UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

April 4, 2011

MEMORANDUM TO: Harold K. Chernoff, Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

FROM: G. Edward Miller, Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

SUBJECT: MEMORANDUM TO FILE: TRANSCRIPTS FOR 10 CFR 2.206 PETITION REGARDING OYSTER CREEK AND NINE MILE POINT, UNIT NO. 1, PEAK CLADDING TEMPERATURE AND ECCS PERFORMANCE

The Purpose of this memorandum is to provide and make publically available, the transcripts associated with the petition submitted by Mr. Mark E. Leyse regarding the Oyster Creek Nuclear Generating Station and Nine Mile Point, Unit No. 1. The petition was submitted pursuant to Title 10 of the *Code of Federal Regulations*, Section 2.206. Enclosure 1 contains the transcript from the petitioner's first opportunity to address the petition review board (PRB) which occurred on January 13, 2011. Enclosure 2 contains the transcript from the petitioner's second opportunity to address the PRB which occurred on February 17, 2011. Both transcripts have been corrected based upon review by the NRC staff and the petitioner, as supported by the audio recording of the call. Changes made to the petitions are marked in square brackets.

Docket Nos. 50-219 and 50-220

Enclosure:
As stated

Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

Title: 10 CFR 2.206 Petition Review Board
Oyster Creek and Nine Mile Point

Docket Number: (n/a)

Location: (conference call)

Date: Thursday, January 13, 2011

*Transcript Corrections marked in [square brackets]

Work Order No.: NRC-652 Pages 1-55

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Encolsure 1

1 UNITED STATES OF AMERICA

2 NUCLEAR REGULATORY COMMISSION

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4 10 CFR 2.206 PETITION REVIEW BOARD (PRB)

5 CONFERENCE CALL

6 ON

7 OYSTER CREEK AND NINE MILE POINT

8 + + + + +

9 THURSDAY

10 JANUARY 13, 2011

11 + + + + +

12 The conference call was held, Theodore

13 Quay, Chairperson of the Petition Review Board,

14 presiding.

15

16 PETITIONER: MARK LEYSE

17

18 PETITION REVIEW BOARD MEMBERS

19 THEODORE QUAY, Deputy Director,

20 Division of Policy and Rulemaking

21 TANYA MENSAH, Petition Coordinator,

22 Office of Nuclear Materials Safety and

23 Safeguards

24 ED MILLER, Petition Manager for 2.206 petition

25

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1 P-R-O-C-E-E-D-I-N-G-S

2 1:01 p.m.

3 MR. MILLER: Okay. So, we're here today

4 to allow the Petitioner, Mr. Mark Leyse, to address

5 the Petition Review Board regarding the 2.206 Petition

6 dated December 10, 2010.

7 I'm the Petition Manager for the petition

8 and the Petition Review Board Chairman is Ted Quay.

9 As part of the Petition Review Board's

10 review of the petition, Mr. Leyse has requested the

11 opportunity to address the PRB.

12 This meeting is scheduled to go from 1:00

13 to 3:00 p.m. Eastern Time.

14 The meeting is being recorded by the NRC

15 Operations Center and will be transcribed by a court

16 reporter. The transcript will become available later

17 and be attached as a supplement to the petition. It

18 will also be made publicly available.

19 I'd like to open this meeting with

20 introductions. We'll start here. We'll go around the

21 room.

22 As I said, myself, I'm Ed Miller.

23 MR. DUDLEY: I'm Richard Dudley from the

24 NRR Rulemaking Branch.

25 MS. ROSENBERG: Stacey Rosenberg. I'm a

1 Branch Chief in the Division of Policy and Rulemaking
2 in Office of Nuclear Reactor Regulations.
3 MS. MENSAH: Tanya Mensah. I'm the 2.206
4 Coordinator in the Office of Nuclear Reactor
5 Regulations.
6 CHAIRMAN QUAY: Ted Quay, Division of
7 Policy and Rulemaking, NRR.
8 MR. KLUKAN: Brett Klukan. I'm the
9 Attorney Representative from the Office of the General
10 Counsel.
11 MR. WU: Shih-Liang Wu, Nuclear
12 Performance and Code Review Branch, NRR.
13 MR. GUZMAN: Rich Guzman, Project Manager
14 in the Office of Nuclear Reactor Regulation or NRR.
15 MS. SANDERS: Carleen Sander, Project
16 Manager, Office of NRR.
17 MR. WHITED: Jeff Whited, Project Manager
18 also in NRR.
19 MR. MILLER: Okay. That's the
20 introductions for NRC Headquarters. At this time, I'd
21 like to ask for anybody from the NRC not with us in
22 person to identify themselves if they could.
23 MR. KULP: Hi. This is Jeff Kulp. I'm up
24 at Region 1. Also, Senior at Oyster.
25 MR. MILLER: Anyone else from the NRC?

1 Okay.

2 Do we have any representatives from the

3 Licensee on the phone?

4 MR. WALKER: Yes, there's a number of

5 people from Exelon here. I'll go through the names.

6 I think we've given them to the court reporter

7 already, but --

8 MR. MILLER: Yes, I know we went through

9 them before, but for the record, if you could. So.

10 MR. WALKER: And if I miss anybody, please

11 speak up. I have Dean Galanis, Andy Olson, Hossein

12 Youssefnia, Anthony Giancatarino, Don Ferraro, Chase

13 McDaniel, Dave Helker, Doug Walker. Did I miss

14 anybody?

15 MR. THOMPSON: Rick Thompson.

16 MR. WALKER: Rick Thompson.

17 MR. FLEMING: From Constellation Energy

18 Nuclear Group Headquarters, this is Carey Fleming C-A-

19 R-E-Y and Fleming with one M.

20 MR. DOSA: And John Dosa from the site.

21 MR. MILLER: Anybody else from the

22 Licensee's side? Okay. Mr. Leyse, for the record,

23 could you please introduce yourself as well?

24 MR. LEYSE: Sure. Mark Leyse. I'm the

25 Petitioner.

1 MR. MILLER: Okay. And I thought I heard
2 somebody speak up just about the same time. Did
3 somebody else want to introduce themselves?
4 MR. LOCHBAUM: This is David Lochbaum with
5 the Union of Concerned Scientists.
6 MR. MILLER: Okay. Any other members of
7 the public? Okay. We'll move forward then.
8 I'd like the emphasize today that
9 everybody when they speak please do so loudly and
10 clearly. It will assist our court reporter in
11 accurately transcribing the meeting.
12 If you do have something you'd like to
13 say, also please state your name before you speak.
14 Again, to help him attribute that to the appropriate
15 person.
16 For those dialing into the meeting, if you
17 would please put your phone on mute when you're not
18 speaking to minimize any background noises and
19 distractions. If you don't have a mute button, you
20 can also press *6 and that will through the conference
21 line, mute your phone. Again, that's *6 to mute your
22 phone if you don't have an mute feature.
23 At this time, I'd like to turn it over to
24 the PRB Chairman, Mr. Quay.
25 CHAIRMAN QUAY: Good afternoon. Welcome

1 to this meeting regarding the 2.206 Petition submitted
2 by Mr. Leyse.
3 I'd like to first share some background on
4 our process. Section 2.206 of Title 10 of the Code of
5 Federal Regulations describes the petition process,
6 the primary mechanism for the public to request
7 enforcement action by the NRC in a public process.
8 This process permits anyone to petition the NRC to
9 take enforcement-type action related to NRC licensees
10 or licensed activities.
11 Depending on the results of its
12 evaluation, NRC could modify, suspend or revoke an
13 NRC-issued license or take any other appropriate
14 enforcement action to resolve a problem.
15 The NRC staff's guidance on a disposition
16 for 2.206 petition requests in Management Directive
17 8.11 which is publicly available.
18 The purpose of today's meeting is to give
19 the petitioner an opportunity to provide any
20 additional explanation or support for the petition
21 before the Petition Review Board's initial
22 consideration and recommendation. This meeting is not
23 a hearing nor is it an opportunity for the Petitioner
24 to question or examine the PRB on the merits or the
25 issues presented in the petition request.

1 No decision regarding the merits of this
2 petition will be made at this meeting.
3 Following this meeting, the Petition
4 Review Board will conduct its internal deliberations.
5 The outcome of this internal meeting will be discussed
6 with the Petitioner.
7 The Petition Review Board typically
8 consists of a Chairman, usually a manager at the
9 senior executive service level at the NRC and has a
10 Petition Manager and a Petition Review Board
11 Coordinator. Other members of the Board are
12 determined by the NRC staff based on the content of
13 the information in a petition request.
14 At this time, I'd like to introduce the
15 Petition Board. I am Ted Quay, the Petition Review
16 Board Chairman. Ed Miller is the Petition Manager for
17 the petition under discussion today. Tanya Mensah is
18 the Office of Petition Review Board Coordinator. Our
19 technical staff includes Shih-Liang Wu from the Office
20 of Nuclear Reactor Regulations, Nuclear Performance
21 and Code Review Branch. Joyce Tomlinson from NRC's
22 Region 1 Division of Reactor Safety. We also obtain
23 advice from our General Counsel represented by Brett
24 Klukan.
25 As described in our process, the NRC staff

1 may ask clarifying questions in order to better
2 understand the Petitioner's presentation and to reach
3 a reasoned decision whether to accept or reject the
4 Petitioner's request for review under the 2.206
5 process.
6 I would like to summarize the scope of the
7 petition under consideration and the NRC activities to
8 date.
9 On December 10th, 2010, Mr. Leyse
10 submitted to the NRC a petition under 2.206 regarding
11 the licensing basis peak-cladding temperatures of
12 Oyster Creek Nuclear Generating Station and Nine Mile
13 Point Unit 1 and the Licensee's ability to quench fuel
14 cladding using emergency core cooling systems in the
15 event of a loss of coolant accident or known as a
16 LOCA.
17 In this petition request, Mr. Leyse
18 identified the following areas of concern.
19 Experimental data indicates that Oyster Creek and Nine
20 Mile Unit 1 licensing basis peak-cladding temperatures
21 of 2150 and 2149 respectively do not provide necessary
22 margins of safety against partial or complete meltdown
23 in the event of LOCAs. Such data indicate that Oyster
24 Creek and Nine Mile 1 licensing basis peak-cladding
25 temperatures must be decreased to temperatures lower

