part  
23 of that question.

24 CHAIR KARLIN: Okay.

25 MR. SHADIS: It is really a --

1 CHAIR KARLIN: Just read that one again,  
2 one time, for us.

3 MR. SHADIS: Thank you. Can you describe,  
4 in quantitative terms, how so-called mild transient  
5 tests, with all relief valves open, would vary as to  
6 pressure versus time, power changes versus time, and  
7 level changes versus time?

8 CHAIR KARLIN: Okay.

9 MR. SHADIS: And the flip side of that, if  
10 you will, have you done any studies, and could you  
11 please describe or provide them, of how the above  
12 parameters would vary as a factor of scram delay?

13 CHAIR KARLIN: Would you repeat that one  
14 again?

15 MR. SHADIS: Yes, I think I can. Have you  
16 done any studies, and could you describe or provide  
17 them, of how the above parameters would vary as a  
18 factor of scram delay.

19 ADMINISTRATIVE JUDGE RUBENSTEIN: Scram  
20 delay time?

21 MR. SHADIS: Scram delay, yes.

22 ADMINISTRATIVE JUDGE RUBENSTEIN: Thank  
23 you.

24 MR. SHADIS: If I understand on what you  
25 are looking for in clarification. Yesterday we heard -

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1 -

2 CHAIR KARLIN: Okay, keep going, question  
3 number 2. No, that was a two-part number one.

4 MR. SHADIS: Yes, it is a two-part number  
5 one. And actually I had listed them here 1 and 2, but  
6 I'm not --

7 CHAIR KARLIN: All right, whatever.

8 MR. SHADIS: For the General Electric  
9 representative, General Electric wrote full transient  
10 testing into the licensing topical report. And after  
11 that report was accepted, in a several year process,  
12 GE asked for generic exemption.

13 What rationale did GE offer for placing  
14 the requirement for large transient testing in the  
15 topical report in the first place?

16 CHAIR KARLIN: Okay.

17 MR. SHADIS: If the licensing basis, or  
18 safety analysis assumes, as a matter of conservation,  
19 transients near the end of core life, why not perform  
20 the large transient testing at the end of the fuel  
21 cycle, with resulting outage concurrent with the  
22 refueling outage? To address the concern for losing  
23 a couple of days of power generation, why not do it on  
24 the eve of shutting down anyway?

25 CHAIR KARLIN: Does everybody have that?

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1 Okay. Which number are we on now, Mr. Shadis, do you  
2 have the number?

3 MR. SHADIS: This would be number four  
4 that we are moving to.

5 CHAIR KARLIN: Okay.

6 MR. SHADIS: And number four, the question  
7 goes to the reliability and dependence on turbine  
8 bypass valves.

9 Can generator load shed, and failure of  
10 bypass valves to open result from common mode  
11 failures, and as example, electrical failures, either  
12 power supply, or signal, or control?

13 CHAIR KARLIN: Is that a question that  
14 arose from any of the questions we asked here in the  
15 last two days?

16 MR. SHADIS: Yes.

17 CHAIR KARLIN: That is going to be a  
18 criterion to apply.

19 MR. SHADIS: It rose from the answers that  
20 were given to your questions. I don't recall the  
21 particular questions. But --

22 CHAIR KARLIN: Okay.

23 MR. SHADIS: -- there was a great deal of  
24 discussion about the history of the reliability of the  
25 turbine bypass valves to --

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1 CHAIR KARLIN: All right, I know.

2 MR. SHADIS: Thank you, Your Honor. Okay,  
3 we were on four.

4 CHAIR KARLIN: Are you starting five?

5 MR. SHADIS: Yes, we are starting five.  
6 In the generator load shed failure, at Vermont Yankee  
7 in 2004, what unanticipated events, if any, resulted  
8 in the turbine hull and the reactor bin?

9 And we would presume those events, if any,  
10 occurred, events that might result in difficulties in  
11 restoring the plant balance. That was number five.