1 than 1832 degrees Fahrenheit in order to provide
2 necessary margins of safety.
3 Experimental data indicates that Oyster
4 Creek and Nine Mile 1 emergency core cooling systems
5 would not effectively quench the fuel cladding in the
6 event of LOCAs if the fuel cladding reached Oyster
7 Creek and Nine Mile 1 licensing basis peak-cladding
8 temperatures of 2150 degrees Fahrenheit and 2149
9 degrees Fahrenheit respectively.
10 Based on the stated concerns, Mr. Leyse
11 requested the NRC order the Licensees of Oyster Creek
12 and Nine Mile 1 to lower the licensing basis peak-
13 cladding temperature of Oyster Creek and Nine Mile 1
14 in order to provide necessary margins of safety to
15 help prevent partial or complete meltdown in the event
16 of LOCAs, order the Licensees of Oyster Creek and Nine
17 Mile 1 to demonstrate the Oyster Creek and Nine Mile
18 1 BWR/2 emergency core cooling systems would
19 effectively quench the fuel cladding in the event of
20 LOCAs and prevent partial or complete meltdowns.
21 The activities, to date, regarding this
22 petition have included on December 10th, 2010, the
23 petition was received by the NRC. On December 17th,
24 2010, the Petitioner requested to address the Petition
25 Review Board prior to his initial meeting to further

1 clarify the provided information for the Board's
2 consideration. On January 13th, 2010, today, we are
3 providing the requested opportunity to address the
4 Petition Review Board.
5 As a reminder for the phone participants,
6 please identify yourself if you make any remarks as
7 this will help in the preparation of the meeting
8 transcript that will be made publicly available.
9 Thank you and at this point, I'm going to
10 turn it over to you, Mr. Leyse.
11 MR. LEYSE: Okay. Yes. Yes, Mark Leyse
12 speaking. I would first like to bring up a couple of
13 things. Just that this petition is very similar to an
14 enforcement action petition I filed regarding Vermont
15 Yankee except that it has additional information that
16 the petition regarding Vermont Yankee did not have and
17 one additional thing is that I've placed information
18 in about the -- how the presence of inconel spacer
19 grids would affect the cladding in the event of a loss
20 of coolant accident and that's something that I did
21 not cover in the Vermont Yankee petition.
22 So, that basically on pages 69 through
23 roughly -- let me see. Sixty-nine through 72 of the
24 petition, it talks about chemical interactions between
25 zircaloy and stainless steel and between zircaloy and

1 inconel at "low temperatures." So, I think that's
2 something important to look at just -- and it even
3 actually has a quote from Dan Ford of Union of
4 Concerned Scientists from 1971 regarding zircaloy
5 inconel eutectics and just how this is not considered.
6 So, you know, when you see that this was an issue
7 raised back in 1971, it really kind of means that, you
8 know, it's about time that we look at it.
9 And then, of course, the petition how it
10 differs from the Vermont Yankee petition is that I
11 talk about BWR thermal hydraulic experiments and, of
12 course, [spray] cooling and also kind of point out
13 that there -- there really has not been many
14 experiments conducted with zircaloy bundles and that
15 the heat transfer coefficients that are used in the
16 computer codes are derived -- the appendix [K ones]
17 that are used both at Oyster Creek and Nine Mile Point
18 Unit Number 1 are actually from stainless steel
19 [tests] where they used stainless steel fuel rod
20 simulators and they're not from zircaloy bundled
21 [tests] and I think that's a big problem that is --
22 just really needs to be addressed.
23 And I also did want to see -- I can
24 continue, but I just wanted to see if Mr. Lochbaum
25 wanted to discuss BWR systems and how the BWR/2 system

1 is different from other ECCS systems. But, I'm not --
2 you know, I just -- because I -- I'm not sure what his
3 schedule is like and two hours -- I'm not sure if this
4 will -- if we have enough to continue this until 3:00.
5 I had actually asked for 90 minutes. I Appreciate the
6 extra time, but I just wanted to see if he wanted to
7 say something.
8 MR. LOCHBAUM: Yes, this is Dave Lochbaum.
9 Thanks, Mark.
10 I just wanted to reiterate what Mark has
11 stated in the petition he submitted. The Oyster Creek
12 reactor, the BWR/2 product, the emergency core cooling
13 systems for the Oyster Creek reactor are different
14 from those systems on the later versions of the
15 boiling water reactor. The Dresden -- introduced at
16 Dresden and later expanded the BWR/4 and BWR/5 and 6
17 lines. In that the Oyster Creek emergency core
18 cooling systems aren't quite as diverse and redundant
19 as the latter product lines in terms of core spray and
20 [LPCI (Low Pressure Coolant Injection)] and all the
21 other stream-driven, electric-driven diverse systems,
22 number pumps and capabilities. Oyster Creek is
23 different from those and that.
24 Shouldn't mean it's deficient. It's just different
25 and the margins are -- safety margins in that regard

1 are probably as small at Oyster Creek as anywhere.

2 In that regard, it seems that his petition

3 -- the safety concerns about cladding rate in Mark

4 Leyse's petition are as relevant at Oyster Creek as

5 anywhere. Perhaps more so because of the minimal

6 safety margins that exist there.

7 And that's about as much as I wanted to

8 say. I appreciate the opportunity. Thanks.

9 MR. LEYSE: This is Mark Leyse speaking.

10 Yes. Yes, thank you and I appreciate your input on

11 this and I think that this does make -- this is --

12 obviously, this petition is addressing generic issues

13 where the metal water reaction is indeed a generic

14 issue and, in fact, it's a generic issue to say that

15 there are problems with these tests that are all based

16 on stainless steel tests.

17 However, there is some part that is plant

18 specific which is what Mr. Lochbaum just mentioned.

19 Was the fact that Oyster Creek and Nine Mile Point

20 Unit Number 1 are the only two reactors that are

21 licensed by the NRC that do have the BWR/2 ECCS. So,

22 that makes this issue regarding those plants, you

23 know, plant specific.

24 So, I think that is something to take into

25 consideration -- for the Petition Review Board to take

1 into consideration how this is unique to these two
2 plants and would not apply to other BWR systems or
3 PWRs. Where the petition that was filed with Vermont
4 Yankee, the Petition Review Board decided that it was
5 a generic issue because that was focusing primarily on
6 the metal water reaction. That that would apply to
7 all plants even PWRs and as you know, that was
8 actually even turned into a rulemaking petition PRM
9 [50-95].
10 But, in this case, I think there is
11 something that's plant specific for these two plants.
12 And I also think that there is a -- as I
13 repeated -- I'm repeating what I said before. Just
14 with Appendix K which is what is used at Oyster Creek
15 and Nine Mile Point Unit Number 1, the heat transfer
16 coefficients that are used in the ECCS evaluation
17 calculations, they're derived from stainless steel
18 tests and that is discussed in the petition. Let me
19 see. I think that's page 74 to page 78 and that's
20 just -- I think there's definitely a problem where I
21 -- admittedly, what I'm going to say now is more of a
22 generic issue. I think the NRC needs to have tests
23 conducted with zircaloy bundles, zircaloy fuel rod
24 simulators and bundles for heat transfer tests and for
25 deriving heat transfer coefficients.

1 There's actually a statement from the PWR
2 [FLECHT] reports that Westinghouse did[,] where they
3 state that heat transfer coefficients are not directly
4 measurable quantities. They must be calculated from
5 measured temperatures, known heat sources and known
6 thermal properties and I would add that, you know, in
7 line with that, the heat transfer coefficients that
8 would be used in LOCA analysis for real reactor cores
9 with zircaloy fuel assemblies, they must also be
10 calculated from thermal hydraulic experiments that are
11 conducted with multi-rod zircaloy bundles.
12 And basically, in recent years, most of
13 the primary facilities that have -- testing facilities
14 for BWR thermal hydraulic tests, they've been
15 conducted with inconel 600 bundles and the behavior of
16 that regarding oxidation is just different than it is
17 with zircaloy when you get up to temperatures above
18 1800 degrees Fahrenheit.
19 And I wanted to point out that even today
20 there's a test facility at Purdue and oddly enough
21 papers that are talking about this facility. It's the
22 [PUMA] Facility. They don't mention what the cladding
23 material is. I'm assuming that the cladding material
24 would be inconel 600 since that has been used at a lot
25 of other test facilities. But, this paper -- you

1 know, I've looked at over a dozen papers from this
2 test facility and none of them even state what the
3 cladding material is.
4 And just recent facilities like the two
5 [loop] -- well, not recent, but just past facilities
6 like the two [loop] test apparatus, the TLTA facility
7 that General Electric had that had electrically heated
8 inconel 600 fuel rod simulators, for example, and
9 there was another facility that General Electric had
10 the FIST facility. That also had inconel 600 fuel rod
11 simulators. The Rosa facility in Japan also had
12 inconel 600 fuel rod simulators.
13 And as I mentioned before, General
14 Electric, what appendix K is based off of are the BWR
15 [FLECHT] tests that were conducted by General Electric
16 in the early 1970s and they did, I believe, five tests
17 with zircaloy, but those tests, they did not use the
18 results of those tests and they actually used those
19 tests to compare them to the results of the stainless
20 steel tests and what are used as appendix K heat
21 transfer coefficients actually come from some of the
22 stainless steel tests that General Electric conducted.
23 That's for BWR ECCS evaluation calculations.
24 And then some of the results actually of
25 the -- one of the, in particular, zircaloy tests was

1 very problematic. It really did not demonstrate that
2 the core spray systems would work and there were a
3 number of criticisms of this test including criticisms
4 from Roger Griebe who worked with Aerojet who kind of
5 oversaw the -- I don't know the exact role that he
6 had, but I believe it was with the Atomic Energy
7 Commission. He was in the role of overseeing the test
8 that General Electric was conducting and he wasn't so
9 convinced that one of these tests didn't turn out so
10 well and that would be the ZR2 test.
11 And there is a quote that I have in the
12 Oyster Creek/Nine Mile Point Unit 1 petition. It's on
13 page 72 and 73. It's from J.W. McConnell who also
14 worked at Aerojet and that just kind of shows that he
15 wasn't so convinced that the top -- the top spray ECCS
16 systems would be very effective. He actually said
17 from a licensing viewpoint, the effectiveness of top
18 spray emergency core cooling systems that it has not
19 been demonstrated nor has it been proven ineffective
20 and he also questioned the accuracy of predicting the
21 heat transfer coefficients for the metal water
22 reactions and how they could be -- in terms of
23 separating them and just showing that they did, in
24 fact, have proper heat transfer coefficients that had
25 been derived from the stainless steel tests.