12 Number six, does fast shutdown analysis  
13 assume feedwater pump trip, have feedwater pumps  
14 failed to trip historically? That is, is there a  
15 history?

16 CHAIR KARLIN: I really have some doubt  
17 whether that question arises from anything we asked in  
18 the last two days. But we will listen to it and take  
19 consideration of it. Because this is limited to  
20 supplemental questions, they are not something you  
21 should have asked originally, but something that arose  
22 directly out of what we asked.

23 And we will think about that, as we decide  
24 whether to ask these questions.

25 MR. SHADIS: Judge Karlin, a great deal of

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1 the discussion not only with Entergy, but with the NRC  
2 Staff yesterday, surrounded the timing of restoring  
3 plant balance.

4 CHAIR KARLIN: Yes, I remember that.

5 MR. SHADIS: So if the feedwater pumps  
6 fail to trip you have some issues. And there was a  
7 great deal of emphasis placed upon the reliability of  
8 individual components. So I think the question  
9 follows on that.

10 CHAIR KARLIN: Okay.

11 MR. SHADIS: That was number six, was it?  
12 Number seven, describe how core and fuel modifications  
13 for EPU, at Vermont Yankee, affect scram parameters.

14 CHAIR KARLIN: Okay.

15 MR. SHADIS: Entergy asked, answered a  
16 question respecting a list of modifications done in  
17 anticipation of extended power uprate. What  
18 modifications were made to the steam dryer, and why  
19 were these modifications not included in the list?

20 The issue of the cost of large transient  
21 testing were raised, and there was a comparison  
22 requested to the cost of unanticipated transients, as  
23 well as how the company would follow on each of these.

24 And the question is, when an event occurs  
25 on its own, and unanticipated transient, is root cause

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1 analysis performed, and what is the range of cost of  
2 the root cause analysis?

3 And the following question, then, if root  
4 cause analysis would not have to be performed for a  
5 large transient test, shouldn't that result in savings  
6 be factored into the comparative costs?

7 This is a two part with respect to the  
8 ODYN code, I think. Is the ODYN code predicted of  
9 maximum pressure, is that what one is looking for in  
10 employing an ODYN code?

11 And along with that, we would want to see  
12 some considerations of level in responses. If, this  
13 is going on to the next one, which I think we are now  
14 on number 11, is that right?

15 We discussed very early plant startups and  
16 the use of full transient testing. And then Entergy  
17 responded on some question, remarking that there is a  
18 history of latter day startups, such as Clinton and  
19 Seabrook, where full transient testing was done.

20 And the question is, was ODYN used to  
21 predict plant response in those plants? And if not  
22 why was it not, or if it was, then why was it not  
23 benchmarked against those plants?

24 We have benchmarking going back to Peach  
25 Bottom and so on, but not on the latter day plants.

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1 And since we are in pacman version number 9, it might  
2 be good to apply it to those plants. And we want to  
3 know why it wasn't.

4 And I miscounted, so we now have a number  
5 12. And I think it was answered, actually, and I may  
6 just drop that. The question had to do with the  
7 history of full transient testing in the original  
8 licensing of Vermont Yankee. And I don't know that we  
9 ever got an answer as to whether it was done at one  
10 hundred percent or not.

11 But if we didn't I think that question  
12 needs to be asked again. And now questions for NRC  
13 panel. And this would be number 13 in a running list.

14 CHAIR KARLIN: All right.

15 MR. SHADIS: But it is the first one for  
16 the NRC panel. What mensara, including data,  
17 calculations, screening criteria, etcetera, were used  
18 to evaluate exemption considerations at Vermont  
19 Yankee?