1 So, that's something -- these are things
2 to consider. Admittedly, what I've just discussed are
3 more generic issues.
4 And I did want to also mention that there
5 was an issue in the early '80s regarding I believe it
6 was generic issue A16, steam affects on BWR core spray
7 distribution and apparently, they wanted to show that
8 the BWR ECCS systems would actually be effective in
9 terms of core spray distribution.
10 And there were a number of tests that were
11 conducted by General Electric and these tests were
12 actually conducted by the two [loop] test apparatus,
13 the TLTA facility and again, as I mentioned before,
14 they had inconel 600 fuel rod simulators and they also
15 conducted some tests with the 30 percent steam sector
16 test facility. That's the SSTF facility and I'm not
17 sure what the cladding material was at that facility.
18 I haven't been able to locate information on that.
19 But, one thing that indicates the temperatures may not
20 have been very high is that I believe they used steam
21 injection to simulate core heat and the maximum
22 temperature of the steam was 800 degrees Fahrenheit.
23 Anyway, these generic issues -- this issue
24 that was of concern A16 steam affects on BWR core
25 spray distribution was decided -- after these tests,

1 they concluded that this issue had been resolved and
2 I think that's something to also look at. That, you
3 know, this issue -- it was concluded that this issue
4 was resolved with tests that were at least at the TLTA
5 and most likely the other test facility the SSTF.
6 That this issue was resolved for tests conducted with
7 inconel 600 rods[,] not resolved with tests conducted
8 with zircaloy fuel rods or fuel rod simulators.
9 You know, I think the results of the tests
10 could have been entirely different just with the BWR
11 [FLECHT] tests. How there were problems with the
12 zircaloy bundles. You're going to get different
13 results if you actually use the material that's used
14 in reactor cores and not a stand-in that doesn't have
15 [the] oxidation rates that zircaloy does.
16 And it's kind of interesting just to touch
17 on the fact that this BWR core spray distribution
18 problem, it was resolved and there is a cover letter
19 regarding that from Roger Mattson, the final report
20 and that's in [ADAMS] Online, but the attachment to
21 that is actually nonpublicly available. It's a -- and
22 again, this is not in particular, you know -- I mean
23 it relates --
24 COURT REPORTER: Excuse me. This is the
25 court reporter. Could you hold on for a second? I'm

1 having a technical problem.

2 MR. LEYSE: Sure.

3 COURT REPORTER: Okay. You can go ahead.

4 Sorry about that.

5 MR. LEYSE: Oh, no problem. Yes, this is

6 a -- actually, it's in "[ADAMS] Legacy" and this is --

7 I haven't been able to look at it because as I said,

8 it's nonpublicly available and the [accession] number

9 is 8304130488 and it has like an estimated page count

10 of ten. The date is 1983 and it says that it

11 recommends closure of task plan A16, steam affects on

12 BWR core spray distribution and this is nonpublicly

13 available. So, I actually haven't been able to look

14 at that and that might be something to consider just

15 for rulemaking branch. The fact that it seems like

16 this should be publicly available. It's a resolution

17 of this core spray problem, this generic issue and

18 yet, can't look at it.

19 And another thing that's interesting is

20 what I just mentioned. This is for BWR/1, 3, 4, 5 and

21 6 type reactors. It actually is not for BWR/2

22 reactors and the cover letter that's actually in

23 ADAMS online I can give you the ML number for that.

24 That's ML993370214. It's the same -- the cover letter

25 from Roger Mattson.

1 It says that they are going to be
2 reviewing this core spray issue for BWR/2 reactors and
3 that they will provide a separate SER to document the
4 evaluation results for each plant, but that's actually
5 a separate issue. I haven't been able to [locate]
6 that SER and I'm not sure if that would also be
7 nonpublicly available.
8 Also, that kind of brings up another issue
9 which is kind of related to this in just kind of
10 shifting gears to talk about the metal water reaction
11 and the limits of 50.46b number 1 and 2 in terms of
12 the 2200 limit and the 17 percent oxidation limit.
13 Those are actually -- those come largely
14 from research done by David Hobson and Philip
15 Rittenhouse and there's actually a paper that they
16 wrote. I don't have the title in front of me, but
17 that's actually also nonpublicly available and that's
18 just a side issue that I thought I would mention.
19 [It] just seems odd that the primary
20 research paper that the 2200 limit and also the 1700
21 oxidation limit are based off of that that's
22 nonpublicly available. We're talking about a paper
23 from the early 1970s.
24 So, that's kind of -- actually, I think I
25 -- yes, I do have the title. It's Enbrittlement of

1 Zircaloy-Clad Fuel Rods by Steam During LOCA
2 Transients. That's a paper from Rittenhouse and
3 Hobson from 1972. It's located at ML082410413 and
4 it's nonpublicly available.
5 So, anyway, just since there are some
6 people from Rulemaking Branch who are listening to
7 that. If there is anyway to make these documents
8 publicly available, I think that would be great and I
9 think it would be appropriate.
10 So, anyway, sorry. That's sort of an
11 aside.
12 MR. MILLER: Well, actually, could I get
13 you to repeat that last ML number just so we can get
14 it down here?
15 MR. LEYSE: Oh, sure. I would be happy
16 to. Yes, this is for the Hobson-Rittenhouse paper and
17 the ML number is ML082410413.
18 MR. MILLER: Thank you.
19 MR. LEYSE: Yes, I have actually written
20 to the Public Document Room and that's how I know that
21 these papers are nonpublicly available. So, but yes.
22 And just sort of back to the petition, as
23 I mentioned, what I just was talking about this
24 generic issue, steam affects on BWR core spray
25 distribution, I mean it's sort of -- it's related to

1 this problem obviously and I think it is just
2 interesting that, you know, here you had this -- what
3 was brought up in the late '70s I guess, early '80s.
4 This generic safety issue for BWRs and they did
5 conduct the tests for at least the BWR types 6, 5 and
6 4 and I guess they also did the other ones.
7 As I said, these -- this generic safety
8 issue was resolved with the results of tests conducted
9 with inconel 600 fuel rod simulators and here you
10 have, you know, appendix K. To this day, it's still
11 based off of the tests that were done with stainless
12 steel bundles by General Electric in the early 1970s.
13 That's where the heat transfer coefficients are coming
14 from and I think that that's definitely something that
15 as Dave Lochbaum pointed out there are limitations of
16 the BWR/2 ECCS that they do not have the redundancy as
17 he had mentioned that the more advanced systems have.
18 So, that's something I think that really
19 should be considered for these two plants with this
20 petition and that's -- just mentioning in the -- just
21 kind of regarding the problems with recent tests and
22 inconel 600 fuel rod simulators. On page 93 through
23 page 96 of the petition, I mention a number of
24 different test facilities that the primary BWR test
25 facilities for heat transfer tests or thermal

1 hydraulic experiments and how they're all using these
2 inconel 600 fuel rod simulators and it just seems that
3 -- well, not seems. It's just this is just not -- if
4 you were going to be basing your interpretations of
5 what's going to occur in the reactor core in the event
6 of a real loss of coolant accident off of these tests
7 conducted with inconel 600, that's a real big problem
8 because that's just not the reality.
9 The oxidation rates are different. I have
10 some information on that on page 95. Just talking
11 about the different oxidation rates of inconel 600.
12 So, you're going to have different test results.
13 If the bundles would be heated up to
14 temperatures between say 1,000 degrees Celsius and
15 1200 degrees Celsius. They are going to -- if they
16 were zircaloy, they would with high probability incur
17 autocatalytic oxidation. You'd have runaway
18 oxidation. Where this very same counterpart bundles
19 inconel 600, you're not going to have that.
20 And I realize the Oyster Creek and Nine
21 Mile Point Unit 1, the heat transfer coefficients that
22 are used are not based on inconel 600, but you have
23 the same problem with them. They're based on
24 stainless steel.
25 It's a situation where [a] counterpart

1 bundle that would be zircaloy, you know, counterpart
2 to a stainless steel bundle, you could heat the
3 stainless steel bundles between, you know, 1,000
4 degrees Celsius and 1200 degrees Celsius and you would
5 not have a problem. However, with zircaloy with high
6 probability, you would incur runaway oxidation at
7 those temperatures.
8 So, clearly, there's a big problem with
9 the licensing basis [peak cladding] temperatures of
10 Oyster Creek and Nine Mile Point Unit Number 1 being
11 [set] at 2150 and 2149 Fahrenheit respectively. So,
12 that's obviously, a big problem because these -- it's
13 all based off of, you know -- well, that's based off
14 largely from tests that were conducted with single
15 rod tests that were conducted for the metal water
16 reaction.
17 In the case of appendix K, they're using
18 the Baker-Just data. So, that would -- you're going
19 to have different oxidation rates with --
20 MR. MILLER: Are you still there? It
21 sounds like his phone might have cutoff. We'll go
22 ahead and give him a minute here to attempt to rejoin.
23 (Whereupon, at 1:44 p.m., a recess was
24 taken until 1:45 p.m.)
25 MR. LEYSE: This is Mark Leyse again. I'm

1 sorry. I was disconnected somehow.

2 MR. MILLER: Yes, we were just giving you

3 -- just taking a break here to give you a minute to

4 reconnect.

5 MR. LEYSE: Okay. Yes, I appreciate that.

6 MR. MILLER: Okay.

7 MR. LEYSE: I'm not sure what happened.

8 MR. MILLER: Neither are we.

9 MR. LEYSE: Yes. Anyway, as I was saying,

10 with appendix K, that's based off of Baker-Just which

11 is basically for the metal water reaction. It's

12 coming from single rod tests conducted with zircaloy

13 and there's plenty of information in the petition

14 where I talk about how the metal water reaction is

15 different when you have bundles and then oddly enough,

16 with the heat transfer coefficients and also

17 demonstrating that the system, that the emergency core

18 cooling systems at Oyster Creek and Nine Mile Point

19 Unit Number 1, you know, here you do have [bundle]

20 tests, but instead of using zircaloy to demonstrate

21 that these systems would work and also for the heat

22 transfer code coefficients that are used in the

23 calculations, the ECCS evaluations, those come from,

24 you know, stainless steel bundles.

25 So, it's kind of -- I think you have two

1 problems here with these appendix K, the metal water
2 based on a single zircaloy rod not a bundle and then
3 heat transfer coefficients based off of stainless
4 steel bundles and not zircaloy bundles.
5 And I believe there's also information in
6 the petition that just kind of shows that a lot of
7 this way of thinking about this is just kind of based
8 in what people were thinking back in the early '70s.
9 There are statements from the Atomic Energy
10 Commissioners that the heat that was generated from
11 oxidation that it would all go back into the rod and
12 there really wouldn't be a problem with stainless
13 steel being a stand in for the zircaloy.
14 And, in fact, I think there's a quote that
15 I have on page 77 from the Atomic Energy
16 Commissioners. They say the Commission sees no basis
17 for concluding that the heat transfer mechanism is
18 different for zircaloy and stainless steel and
19 believes that the heat transfer correlations derived
20 from stainless steel clad heater rods are suitable for
21 use with zircaloy clad fuel rods and so, I mean it's
22 just kind of interesting. There's a lot of -- I try
23 to in those pages in that area map out the history and
24 show kind of just how the Commissioners that made
25 these decisions.