20 CHAIR KARLIN: Could you repeat that?

21 MR. SHADIS: Yes, sir. What mensara --

22 CHAIR KARLIN: Mensara?

23 MR. SHADIS: What modes of measurement,  
24 what kinds of measurements, and it would include such  
25 things as data, calculations, screening criteria,

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1 excuse me, data calculations, screening criteria --

2 CHAIR KARLIN: Like criteria, except it is  
3 mensara? Go ahead. What mensara --

4 MR. SHADIS: What kind of criteria --

5 CHAIR KARLIN: All right.

6 MR. SHADIS: -- were used to evaluate  
7 exemption considerations at Vermont Yankee? This is  
8 the next question, 14. What were the standards of  
9 review for exemption considerations at Vermont Yankee?

10 And I think by standards of review we  
11 would mean, to what standards were the reviewing staff  
12 held.

13 ADMINISTRATIVE JUDGE RUBENSTEIN: I don't  
14 understand that.

15 MR. SHADIS: I'm sorry?

16 ADMINISTRATIVE JUDGE RUBENSTEIN: I don't  
17 understand it.

18 MR. SHADIS: Well, let me try to explain -

19 -

20 ADMINISTRATIVE JUDGE RUBENSTEIN: --  
21 satisfying the GDCs and the regulations, do you mean  
22 more than that?

23 MR. SHADIS: Well, in listening to the  
24 Staff's responses as to how they evaluated this, their  
25 familiarity, or lack of familiarity with the Vermont

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1 Yankee operational history, all the rest of it, one  
2 could assume that it was very casual, off-the-shoulder  
3 kind of approach with professional nonchalance, and  
4 they said, yes it looks good to me.

5 Or did they have to actually get out a  
6 checksheet and punch all the little boxes? I mean,  
7 how strict are the standard of review held to when  
8 they put out that SER? That is the question. It  
9 looks to me like it is --

10 CHAIR KARLIN: Okay.

11 MR. SHADIS: I'm not going to testify.

12 CHAIR KARLIN: All right.

13 MR. SHADIS: And as a subpart to that  
14 question, in reviewing the criteria for exemption,  
15 what weight did they assign to each of those criteria?  
16 And then I actually have two more.

17 Number 16. What characteristics of the  
18 plant design, operational parameters, and so forth, of  
19 individual plants, in the compared EPU transient  
20 population were considered when applying industry  
21 experience to the Vermont Yankee EPU?

22 We heard some of that, but there was very  
23 little detail. So I guess the question goes, what was  
24 the extent and detail of comparison.

25 And the final question for Dr. Hopenfeld,

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1 please discuss, in more detail, the ability of the  
2 ODYN code to predict various aspects of a full  
3 transient.

4 CHAIR KARLIN: Okay.

5 MR. SHADIS: That is it, sir.

6 CHAIR KARLIN: All right, thank you. With  
7 that I think what we will do is adjourn for lunch, and  
8 reconvene at 1:30 by that clock. Thank you, we are  
9 adjourned.

10 (Whereupon, at 12:28 p.m., the above-  
11 entitled matter was adjourned for lunch.)

A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

1:31 p.m.

1  
2  
3 CHAIR KARLIN: Thank you. The Atomic  
4 Safety and Licensing Board is reconvening in the  
5 Vermont Yankee uprate matter. We are now at a stage  
6 where we, if we have any follow-up questions, we have  
7 taken into consideration the questions that have been  
8 posed, suggested by the parties, that we might ask.

9 In thinking about those questions we had  
10 several factors to keep in mind. One is the parties  
11 had an opportunity to ask questions, propose questions  
12 to us on August 4th, on any and every subject they  
13 chose, and wanted to suggest questions on.

14 And this was not a time to repeat that, or  
15 redo that. Even if we asked some questions of a  
16 similar vein, this is not an opportunity to revitalize  
17 that set of questions.

18 Second, a lot of the questions we think  
19 were already answered, asked and answered. And so,  
20 you know, we are going to proceed with asking several  
21 questions. We would like the Entergy witnesses to come  
22 back up, and we would like to pose some questions for  
23 them.

24 So, Mr. Nichols, Mr. Casillas, if you  
25 would return to the witness stand, we would appreciate

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1 it.

2 Whereupon,

3 CRAIG NICHOLS

4 JOSE CASILLAS

5 were recalled as witness by the Atomic Safety and  
6 Licensing Board Panel and, having been previously duly  
7 sworn, assumed the witness stand, were examined and  
8 testified as follows:

9 CHAIR KARLIN: I don't know that we have  
10 that many questions. You are loaded for bear.

11 Please be seated. I will remind you both  
12 that you are still under oath, and if you would --  
13 yes, I guess I will ask one question.

14 Earlier in the session we asked whether or  
15 not the large transient test, the main steam isolation  
16 valve, and the generator load rejection tests had been  
17 performed at the startup.

18 And could you perhaps address that, Mr.  
19 Nichols, were they performed, were they performed at  
20 one hundred percent, when were they performed?

21 MR. NICHOLS: And I checked my records and  
22 this is actually in a public document that was  
23 submitted to the NRC in response to what is referred  
24 to as an RAI.

25 CHAIR KARLIN: Yes.

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1 MR. NICHOLS: And as the Staff testified,  
2 Vermont Yankee completed power ascension through 75  
3 percent power, upon which there were problems with  
4 fuel performance. Went through a period of reduction,  
5 and then recommenced power operation and power  
6 ascension testing in early 1974.

7 And they completed three large transient  
8 tests. On January 24th of 1974, at 98 percent power,  
9 Vermont Yankee performed a turbine trip test.

10 CHAIR KARLIN: Is that generator load  
11 rejection test?

12 MR. NICHOLS: No, that is turbine trip.

13 CHAIR KARLIN: Okay.

14 MR. NICHOLS: Obviously that took the  
15 plant offline, returned to power. And on February  
16 23rd, of 1974, at approximately 92.7 percent power,  
17 Vermont Yankee completed the MSIV closure test.

18 And upon return to power on March 29th,  
19 1974, Vermont Yankee performed the generator load  
20 reject test.

21 CHAIR KARLIN: And at what power level was  
22 that?

23 MR. NICHOLS: I apologize. That one was  
24 at 93.7 percent power.

25 CHAIR KARLIN: At 93.7. Okay, thank you.

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1 ADMINISTRATIVE JUDGE BARATTA: Mr.  
2 Casillas, you indicated that as part of the process  
3 for the constant pressure power uprate the void  
4 fraction distribution was unchanged and you achieve  
5 that by increasing the velocities through the core?

6 MR. CASILLAS: Yes.

7 ADMINISTRATIVE JUDGE BARATTA: That is  
8 correct? Okay.

9 MR. CASILLAS: Well, you effectively  
10 increase the core flow through the core. In effect,  
11 actually, you decrease the flexibility that the plant  
12 has to operate at low flow. So, correct.

13 ADMINISTRATIVE JUDGE BARATTA: Did -- you  
14 are familiar with the real number and nissl number?

15 MR. CASILLAS: Yes.

16 ADMINISTRATIVE JUDGE BARATTA: And those  
17 are usually used to determine the flow regime, are  
18 they not, or heat transfer regime?

19 MR. CASILLAS: Right, correct.

20 ADMINISTRATIVE JUDGE BARATTA: Did any of  
21 the changes that were made, as a result of the  
22 constant pressure power uprate result in any  
23 significant changes in those quantities in the core?

24 MR. CASILLAS: There were no new,  
25 certainly the average behavior of the average channel

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1 changed, because it had a higher quality, higher void,  
2 and so it was a higher distribution skewed towards the  
3 maximum power.

4 But the maximum power assemblies,  
5 actually, do not increase in power at all. Because  
6 contrary to some discussions, the limit as to what is  
7 the maximum power that the limiting element is allowed  
8 to operate, whether it be at current power, or at the  
9 EPU, is the same.

10 ADMINISTRATIVE JUDGE BARATTA: Right.  
11 What I'm trying to get at is you didn't derive  
12 anything in any new flow regime?