1 And also the fact that Henry Kendall and
2 Dan Ford of Union of Concerned Scientists, they
3 criticized the fact -- during the rulemaking hearings,
4 they were very critical of the fact that the heat
5 transfer coefficients that they were based off of
6 stainless steel bundles and not from zircaloy bundles
7 and they criticized the fact that in the BWR [FLECHT]
8 tests that they -- out of over 100 tests, that they
9 had only conducted five with the zircaloy bundles and
10 that's obviously in that area where there's a lot of
11 detail where they're also criticizing, you know, just
12 the [FLECHT] tests in general and there are quotes
13 from some of the people that were experts. Aerojet's
14 Robert Griebe and McConnell who I mentioned earlier
15 and what they had to say about these issues.
16 And it just seems to me that this [has]
17 kind of somehow fallen through the cracks and these
18 issues really need to be addressed and let me see just
19 to make sure I'm covering things.
20 Yes, I actually -- you know, I realize
21 that I had initially asked for 90 minutes. It was
22 very friendly that more time was offered than one
23 hour, but Mr. Miller had -- this was a couple of weeks
24 ago. He had said that I could have longer than one
25 hour's time regarding this issue and I thought 90

1 minutes would be in order.

2 But, I think I'm pretty much concluded,

3 but there might be things that other people want to

4 say and also I would be [happy] to answer any

5 questions that anyone may have.

6 CHAIRMAN QUAY: Okay. Thank you, Mr.

7 Leyse. Is there anyone else that wants to comment?

8 Okay.

9 Before I conclude this meeting, members of

10 the public may provide comments regarding the petition

11 and ask questions about the 2.206 Petition process.

12 However, as stated at the opening, the

13 purpose of this meeting is not to provide an

14 opportunity for the Petitioner or the public to

15 question or examine the Petition Review Board

16 regarding the merits of the petition request.

17 Is there any member of the public that has

18 any comments?

19 MR. WEBSTER: Yes, I'll comment. Richard

20 Webster.

21 CHAIRMAN QUAY: Okay.

22 MR. WEBSTER: I think there are a couple

23 of comments. One is that obviously this is an

24 extremely important safety issue. It's one that I

25 hope the Board will take extremely seriously and

1 [ensure] that it is addressed very expeditiously.

2 I think one thing to perhaps consider is

3 whether it's appropriate to -- whether reasonable

4 assurance currently exists on safety when these kind

5 of issues are being raised. I remind the Board that

6 the essence of reasonable assurance is that it is up

7 to the applicant, it is up to the reactor operator to

8 demonstrate reasonable assurance. It is not up to the

9 public to demonstrate the lack thereof and I think

10 with the very serious question Mr. Leyse's raised, I

11 questioned whether the operator actually has been able

12 to demonstrate reasonable assurance.

13 That being said, I think there's the

14 second issue or there's two other issues really. One

15 issue is it's kind of amazing to me that this issue

16 could have lurked for so long and not been adequately

17 dealt with by the staff in the past. I think this is

18 something which the NRC really needs to look at more

19 systemically to see why these kind of very fundamental

20 safety issues are coming to the fore decades after the

21 license was issued and especially after the reactor's

22 supposedly gone through a comprehensive safety review

23 process in re-licensing.

24 And finally, I'd just like to give my

25 thanks to Mr. Leyse for spending so much time and

1 energy working on this when he actually isn't
2 receiving any compensation whatsoever and there is no
3 funding at all or funding for these kind of things and
4 I think what this really shows is that there should
5 be.
6 The public play a very useful role in
7 finding and highlighting safety issues and I think
8 where they do find and highlight a safety issue, I
9 think there should be some ability for the public to
10 recover the time spent in doing what is difficult and
11 technical work.
12 Thank you.
13 MR. LEYSE: Mark Leyse. I really
14 appreciate your comments, Mr. Webster and especially
15 what you said at the last point regarding spending a
16 lot of time.
17 And some of your other comments just -- I
18 mean I do find that -- I don't know how to [phrase]
19 this, but as I pointed out, I think some of these
20 issues were raised, you know, 40 years ago during the
21 -- almost 40 years ago during the rulemaking hearings
22 and I like I said, why should the heat transfer
23 coefficients that are used in the ECCS evaluation
24 calculations be based on tests that were done with
25 stainless steel bundles as opposed to zircaloy

1 bundles. It just doesn't make sense.

2 And then you had the BWR [FLECHT] test.

3 The ZR2 test which actually seemed to incur runaway

4 oxidation. Just looking at the graphs on that, it

5 seemed to take off. You know, incur runaway oxidation

6 around 2100 degrees Fahrenheit. Maybe between 21 and

7 22. Maybe it was even above. You know, it's hard to

8 see from the graph.

9 But, I mean why after such -- and this

10 test was such an issue of contention. Henry Kendall

11 and Dan Ford spent a great deal of their time focusing

12 on this test.

13 The people from Aerojet, they said --

14 Roger Griebe said that most like -- he said that

15 runaway oxidation [maybe] it did occur in this test.

16 He wasn't sure. He seemed to think that -- he said

17 that General Electric's interpretation of the results,

18 I quote him, "Were tremendously slanted" and yet after

19 that, why not just say okay, maybe General -- you

20 know, even if you think there's something wrong with

21 that conclusion, why not conduct more tests? Why not

22 figure out[,] is this, in fact, a real problem? Would

23 you have runaway oxidation in this situation or not?

24 And then if you look at the history, you

25 can just read this in "The [Cult] of the Atom" by Dan

1 Ford. The people at Aerojet like Roger Griebe, he was
2 basically -- he lost his job in reactor safety. He
3 was basically -- because of his testimony, what he
4 said during the rulemaking hearings, he was told to go
5 look for another job from Aerojet or basically,
6 transferred. I don't know the details, but they were
7 -- basically him and I think George Brocket, he was
8 also at Aerojet, they were basically not allowed to
9 keep the jobs that they had had.
10 And you had a similar situation with
11 Philip Rittenhouse at Oak Ridge National Labs and, you
12 know, I can go on and on. Even Alvin Weinberg lost
13 his position as the Director of Oak Ridge.
14 I think that's something important to look
15 at. Only if it's primarily just the fact that more
16 tests were not conducted and the people who had
17 criticized the tests were basically told to take a
18 walk and, you know, it's just something that I think
19 is pretty important.
20 Are you still there? Am I still
21 connected?
22 CHAIRMAN QUAY: You are still connected.
23 MR. LEYSE: Okay. I'm sorry. I heard
24 things that it sounded like I may have been
25 disconnected a second time. So.

1 CHAIRMAN QUAY: I don't know if somebody
2 joined us, Mr. Leyse or somebody dropped off.
3 MR. LEYSE: Okay. Sure. But, I just
4 wanted to say that I really appreciate Richard
5 Webster's comments and also, just, I guess, personally
6 what he said about fiscal compensation.
7 I do feel kind of that -- you know, I
8 don't know what to say. It's like I think that I
9 shouldn't have to really be spending as much time on
10 this. You know, telling the NRC to conduct more
11 tests. I think it's pretty obvious that more tests
12 should be conducted and I think it's pretty obvious
13 that with Oyster Creek and Nine Mile Point Unit Number
14 1 that there should be a demonstration that these --
15 you know, it's plant specific for two plants. That
16 their ECCS systems would indeed work in the event of
17 a loss of coolant accident if the zircaloy peak -- you
18 know, the peak cladding temperature would indeed
19 approach temperatures that they say are the licensing
20 peak cladding temperature for both of those plants.
21 And I also just want to state again that
22 I really appreciate Dave Lochbaum's input on this
23 from, you know, the [Union of] Concerned Scientists
24 and again, I would be -- if anyone else wants to
25 comment or if you have any questions for me, I would

1 be happy to answer them.

2 CHAIRMAN QUAY: At this time, does the

3 staff here in headquarters have any questions for Mr.

4 Leyse?

5 MR. DUDLEY: Yes. Yes, Mr. Leyse, this is

6 Richard Dudley.

7 Because we have such a large amount of

8 information in-house that you've submitted to us on

9 various petitions for rulemaking and actual comments

10 on other rulemakings, well over a thousand pages,

11 would you please identify in your 2.206 petition the

12 pages that you believe contain new technical

13 information or new issues or additional information

14 regarding issues that you've already raised with us

15 and identify those pages in this petition so that we

16 are sure that we do not overlook or miss some new

17 information as we review the information you've

18 submitted?

19 MR. LEYSE: Sure. I think that in this

20 case because of PRM [50-95] which was the Vermont

21 Yankee 2.206, you reopened the public comment period

22 and I think there is actually -- I'm quite sure that I

23 have not really added any new information in this

24 particular 2.206 regarding Oyster Creek and Nine Mile

25 Point Unit Number 1. Because a lot of the issues like

1 discussing zircaloy and stainless steel and inconel
2 600 for example, I submitted that information in the
3 recent comments that I made in that comment period.
4 So, I can't really -- I do not think that there would
5 be anything in this particular case just because the
6 second comment period was opened.
7 However, one thing is that as I said there
8 are some -- just with this petition, in particular,
9 like I said, you know, this is plant specific for two
10 plants since they are the only two plants with the
11 BWR/2 ECCS emergency core cooling systems and I have
12 perhaps focused on that a little more than I did in
13 the comments that I made. But, I don't think there's
14 anything necessarily too different.
15 And actually, I did make a third comment
16 and I'm sorry. This is sort of a side issue. NEI
17 made a comment in the recent comment period and I
18 submitted a response to NEI that has not been placed
19 in the docket folder yet.
20 But, there is some information actually in
21 my response to NEI that is pertinent to this petition
22 and actually, you kind of reminded me of it. NEI
23 points out something that I really didn't clarify when
24 I talk about the control rods or BWR cruciform control
25 elements. Say when the cladding would be around 2150,

1 the peak cladding temperature, the control elements
2 would actually be roughly say 400 degrees or almost
3 400 degrees Fahrenheit cooler than the fuel rods and
4 this was demonstrated in some of the experiments that
5 were conducted at the [CORA] test facility.
6 And actually, in those comments, my third
7 group of comments, I think they're dated December
8 27th, 2010, I actually have two graphs in there, you
9 know, that I placed for the CORA-16 experiments and
10 they show that the control rods would basically be
11 about 400 degrees Fahrenheit lower than the fuel rod
12 cladding and that's something I really didn't clarify
13 in this Oyster Creek Petition.
14 But, what I responded to NEI is that
15 basically if you're going to incur runaway oxidation
16 between 1832 degrees Fahrenheit and 2200 degrees
17 Fahrenheit which you could[,] with a high probability
18 according to this data, what's going to happen is
19 suddenly the fuel rod temperatures, the maximum fuel
20 rod temperatures, are going to start increasing at a
21 rate of tens of degrees Fahrenheit per second and so,
22 within say 30 seconds, you're going to probably be up
23 -- I mean this -- you're going to have -- it's
24 different case by case, but so, you incur runaway
25 oxidation at say around 2,000 degrees Fahrenheit.