13 MR. CASILLAS: Absolutely not, nothing  
14 new.

15 ADMINISTRATIVE JUDGE BARATTA: Which would  
16 be indicated by a change in the Reynolds number, or  
17 new heat transfer regime, which would be --

18 MR. CASILLAS: Yes, nothing would be.

19 ADMINISTRATIVE JUDGE BARATTA: -- by a  
20 nissl number, is that correct?

21 MR. CASILLAS: That is correct, yes.

22 CHAIR KARLIN: What is the second number?

23 MR. NICHOLS: The nissl, heat transfer.

24 ADMINISTRATIVE JUDGE BARATTA: Do you have  
25 any follow-up on that?

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1 ADMINISTRATIVE JUDGE RUBENSTEIN: No.

2 ADMINISTRATIVE JUDGE BARATTA: Mr.

3 Nichols, you mentioned yesterday, and I tried to find  
4 the testimony where you said that I think a one-inch  
5 plate was added to the steam dryer, and you mentioned  
6 that it was done to be better able to resist the  
7 pressure pulse that comes, I think, it was a turbine  
8 trip, is that correct? Do you remember that  
9 discussion?

10 MR. NICHOLS: I remember the discussion.  
11 We did make modifications to the steam dryer, one of  
12 which is strengthening the lower cover plate, the  
13 front vertical plate was taken to one inch, as you  
14 referred to. We added gussets for additional  
15 strengthening of that front plate area.

16 It was not for the purpose of the turbine  
17 trip. It was for normal steady state flow vibration,  
18 that was the purpose of the modification, to resolve  
19 the questions in the industry, the OE, but steady  
20 state operation.

21 ADMINISTRATIVE JUDGE BARATTA: So it  
22 wasn't based on any stress analysis that you did, or  
23 that indicated a problem under EPU conditions?

24 MR. NICHOLS: No, it was really a  
25 proactive modification to strengthen it. The

1 subsequent testing that we did during power ascension,  
2 and analysis that we talked about yesterday, at full  
3 power, indicated that the stresses were very low.

4 ADMINISTRATIVE JUDGE RUBENSTEIN: Was this  
5 recommended by the owner's group, or was this a GE,  
6 was this an industry wide accommodation?

7 MR. NICHOLS: It was certainly, it is part  
8 of the analysis for the extended power uprate. There  
9 is a whole section of structural analysis performed  
10 for the power uprate, steady state, transient,  
11 accident loads.

12 And it came out of that, that steady state  
13 load. Certainly the information gained throughout the  
14 failures at other plants, and the data that they  
15 gathered, was incorporated into that.

16 But we made the modification almost two  
17 years before we uprated the plant.

18 ADMINISTRATIVE JUDGE RUBENSTEIN: But the  
19 thrust of the question was, was this sort of an  
20 individual Vermont Yankee action, or was it a result  
21 of owner's group and GE SIL recommendation?

22 MR. NICHOLS: There is a GE SIL number 644  
23 that relates to dryer effects. But it doesn't  
24 necessarily talk to the modification. It talks to the  
25 inspections you should do, etcetera. And the owner's

1 group, there is an owner's group committee. But  
2 that, again, did not drive the modification.

3 It was really the analysis done by General  
4 Electric for the steam dryer, for the uprate that  
5 resulted in that mod.

6 ADMINISTRATIVE JUDGE RUBENSTEIN: So they  
7 called your attention that this is a potentially weak  
8 area, and do the analysis and, therefore, as a  
9 consequence of the analysis, make the certain  
10 modifications would fit your case?

11 MR. NICHOLS: That is correct.

12 ADMINISTRATIVE JUDGE RUBENSTEIN: Thank  
13 you.

14 CHAIR KARLIN: Anything more? Okay, thank  
15 you, gentlemen. You may sit down. You didn't need it.  
16 Always better to be prepared.