1 Thirty seconds later, you could be up around 2500 or
2 say 2600 degrees Fahrenheit.
3 Let's say you're up around 2600 degrees
4 Fahrenheit. The, you know, data has shown that this
5 could be the case. In such case, then your control
6 rods or control elements they're going to up around
7 2200 degrees Fahrenheit or around 1200 degrees
8 centigrade and according to [the CORA] data, that's
9 when you start to have eutectic liquefaction when the
10 -- you can have the -- I think the boron [carbide] in
11 the stainless steel start having eutectic reactions
12 and there can be problems with that.
13 So, that's -- even though at say 2150,
14 you're going to be -- the control rod element or
15 control elements are going to be lower, if you do, in
16 fact, incur runaway oxidation at say around 2150 or,
17 you know, within about 30 seconds, the BWR control
18 elements will be up at a temperature where you're
19 going to have these eutectic reactions.
20 I'm sorry. That's rather a long answer to
21 your question, Mr. Dudley, but --
22 CHAIRMAN QUAY: There apparently are no
23 other questions here at headquarters.
24 MR. KLUKAN: I actually have a couple.
25 CHAIRMAN QUAY: Okay.

1 MR. KLUKAN: I'm sorry. This is Brett
2 Klukan, the OGC Representative.
3 Mr. Leyse, I just wanted to clarify. Have
4 you filed a FOIA request for those nonpublic
5 documents?
6 MR. LEYSE: Have I done what? I'm sorry.
7 MR. KLUKAN: Filed a Freedom of
8 Information --
9 MR. LEYSE: No, I'm sorry. I have not.
10 MR. KLUKAN: Okay. That's generally the
11 process by which the public can either seek the
12 redaction of otherwise nonpublic information or
13 challenge the agency's designation as such.
14 MR. LEYSE: Okay.
15 MR. KLUKAN: And then my -- just to
16 understand what it is that you're asking in layman's
17 terms, so, while you're saying this is plant specific
18 and thus, different from what you've previously
19 submitted, the information is different. Is not
20 necessarily contained in this -- is based on prior
21 comments to other petitions' rulemaking. That's where
22 this new information has come in or that's where this
23 new source of information regarding your plant
24 specific allegation is located or first located.
25 MR. LEYSE: Let me see. I'm sorry. Are

1 you responding -- when you say comments on rulemaking,
2 are you responding some to what I just answered?
3 MR. KLUKAN: I'm just trying to
4 understand. There was a question posed about you
5 responded that there's nothing new in this petition.
6 MR. LEYSE: Right. Okay. I see. I got
7 it. Yes, let me explain that.
8 There would have been a great deal of new
9 material in this petition, but it just so happened
10 that the 2.206 that I filed regarding Vermont Yankee,
11 this was something I could not have anticipated. That
12 the NRC, and, you know, I think it's laudable that
13 they did this, they decided to change the status of
14 that 2.206 into a rulemaking petition and that became
15 PRM [50-95]. So, what NRC did was the Rulemaking
16 Branch reopened the comment period on both PRM [50-93]
17 and PRM, you know, [50-95] and so, you know, I
18 basically -- so, a lot of the "new information" that I
19 put into this Oyster Creek and Nine Mile Point Unit
20 Number 1 Petition, I actually ended up putting into
21 the rulemaking comments that I made during this
22 comment period.
23 So, Mr. Dudley had asked, you know, what
24 additional information this petition may have and so,
25 I told them probably not much if any because they had

1 reopened the comment period.

2 If they had not reopened the comment

3 period, there would be a lot of new information in

4 this petition.

5 But, just to continue with it, to answer

6 your question, that still does not take away the fact

7 that -- in this petition, I'm obviously talking about

8 generic safety issues. The metal water reaction that

9 I'm discussing, that would apply to all light-water

10 reactors that are licensed by the NRC. You're going

11 to have that same problem in all BWRs, all PWRs.

12 And some of the problems that I'm

13 discussing with these tests, the heat transfer tests

14 or thermal hydraulic tests being conducted with

15 stainless steel bundles and also inconel 600 bundles,

16 most of them now it's all inconel 600, that's a

17 generic issue that would apply to all BWRs.

18 However, the issue that is specific to

19 both Nine Mile Point Unit Number 1 and Oyster Creek is

20 the fact that they are the only two reactors licensed

21 by NRC that have the BWR/2 ECCS and as Dave Lochbaum

22 pointed out, that system does not have the redundancy

23 built in. You know, I'm not trying to summarize what

24 he said, but one thing, they're just not the same

25 system as the other systems, have the redundancy and

1 other features. They don't have them.

2 So, I think that makes this, you know,

3 specific to that issue. So, in that sense, this is

4 like plant specific for those two plants.

5 MR. KLUKAN: Thank you for that, Mr.

6 Leyse. Just for my own clarification, what exactly,

7 and again in layman's terms if possible, are you --

8 what actions are you asking the NRC to take in this

9 petition? Specific to this petition, what actions

10 would you like the NRC to do? What do you want us to

11 do? Just in summary if you can.

12 MR. LEYSE: Now, you're really putting me

13 on the spot. I'm just kidding.

14 Like I -- you know, it's just what does --

15 you know, it's like what is the rule of 2.206? What

16 can this petition do? You know, it could modify,

17 suspend or revoke the license or any action as may

18 seem proper.

19 You're the regulator. I'm not. So, I

20 would hope that you would know what to do in this

21 case, but I will try to answer your question.

22 One is that the power level of Oyster

23 Creek and also Nine Mile Point Unit Number 1, the

24 power level should be decreased so that -- I mean it's

25 difficult to say. Because here I'm criticizing the

1 ECCS evaluation calculations. So, I think these
2 calculations are so flawed that, one, you could maybe
3 look at the results of the CORA-16 experiment just in
4 the preliminary to get your metal water reaction.
5 I discussed the CORA-16 experiment results
6 in this -- let me see. I think that's around page 12.
7 Yes, it's -- yes, page 12. In that experiment, it
8 said that the predicted and observed cladding thermal
9 response that they were in excellent agreement until
10 application of the available zircaloy oxidation
11 kinetics models causes the low temperature, that's 900
12 degrees to 1200 Celsius, so that's 1652 to 2192
13 Fahrenheit, oxidation to be under predicted. So,
14 basically, they're talking about available kinetics
15 models and so, they're talking about Baker-Just,
16 Cathcart Powell.
17 So, I mean you could maybe look at the
18 CORA-16 experiment just real quick, get your metal
19 water reaction from that and then maybe you could go
20 back and look at the results of the ZR, the BWR flect
21 ZR2 experiments and maybe just come to the conclusion
22 that those results were perhaps not anomalous.
23 So, you know, General Electric basically
24 said that the thermocouple readings were not valid.
25 That the thermocouple readings that Henry Kendall and

1 Dan Ford of Union of Concerned Scientists argued that
2 there was -- they actually said that it wasn't
3 necessarily runaway -- that oxidation it almost
4 incurred. That's how they phrased it at that time.
5 I would say it did incur runaway oxidation.
6 But, maybe to look at the results of the
7 BWR [FLECHT] ZR2 [test] and just to take them
8 seriously. Think well maybe these thermocouple
9 readings were, in fact, real and so, based -- you
10 know, based off of that, just do maybe the best you
11 could to lower the power levels of both of those
12 plants so that your licensing basis peak cladding
13 temperature would be below, you know, 1832 degrees
14 Fahrenheit or below 1000 degrees Celsius. I'm not
15 sure how far below it would need to be.
16 So, that would be the first phase. So, I
17 said drop the power level and just we have some crude,
18 you know, metal water reaction from CORA-16. Maybe
19 look at the BWR [FLECHT] ZR2 test. Take it seriously
20 the thermocouple readings. Don't just say they're
21 erroneous and then immediately implement a situation
22 where you conduct BWR thermal hydraulic tests with
23 zircaloy bundles and you would conduct these tests
24 with the zircaloy bundles to see -- you would have to
25 use temperatures say, you know, start at around --

1 temperatures below 1832 degrees Fahrenheit. You know,
2 so that the peak cladding temperature would be between
3 1832 and 1200. Maybe try some other variations and
4 vary the core spray rates and just investigate all
5 kinds of parameters that would be within the possible,
6 you know, realistic parameters that could occur in
7 the event of a loss of coolant accident.
8 That's kind of my answer. To first try
9 to, you know, lower that licensing basis peak cladding
10 temperature and then follow that up by conducting
11 thermal hydraulic tests that would be particular to
12 the BWR/2 ECCS and, you know, use zircaloy fuel rods
13 for that, bundles, not inconel 600 bundles.
14 MR. KLUKAN: Thank you, Mr. Leyse. My
15 next question is based on your answer to the previous
16 question. If we were to engage those actions,
17 particularly your first point regarding [lowering the]
18 licensing temperature or the temperature, would that
19 necessarily result in your opinion into a changed NRC
20 regulation or would it have to result into a changed
21 NRC regulation?
22 MR. LEYSE: I see. Well, okay. I'm not
23 a lawyer as you know. So, I don't know the complete,
24 you know, legal, you know, all the legal guidelines
25 for that. So, I would think that it would certainly

1 make sense to change the regulation, but here as I
2 said, it's a plant specific situation. I think that
3 licensing basis peak cladding temperatures at all
4 plants should definitely be below that. So, it would
5 make sense to make that into a generic, you know,
6 issue. You know, a regulation most certainly.
7 But, at the same time, you know, I still
8 think a good place to start is, you know, maybe at
9 Oyster Creek and Nine Mile Point Unit Number 1 and
10 just -- but, I think in general what you're saying is
11 true. That it would result in a change of regulation,
12 but I'm -- you know.
13 MR. KLUKAN: One final question, Mr.
14 Leyse, and again, thank you for your response to these
15 thus far.
16 MR. LEYSE: Sure.
17 MR. KLUKAN: And again, this is Brett
18 Klukan. My final question is are you alleging in this
19 petition that either two plants you've particularly
20 identified the BWR/2s or any other plants are
21 currently in violation of NRC requirement or of their
22 licenses?
23 MR. LEYSE: Yes, I would assert that these
24 two plants are in violation of 50.46b, the parameters.
25 Because -- and, you know, I need to explain. You

1 know, as things stand, obviously, the licensing basis
2 peak cladding temperature for these plants is roughly
3 -- well, you know, it's 2150 and then 2149 in the
4 other. Let's just for convenience call them both
5 2150.
6 So, I mean that is obviously 50 degrees
7 Fahrenheit below the 2200 limit. So, I mean on paper,
8 obviously, it's not in violation. But -- and then I
9 don't know what the oxidation layer would be in this
10 case. You know, I take it for granted that it's also
11 going to be below the 17 percent [limit] and
12 obviously, these calculations are going to demonstrate
13 that there's going to be core cooling and so, you're
14 not going to incur a meltdown.
15 So, it's like on paper these are obviously
16 not in violation of 50.46b. Just like the Vermont
17 Yankee 2.206, you know, I can't recall. I think that
18 that licensing basis peak cladding temperature was
19 1960 degrees Fahrenheit. So, on paper, obviously not.
20 But, I'm just saying the reality of the
21 fact is that here you have these licensing basis peak
22 cladding temperatures and I'm not going to repeat, but
23 all through the petition and what I've been
24 discussing, they're based off of these calculations
25 that come from the single rods and then the stainless

1 steel bundle inputs from those experiments and so, I'm
2 arguing that it's just what's going to, in fact,
3 happen in the event of a loss of coolant accident at
4 Oyster Creek or Nine Mile Point Unit Number 1 if the
5 fuel rods are going to reach a temperature say as low
6 as 1832 degrees Fahrenheit. With high probability,
7 they're going to incur, you know, runaway oxidation.
8 So, and just to repeat, that's going to
9 then mean that temperature, the maximum in a local
10 area, the maximum fuel rod temperature is going to
11 start increasing by tens of degrees Fahrenheit per
12 second. So, within seconds, you know, within say, you
13 know, less than a minute's time, you're going to be
14 above 2200 degrees Fahrenheit. So, in that sense, I
15 think that these plants are operating in violation of
16 50.46b.
17 So, yes, most certainly they're -- and
18 they're not -- and you're going to not have -- you
19 know, you're not going -- you haven't demonstrated
20 that this core is going to be cooled and the fuel rods
21 will be quenched.
22 Even though on paper these -- you know,
23 these false -- what I'm asserting are false
24 calculations because they're not realistic because
25 they're being derived from these unrealistic things,

1 stainless steel bundles, single rods, that, you know,
2 this -- but, the real, you know, real LOCA, you're
3 going to have -- you are going to be over 2200 degrees
4 Fahrenheit and then within, you know, less than two
5 minutes time, you know, it's going to be different in
6 different cases, you're going to have -- you're going
7 to get up to the point in a local area where the
8 zircaloy is going to -- it's going to be up around
9 3300 degrees Fahrenheit and it will start to melt in
10 the local area.
11 But, even at far lower temperatures as is
12 pointed out, the control elements are -- they're going
13 to be following. You know, they're going to be
14 increasing in temperature. Also albeit say around,
15 you know, based on looking at this CORA results maybe
16 400 degrees Fahrenheit[, approximately,] lower than
17 the fuel rods. They're going to start incurring
18 liquefaction at say around 2250 Fahrenheit or so or
19 maybe 2300. So, anyway, so, definitely in violation
20 of 50.46b.
21 MR. KLUKAN: So, just to clarify for my
22 own understanding, you're asserting that while they
23 would not currently be in violation of 50.46, if the
24 regulation were amended for the reasons that you've
25 iterated here today and for those documented in your

1 petition, then they would be in violation assuming
2 that we were to change the regulation for the reasons
3 that you've suggested. To limit the temperature.
4 MR. LEYSE: No, that's not really what I
5 said. What I said is that, you know, clearly on paper
6 right now, you know, the licensing basis peak cladding
7 temperature for Oyster Creek, for example, that's 2150
8 degrees Fahrenheit. So, on paper, you know, that's 50
9 degrees Fahrenheit below, you know, 2200. So, that's
10 not in violation of 50.46b(1). You know, the 2200
11 limit. You know, that's just -- you know, that's on
12 paper. It's kind of like but what's the reality.
13 I'm stating that at the power level that
14 it's set now, the reality is that if you have a loss
15 of coolant accident and, you know, based on test
16 results, if the cladding were to, in fact, reach say
17 approximately 1832 or greater, you would -- the
18 reality is that you would incur -- you know, with high
19 probability incur runaway oxidation. So, within a
20 matter of seconds, that's going to shoot above 2200
21 degrees Fahrenheit and that's going to boom, be a
22 violation of 50.46b(1), your 2200 limit.
23 So, I'm saying that these plants are
24 definitely both operating now with power levels with
25 parameters such that they are, in fact, in violation

1 of 50.46b. Because if you had this loss of coolant
2 accident and the cladding reached, you know,
3 temperatures approaching, you know, their licensing
4 basis peak cladding temperatures, they're going to
5 incur runaway oxidation and they're going to incur at
6 least partial meltdowns or you know.
7 So, I'm saying that they are definitely in
8 violation of this regulation, but I'm saying in terms
9 of maybe legally speaking, bureaucratically speaking,
10 you know, at the moment, you know, on paper, it says
11 that their -- that, you know, their maximum cladding
12 temperature, you know, is going to be 2150. So, you
13 know, that's clearly -- you know, but I'm just saying
14 that that's -- there's no foundation for that and
15 that's, you know, why the petition's over 90 pages
16 long. I try to document, you know, what's wrong with
17 that confidence in this 2150 degree Fahrenheit peak
18 cladding temperature and licensing basis peak cladding
19 temperature to say that everything is fine.
20 Has that clarified your question?
21 MR. KLUKAN: It has. Thank you.
22 MR. LEYSE: Okay. Sure.
23 CHAIRMAN QUAY: Okay. At this point, I'm
24 going to ask are there any additional NRC questions
25 including the region?

1 MR. KULP: Nothing from the region.

2 CHAIRMAN QUAY: Thank you. Hearing none,

3 Mr. Leyse, I want to thank you for taking the time to

4 provide the NRC staff with clarifying information on

5 the petition you submitted.

6 Before we close, does the court reporter

7 need any additional information for the meeting

8 transcript?

9 Okay. Hearing none, this meeting is

10 concluded and we will terminate the phone connection.

11 MR. LEYSE: Yes. May I just add one

12 thing? Mark Leyse speaking.

13 CHAIRMAN QUAY: Yes.

14 MR. LEYSE: Yes. [I just] wanted to thank

15 the Petition Review Board for their time listening to

16 this and thank Ed Miller for the accommodations and

17 also thank Mr. Webster and Mr. Lochbaum. So.

18 CHAIRMAN QUAY: Okay. With that, we're

19 going to conclude the phone connection. Thank you.

20 MR. LEYSE: Thank you.

21 (Whereupon, at 2:32 p.m., the conference

22 call was adjourned.)

23

24

25

Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

Title: 10 CFR 2.206 Petition RE Oyster Creek

Docket Number: 50-[219] and 50-220

Location: (teleconference)

Date: Thursday, February 17, 2011

*Transcript corrections marked in [square brackets]

Work Order No.: NRC-715 Pages 1-31

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Enclosure 2

1 UNITED STATES OF AMERICA

2 NUCLEAR REGULATORY COMMISSION

3 + + + + +

4 PETITION REVIEW BOARD DISCUSSION WITH PETITIONER

5 ----------x

6 IN THE MATTER OF: :

7 10 CFR 2.206 PETITION : Docket Nos.

8 OF MARK LEYSE : 50-209

9 WITH RESPECT TO : 50-220

10 OYSTER CREEK AND :

11 NINE MILE POINT :

12 ----------x

13 Thursday, February 17, 2011

14

15 The above-entitled matter was convened via

16 teleconference, pursuant to notice, at 2:00 p.m.

17 Eastern Standard Time.

18

19 BEFORE:

20 THEODORE QUAY, Petition Review Board Chairman

21 Division of Policy and Rulemaking

22 Office of Nuclear Reactor Regulation

23

24

25

1

2 ALSO PRESENT:

3 ED MILLER, Project Manager for Oyster Creek

4 Nuclear Generating Station.

5 MERRILEE BANIC, NRR Generic Communications

6 Branch

7 RICHARD DUDLEY, NRR Rulemaking Branch

8 BRETT KLUKAN, ESQUIRE, Office of the General

9 Counsel, Attorney/Advisor to Petition Review Board

10 TANYA MENSAH, NRR Generic Communications Branch

11 STACEY ROSENBERG, Branch Chief, NRR Generic

12 Communications Branch, Division of Policy and

13 Rulemaking

14 CARLEEN SANDERS, Reactor Licensing, NRR

15 RAYMOND SHADIS, New England Coalition

16 RICHARD WEBSTER, Public Justice

17 JEFF WHITED, Reactor Licensing, NRR

18 SHIH-LIANG WU, Nuclear Performance and Code

19 Review Branch, NRR

20

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2

1 P-R-O-C-E-E-D-I-N-G-S

2 (2:05 p.m.)

3 MR. MILLER: I'd like to thank everybody
4 here for attending this meeting. My name is Ed
5 Miller. I'm the Oyster Creek Nuclear Generating
6 Station Project Manager.

7 We're here today to allow the Petitioner
8 Mark Leyse to address the Petition Review Board
9 regarding the 2.206 Petition dated December 10, 2010.
10 The Petition Manager for the Petition and the Petition
11 Review Board Chairman is Mr. Ted Quay.

12 The part of the PRB's review of this
13 petition has requested another opportunity to address
14 the PRB. Our meeting today is scheduled to go from
15 2:00 to 3:30 Eastern Time.

16 The meeting is being recorded by the NRC
17 Operations Center and will be transcribed by a court
18 reporter. The transcript will become a supplement to
19 the Petition and will be made publicly available.

20 I would like to start the meeting out with
21 introductions. If we could go around the room first,
22 please be sure to clearly state your name and position
23 in the office within the NRC in which you work.

24 As I said, my name's Ed Miller. I'm in
25 Reactor Licensing.

1 MR. WU: Shih-Lian Wu, Nuclear Performance
2 and Code Review Branch, NRR.
3 MR. KLUKAN: Brett Klukan. I'm from the
4 Office of General Counsel and I'm the attorney/advisor
5 to the Petition Review Board.
6 MS. SANDERS: Carleen Sanders, and I'm
7 also part of Reactor Licensing Group.
8 MR. WHITED: Jeff Whited, Reactor
9 Licensing.
10 CHAIRMAN QUAY: Ted Quay, Deputy Director,
11 Division of Policy and Rulemaking, NRR, and also the
12 Petition Review Board Chairman.
13 MR. DUDLEY: Richard Dudley. I'm from the
14 NRR Rulemaking Branch.
15 MS. BANIC: Merrilee Banic, NRR Generic
16 Communications Branch.
17 MS. MENSAH: Tanya Mensah, NRR Generic
18 Communications Branch. I'm the 2.206 Coordinator.
19 MS. ROSENBERG: Stacey Rosenberg. I'm the
20 Branch Chief of the Generic Communications Branch in
21 the Division of Policy and Rulemaking, NRR.
22 MR. MILLER: Okay. Do we have anybody
23 from the Region on the phone that would like to
24 identify themselves?
25 (No response.)