17 With that we are going to adjourn this  
18 session for ten minutes, so that we will reconvene.  
19 Well, let's make it ten of the hour, and initiate the  
20 proprietary session.

21 At that point only individuals who have  
22 signed the non-disclosure agreement, prescribed in our  
23 order of March 1st, 2005, will be able to sit in on  
24 that session.

25 We will ask a few questions. We have done

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1 our best to maximize the public hearing here. This  
2 closed session for the proprietary questions will  
3 probably last, maybe an hour. I don't know, maybe an  
4 hour and a half or 15 minutes, that is what we are  
5 thinking.

6 At which point we will then reconvene in  
7 public session. So if you want to stay, hang around  
8 for that time frame, please do. But that is our plan  
9 so far. So right now we are adjourned until 10 of the  
10 hour.

11 (Whereupon, at 1:43 p.m., the above-  
12 entitled matter was adjourned, to be reconvened after  
13 the proprietary session.)

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1 CHAIR KARLIN: The Atomic Safety and  
2 Licensing Board for this uprate request is now back in  
3 session. We have now completed the questioning of all  
4 the witnesses, and we appreciate the time, and  
5 attention, and preparation they have given to this.

6 It is helpful to us, in trying to reach a  
7 decision in this matter. As the lawyers know this has  
8 been a relatively unusual proceeding in the sense that  
9 it is the first subpart L proceeding ever held in the  
10 NRC.

11 Normally in courtroom setting you see the  
12 lawyers doing the work, and asking the questions of  
13 the witnesses, and the pro se representatives, they  
14 would ask the questions, and we would sit back and  
15 listen, and learn, and maybe ask a few questions of  
16 our own.

17 Because of the new rules created by the  
18 Commission, in an attempt to expedite the process, and  
19 also to get the Board to take a more active role in  
20 pursuing questions, we have asked the questions over  
21 the last two days.

22 I think we have asked some of the  
23 questions that we think are right, that will help us  
24 reach a decision, and these are all built upon the  
25 written testimony that was filed by all the parties,

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1 direct and rebuttal. And a lot of effort went into  
2 that, and we appreciate that.

3 Where do we go from here? The court  
4 reporter will generate a transcript of this  
5 proceeding. And the parties are welcome to, and can  
6 order a copy of it. And, obviously, I think all  
7 parties should do so.

8 We are going to give you 20 days from  
9 today's date to submit any transcript corrections,  
10 errata, this sort of thing, that may be appropriate,  
11 or necessary. At that same day, 20 days, the record  
12 in this matter, the evidentiary record in this matter  
13 will close.

14 Also if there are any corrections in terms  
15 of the numbering of exhibits, and anything like that,  
16 please get us that information before the 20th day,  
17 because on that day the record, the evidentiary record  
18 closes.

19 Next what happens is we have issued a  
20 revised scheduling order, some time ago. And that  
21 order lays out that 30 days after the close of the  
22 evidentiary hearing, 30 days after today, the parties  
23 are to submit proposed findings of fact, and  
24 conclusions of law to us.

25 That is also set out in a regulation, in

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1 the ubiquitous subpart L regulations, that we are  
2 working under. And I think it is 2.1209, which says  
3 each party shall file written post-hearing proposed  
4 findings of fact and conclusions of law, on the  
5 contentions addressed at the oral hearing, within 30  
6 days of the close of the hearing.

7 So that is what I would like you all to  
8 do. And when you do that, and this will help us in  
9 making our decision, and understanding your case, cite  
10 chapter and verse of the transcript, the testimony,  
11 and the exhibits that support what you contend are the  
12 findings of fact and conclusions of law we should  
13 reach.

14 I mean, if you don't help us in that way  
15 we are going to have a hard time following your  
16 proposals. So please cite, as fully as you can, to  
17 the record here, in your proposals.

18 Because when we arrive at a decision we  
19 want to cite to the record, and the exhibits, and that  
20 sort of thing, so we can support that decision. So 30  
21 days from today please submit the proposed findings of  
22 fact and conclusions of law.

23 At that point, you know, we will take what  
24 we've heard, we will take the evidence that we have  
25 seen, and submit it, we will take what you have

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1 submitted, and then we will render our decision.

2 We will sit down, we will think it out, we  
3 will work it out, and we will write a decision, and  
4 then we will issue it.

5 I guess we are talking a month from now  
6 when we get the proposed findings of fact and  
7 conclusions of law. Undoubtedly it will be a month or  
8 two later than that before you will see a decision  
9 from us, but that is what we will be shooting for.

10 And with that, are there any questions, or  
11 additional issues that any of the parties need to  
12 raise? Mr. Shadis?

13 MR. SHADIS: Yes, if it is possible we  
14 would greatly appreciate the production of a redacted  
15 transcript of the proprietary session?

16 CHAIR KARLIN: Well, I think that might be  
17 possible. Mr. Travieso-Diaz, any concerns about that?

18 MR. TRAVIESO-DIAZ: I'm not sure whether  
19 it can be separated. The questions that were asked  
20 here, whether they are proprietary and the non-  
21 proprietary portions can be separated.

22 For example, the question that Mr.  
23 Casillas replied to, by drawing a diagram, and doing  
24 an extensive discussion, I don't believe that that  
25 could be separated between proprietary and non-

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1 proprietary portions.

2 CHAIR KARLIN: Well, I think you may be  
3 right. The questions we asked in the proprietary  
4 session were relatively limited, in less than 45  
5 minute session. And almost all of them were focused  
6 on specific proprietary matters. A redaction might be  
7 totally useless.

8 We will take that under consideration and  
9 see if it can be done. But I don't know that that is  
10 really going to work. Staff, do you have anything to  
11 say about that?

12 MR. HAMRICK: Nothing further on that, no.

13 CHAIR KARLIN: We will take that under  
14 consideration.

15 MR. SHADIS: Thank you, it would be  
16 helpful to us even if it were portions of the  
17 questions so that we had a general idea of --

18 CHAIR KARLIN: Well, that is one problem.  
19 The questions actually refer to portions of the  
20 proprietary data, and interposed to them. Almost all  
21 of those questions are actually of that nature.

22 MR. SHADIS: Thank you.

23 CHAIR KARLIN: But we will think about it  
24 and see if it might work.

25 MR. SHADIS: Thank you.

1 CHAIR KARLIN: Anything else?

2 MR. HAMRICK: One point, Your Honor.  
3 2.1203 talks about the Staff's hearing obligations.  
4 And it talks about our continuing obligation to update  
5 the hearing. Well, I just want to clarify for the  
6 record that now that the hearing has occurred, that  
7 the Staff is obligated --

8 CHAIR KARLIN: Yes, the hearing has  
9 occurred. That obligation, as far as I would  
10 understand it, is terminated. You have completed that  
11 obligation. Thank you.

12 MR. TRAVIESO-DIAZ: And, likewise, I  
13 believe we discussed that at one of the pre-hearing  
14 conferences. But the discovery obligations are also  
15 terminated, right?

16 CHAIR KARLIN: That is right. The  
17 discovery, duty to produce documents, it applies to  
18 all the parties, is also terminated effective today.  
19 That is a good point, thank you for that.

20 Anything else?

21 MR. TRAVIESO-DIAZ: One question. I  
22 didn't hear you mention reply findings. I presume  
23 that there is no provision for those?

24 CHAIR KARLIN: No. All right, they very  
25 much, we are adjourned.

1 (Whereupon, at 3:01 p.m., the above-  
2 entitled matter was concluded.)  
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CERTIFICATE

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

Name of Proceeding: Entergy Nuclear Vermont  
Yankee, LLC and Entergy  
Nuclear Operations, Inc.

Hearing

Docket Number: 50-271-OLA

Location: Newfane, Vermont

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  
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Crissy Willis  
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