1 MR. MILLER: Okay. Mr. Leyse, just for
2 the record, would you please introduce yourself.
3 MR. LEYSE: Sure. Mark Leyse.
4 MR. MILLER: Okay. Do we have any other
5 members of the public that would like to identify
6 themselves?
7 MR. SHADIS: This is Raymond Shadis with
8 New England Coalition.
9 MR. MILLER: Okay. Thank you.
10 Anyone else?
11 (No response.)
12 MR. MILLER: Okay. Before we get further,
13 I would like to emphasize that we each need to speak
14 clearly and loudly to make sure that the court
15 reporter can accurately transcribe this meeting, and
16 if you do have something to say, please, for the
17 record, state your name first.
18 For anybody dialing in, please remember to
19 mute your phone to minimize background noise and
20 distractions. If you don't have a mute button on your
21 phone you can also press "star 6" and the system will
22 mute that line. Press "star 6" as well to unmute.
23 At this time I will turn it over to the
24 PRB Chairman, Mr. Quay.
25 CHAIRMAN QUAY: Good afternoon. Welcome

1 to this meeting regarding the 2.206 Petition submitted
2 by Mr. Leyse.
3 I'd like to first share some background on
4 our process. Section 2.206 of Title 10 of the Code of
5 Federal Regulations describes the petition process,
6 the primary mechanism for the public to request
7 enforcement action by the NRC in a public process
8 This process is open to anyone to petition
9 NRC that it take enforcement-type action related to
10 NRC licensees or licensed activities. Depending on
11 the results of this evaluation, NRC could modify,
12 suspend or revoke an NRC-issued license or take any
13 other appropriate enforcement action to resolve a
14 problem.
15 The NRC staff guidance for the disposition
16 of 2.206 petition requests is in Management Directive
17 8.11, which is publicly-available.
18 The purpose of today's meeting is to give
19 the Petitioner an opportunity to provide any
20 additional explanation or support for their Petition
21 before the Petition Review Board's initial
22 consideration and recommendations.
23 This is not a hearing, nor is it an
24 opportunity for the Petitioner to question or examine
25 the Petition Review Board on the merits or the issues

1 presented in the Petition Request.

2 No decisions regarding the merits of this
3 Petition will be made at this meeting. Following this
4 meeting, the Petition Review Board will conduct its
5 internal deliberation. The outcome of this internal
6 meeting will be discussed with the Petitioner.

7 The Petition Review Board typically
8 consisted of a chairman, usually a manager at the
9 senior executive service level at the NRC. It has a
10 Petition Manager and a Petition Review Board
11 Coordinator.

12 Other members of the Board are determined
13 by the NRC staff based on the content of the
14 information in the Petition Request.

15 At this time I would like to introduce the
16 Board. I am Ted Quay, the Petition Review Board
17 Chairman. Ed Miller is the Petition Manager for the
18 Petition under discussion today. Tanya Mensah is the
19 Office Petition Review Board Coordinator.

20 Our technical staff includes Shih-Liang Wu
21 from the Office of Nuclear Reactor Regulations,
22 Nuclear Performance and Code Review Branch. We also
23 obtain our advice from our Office of General Counsel,
24 represented by Bret Klukan.

25 After describing our process, the NRC

1 staff may ask clarifying questions in order to better
2 understand the Petitioner's presentation and to reach
3 a reasoned decision whether to accept or reject the
4 Petitioner's Request for Review under the 2.206
5 process.
6 I would like to summarize the scope of the
7 Petition under consideration and the NRC activities to
8 date.
9 On December 10th, 2010, Mr. Leyse
10 submitted to the NRC a Petition under 2.206 regarding
11 the licensing basis peak cladding temperatures of
12 Oyster Creek Nuclear Generating Station and Nine Mile
13 Point, Unit One, and the licensee's ability to quench
14 the fuel cladding using their emergency core cooling
15 systems in the event of a large cooling accident.
16 In this Petition Request, Mr. Leyse
17 identified the following areas of concern: One,
18 experimental data indicates that Oyster Creek and Nine
19 Mile Point One's licensing basis peak cladding
20 temperatures of 2150 degrees Fahrenheit, and 2149
21 degrees Fahrenheit, respectively, do not provide
22 necessary margins of safety against partial or
23 complete melt-down's in the event of loss of cooling
24 accidents.
25 Such data indicates that Oyster Creek

1 Nuclear Generating Station and Nine Mile Point Unit
2 One's licensing basis peak cladding temperatures much
3 be decreased to temperatures lower than 1832 degrees
4 Fahrenheit in order to provide necessary margins of
5 safety.
6 Two, experimental data indicates that
7 Oyster Greek Nuclear Generation Station and Nine Mile
8 Point Unit One's emergency core cooling systems would
9 not effectively quench the fuel cladding in the event
10 of a LOCA if the fuel cladding reached Oyster Creek's
11 and Nine Mile One's -- Unit One's licensing basis of
12 21 degrees Fahrenheit -- 2150 degrees Fahrenheit, and
13 2149 degrees Fahrenheit respectively.
14 Did someone just join us?
15 MR. WEBSTER: Yes. This is Richard
16 Webster from Public Justice.
17 CHAIRMAN QUAY: Okay. Thank you.
18 Based upon the stated concerns, Mr. Leyse
19 requests that the NRC order the licensees of Oyster
20 Creek and Nine Mile Point Unit One to lower the
21 licensing basis peak cladding temperature of Oyster
22 Creek and Nine Mile Point Unit One in order to provide
23 necessary margins for safety to help prevent partial
24 or complete melt-downs in the event of LOCAs. Order
25 the licensees of Oyster Creek and Nine Mile Point Unit

1 One to demonstrate that Oyster Creek and Nine Mile
2 Point Unit One BWR/2 emergency core cooling systems
3 would effectively quench the fuel cladding in the
4 event of LOCAs and prevent partial or complete melt-
5 downs.
6 The activities to date regarding this
7 Petition have included: On December 10th, 2010, the
8 Petition was received by the NRC;
9 On December 17th, 2010, the Petitioner
10 requested to address the Petition Review Board prior
11 to its initial meeting to further clarify the provided
12 information for the Board's consideration;
13 On January 13th, 2011, the Petitioner
14 addressed the Petition Review Board to provide
15 additional clarifying information regarding the
16 Petition;
17 On January 31st, 2011, the Petitioner was
18 informed via email of the Petition Review Board's
19 initial recommendation to not accept the Petition for
20 review. On the same day that Petitioner requested
21 another opportunity to address the Petition Review
22 Board.
23 For the first area of concern, the initial
24 recommendation was that the Petition did not meet the
25 criteria for review because the issue is already

1 considered in the Petitions for Rulemaking 50-93 and
2 50-95.
3 For the second area of concern, the
4 initial recommendation was that the Petition did not
5 meet the criteria for review because the Petitioner
6 had no provided sufficient facts to warrant further
7 inquiry.
8 Specifically, in the Petition and during
9 the January 13th, 2011 teleconference, the Petitioner
10 asserted that [BWR/2], emergency core cooling systems
11 are different from other emergency core cooling
12 systems and potentially inadequate.
13 However, the Petitioner did not provide
14 sufficient information to the Petition Review Board to
15 warrant further inquiry.
16 On February 17th, 2011, today, we are
17 providing the requested opportunity to address the
18 Petition Review Board again.
19 As a reminder for the phone participants,
20 please identify yourself if you make any remarks, as
21 this will help in the preparation of the meeting
22 transcript that will be made publicly-available.
23 Mr. Webster, if you would just introduce
24 yourself for the record and for the transcriber, and
25 then I will turn the phone call over to Mr. Leyse.

1 MR. WEBSTER: Right. Thank you very much.
2 Yes. I'm Richard Webster. I'm the attorney who's
3 represented a number of groups in relicensing
4 proceedings, and Mr. Leyse asked me to call to the
5 cause and just make a couple of points, a couple of
6 legal points which I would like to do fairly quickly,
7 if I may.
8 MR. LEYSE: Yes. I wanted to let Richard
9 speak before I speak. This is Mark Leyse speaking.
10 So, I would like to turn it over to Mr. Webster.
11 CHAIRMAN QUAY: That's fine. Go ahead,
12 Mr. Webster, and proceed.
13 MR. WEBSTER: Thank you very much. This
14 is Richard Webster, of Public Justice.
15 There's two issues I'd [like] to address.
16 One is about some -- the interaction of relicensing
17 and 2.206 Petitions. I think it's very clear, and the
18 Seabrook decision yesterday confirms this, that
19 relicensing covers [aging] management along with the
20 components during the period of extended operation.
21 And so, in a relicensing proceeding you
22 absolutely cannot make any allegations about the
23 current licensing basis, the adequacy of the current
24 licensing basis or about the [aging] management
25 programs in place during the current period of

1 operation.

2 And I do recall reading some logic

3 somewhere in the Board's decision saying that because

4 Mr. Leyse, because his issue might be raised in

5 relicensing that might be a problem, however, that's

6 certainly not the case.

7 In terms of generic issues, I think it's

8 probably reasonable for petitioners to seek both

9 generic resolution and site-specific resolution. I

10 don't think -- I think it's actually unreasonable for

11 the Board to make a decision that says that because

12 Mr. Leyse is seeking both types of resolution, we

13 should therefore, not deal with -- with one or the

14 other.

15 The reality is that Mr. Leyse has chosen

16 to pursue all angles, and I think he's to be commended

17 for that. Until -- I remind the Board that the Atomic

18 Energy Act requires adequate assurance of safety at

19 all times.

20 It is not Mr. Leyse's burden to show lack

21 of safety. It is the Applicant's burden to show on an

22 ongoing basis that there is safety.

23 Until the Commission resolves the

24 rulemaking petition and decides that finally, I firmly

25 believe that it is this Board's legal responsibility

1 to make a determination on the merits as to whether
2 Mr. Leyse has raised an issue which causes reasonable
3 assurance to be brought into question.
4 And therefore, I strongly urge this Board
5 to resolve this Petition on the merits and address the
6 issue of whether the facts that Mr. Leyse's put
7 forward, which are many, and which are extremely
8 detailed, raise an issue which should be dealt with on
9 the merits.
10 And if it does raise such an issue, then I
11 don't think the Board can punt by saying he's also
12 raised it as a generic issue.
13 If this Board reaches a site-specific
14 resolution in this particular proceeding, and then
15 later the Commission reaches a slightly different
16 decision, in the generic proceeding, that's perfectly
17 fine.
18 There's absolutely no need to be afraid of
19 inconsistency in this subject. I'll take any
20 questions from the Board right now.
21 MR. [MILLER]: Do you have any questions?
22 CHAIRMAN QUAY: Does anybody have any
23 questions at this point?
24 (No response.)
25 MR. [LEYSE]: Hello.

1 MR. MILLER: I'm sorry. I'm sorry. No, I
2 don't think there's any questions around the room
3 here.
4 MR. WEBSTER: Okay. Very well, if I may,
5 I may take my leave, and thank you very much for the
6 time.
7 MR. MILLER: Thank you, Mr. Webster.
8 MR. LEYSE: Yes. Thank you, Mr. Webster,
9 for calling in.
10 MR. WEBSTER: All right. Good luck, Mr.
11 Leyse.
12 MR. LEYSE: Yes. Thank you.
13 MR. MILLER: The floor is to you, Mr.
14 Leyse.
15 MR. LEYSE: Okay. Yes. I just wanted to
16 follow up with what he had said, just in terms of not
17 the legal aspects, but I think I have definitely --
18 your number two reason for not wanting -- your initial
19 decision not to consider this, is that I have not
20 provided -- the email, actually, that I received, says
21 that I haven't shown that the ECCS systems for both of
22 these plants are potentially inadequate, and I
23 disagree with that.
24 I think I have shown that they are
25 potentially inadequate. I have -- on page 72 and 73

1 of the Petition, I have a quote from J.W. McConnell,
2 and I think I had mentioned this in the last
3 teleconference.
4 This was someone who worked for [Aerojet]
5 who was in charge of overseeing the BWR FLECHT
6 program, and his conclusion was that from a licensing
7 viewpoint, the effectiveness of top spray ECC has not
8 been demonstrated, nor has it been proven ineffective.
9 And he -- and he also mentions that the
10 BWR FLECHT program being run by General Electric had
11 been done in a very, kind of -- with, you know, a
12 definite conflict of interest.
13 So, I -- I think that just that, in itself
14 -- I mean, we are talking about a nuclear reactor,
15 after all, and you're supposed to really ensure that
16 there's adequate public safety, and here's a statement
17 that says that it hasn't necessarily been demonstrated
18 that this system would be effective.
19 And the system is the same, more or less,
20 as it was back when he made this observation. We're
21 talking about the BWR[/]2 system in this case, of
22 which there are just the ones at Oyster Creek and Nine
23 Mile Point Unit Number One, you know, under the NRC's
24 control.
25 And another observation that I think I've

1 shown, that there's -- to use your -- that the system
2 is "potentially inadequate," is that the heat transfer
3 coefficients that are used in the ECCS evaluation
4 calculations, those come from data from the SS2N
5 bundle and in SS2N, SS stands for stainless steel and
6 the N stands for nichrome, but basically the point is,
7 this comes from a stainless steel bundle. It doesn't
8 come from a [Zircaloy] bundle, and I think that's
9 another reason to show that the system is potentially
10 inadequate.
11 Those are facts and, as Richard Webster
12 kindly pointed out, you know, I've documented these
13 facts pretty thoroughly in the Petition. It's -- and
14 the fact is, you know, these heat transfer
15 coefficients come from stainless steel, not from a
16 [Zircaloy] bundle.
17 And I also want to point out another thing
18 that is concrete, is the Oak Ridge National Labs
19 reports, and those are mentioned on page 11 and page
20 12.
21 They state -- the first one is "In-Vessel
22 Phenomena, CORA, BWR, Core melt Progression Phenomena
23 Program, Oak Ridge National Laboratory.
24 It was presented in 1991. It explicitly
25 states "Cladding oxidation in the CORA-16 experiment,"

1 that was a BWR severe fuel damage experiment. Anyway,
2 "in the CORA-16 experiment the oxidation rates were
3 not accurately predicted by available correlations."
4 So that would be the Baker-Just
5 Correlation and the Cathcart-[Pawel] Correlation.
6 Now, Oyster Creek is Appendix K, so that's
7 using the Baker-Just Correlation. So, this explicitly
8 states that there was an experiment. It had rapid
9 oxidation, and it was not accurately predicted by the
10 Baker-Just Correlation, which is used for the ECCS.
11 It's used in the ECCS evaluation calculations for
12 Oyster Creek.
13 And then another paper, it's also an Oak
14 Ridge National Lab document, it states --
15 MR. DUDLEY: Mr. Leyse --
16 MR. LEYSE: Yes.
17 MR. DUDLEY: This is Richard Dudley. I'd
18 like to ask you a question about your CORA-16
19 statement. Do you have any evidence to say that the
20 CORA test was made in under test conditions that were
21 designed to be consistent with a loss of coolant
22 accident?
23 My understanding is that the CORA test was
24 designed to look at severe accidents and accident
25 progression so it's not at all clear that it would

1 have been performed under conditions consistent with a
2 loss of coolant accident.
3 Do you have any information regarding the
4 CORA test to show that that particular CORA-16 was
5 done under conditions representative of a LOCA?
6 MR. LEYSE: Yes, I do, but let me first
7 reply by saying do you think a single specimen in the
8 data in the Baker-Just Equation comes from a small
9 specimen that would be, I think, an inch or so long,
10 maybe an inch, 1.2 inches long, I believe,
11 inductively-heated [zirconium] specimen that is held
12 at isothermal conditions to measure the oxidation
13 rates, do you think that represents real LOCA
14 conditions, inductively-heated?
15 MR. DUDLEY: Mr. Leyse, I am not a
16 [Zircaloy] oxidation specialist, and the purpose of
17 this call is not, I think, for you to ask us
18 questions, but for us to ask you questions.
19 MR. LEYSE: Sure. Well, I would like to
20 point out that the -- that in no way does a single rod
21 that is inductively-heated represents LOCA conditions,
22 and I would like to read something because, actually,
23 NEI stated that they did not believe that the CORA
24 experiments represented LOCA conditions in some of
25 their recent statements, and they had pointed out that

1 it was a steam environment and that the purpose of the
2 experiments was to create an environment so that there
3 would be oxidation, and then that would lead to fuel
4 damage.
5 But I want to read one thing. This [is]
6 from Appendix K, and it is regarding refill and
7 reflood heat transfer for pressurized water reactors,
8 now, that's not a BWR, but nonetheless, it speaks
9 during refill and during reflood when reflood rates
10 are less than one inch per second, heat transfer
11 calculations shall be based on the assumption that
12 cooling is only by steam and shall take into account -
13 - so, anyway, so that's a condition where cooling is
14 only by steam, and I believe there are counterpart
15 conditions in BWRs, and that is essentially the
16 conditions of the CORA experiments.
17 And the point is, anyway, here is a test
18 where it was the -- you know, we're talking about
19 oxidation rates, and the oxidation [rates] were
20 measured, and they were measured such that the
21 available correlations underpredicted them.
22 So, I think that's something that is very
23 important, and it was similar to conditions that can
24 occur during a LOCA when there would be a steam
25 environment.

1 So, that's kind of a long answer, but I
2 think it's pretty important to, you know, answer that
3 thoroughly.
4 MR. DUDLEY: Mr. Leyse, this is Richard
5 Dudley again. I just wanted to let you know that
6 under -- as part of our review of Petition [PRM] 50-93
7 and 50-95, our Office of Research is now looking into
8 the accident -- excuse me. -- the experiments you
9 described, and we are trying to ascertain what were
10 the conditions of those tests, so that was why I was
11 asking the question.
12 If you don't know the answer, that's fine,
13 but we will -- we will go and figure out the answer
14 and that's how we're going to evaluate your technical
15 allegations as to whether or not we need to institute
16 rulemaking for a change to our ECCS rule.
17 MR. LEYSE: Okay. Yes. No, I appreciate
18 that, and I'm -- I just wanted to try to point out
19 that I think that's great that you're looking at that,
20 and I would also really recommend that you look at the
21 conditions of the tests that Baker-Just and Cathcart-
22 [Pawel], that those correlations are based off of and
23 make a determination if you think that those replicate
24 actual LOCA conditions, and I think you'll find, when
25 you look at those tests, that they are far from it,

1 because we are talking about single specimens that,
2 where there are -- it's just not the same situation
3 where you have interfacial rods and you'll have the
4 hot spots at the center of interfacial rods, and you
5 won't have the same amount of heat loss as you would
6 with a single rod specimen.
7 So -- but I -- I appreciate that you're
8 concerned about that and that you're looking at that.
9 And I think -- I think you will also find
10 that I -- I don't know if I have this handy. I'll
11 look, but I think it's also mentioned in here that
12 there was the -- it's the compendium -- I forget the -
13 - it's a compendium of ECCS research which I've cited
14 a number of times.
15 If you give me one second, I'll be right
16 back. I'll find that.
17 Okay. It says, the compendium will --
18 also talks about the situation where severe [fuel]
19 damage experiments can be used to show -- they claim
20 that severe fuel damage experiments can be used to
21 show that the 2200 limit is, in fact, conservative
22 where, you know, I've argued the opposite.
23 But they have -- let me see. Yes, here it
24 is. I'll read it. It's the Compendium of ECCS
25 Research for Realistic LOCA Analysis, and they

1 describe a method for assessing the conservatism of
2 the 2200 Fahrenheit PCT limit, and they say:
3 "[Assessment] of the conservatism in the
4 PCT limit can be accomplished by comparison to [multi-
5 rod] bundle data for the autocatalytic temperature.
6 This type of comparison implicitly includes complex
7 heat transfer mechanisms and the effects of fuel rod
8 ballooning and rupture on coolability.
9 "Analysis of experiments performed in the
10 Power Burst Facility in the Annular Core Research
11 Reactor[,] and in the NEILS-CORA facilities in West
12 Germany Program have shown that temperatures above
13 2200 Fahrenheit are required before the [Zircaloy-
14 steam] reaction becomes [sufficiently] rapid to
15 produce an autocatalytic temperature excursion.
16 "Another group of relevant experimental
17 data were produced in the [MT-6B]" -- that's material
18 -- I'm sorry. I can't -- it may be "materials
19 testing." Anyway, "6B and the FLHT LOCA and coolants
20 [Coolant Boilaway] and [Damage Progression] tests
21 conducted in the NRU reactor in Canada, Chalk River.
22 "Even though some severe accident research
23 shows lower thresholds for temperature excursion or a
24 cladding failure than previously-believed when design
25 basis heat transfer and decay heat are considered some

1 margin above 2200 Fahrenheit exists."

2 So, the best experiment, I think, to look

3 at would be the LOFT LP -- I'm sorry, the LOFT FP2

4 experiment, and -- yes, FP. I hope I said instead of

5 FB.

6 Anyway, that -- there's data from that

7 that shows that, in fact, runaway oxidation commenced

8 at 1400 Kelvin. So, that would be about 2060 degrees

9 Fahrenheit, and in that experiment, you actually had

10 actual decay heat.

11 So, there you have [the] compendium and

12 they're really saying, you know, take a look at these

13 severe fuel damage experiments and you have your

14 design basis heat transfer, and they just come to the

15 wrong conclusion because, you know, obviously, a lot

16 of these tests[,] runaway oxidation data shows it did,

17 in fact, commence below 2200 degrees Fahrenheit.

18 So, I guess that's the continuation to

19 answer that, but I think that is extremely important.

20 So -- and just back to the situation with Oyster

21 Creek, just -- unless -- I'm sorry. Do you have any

22 other questions, Mr. Dudley?

23 MR. DUDLEY: Not at this point. We are

24 looking at all the information that you submitted in

25 your two petitions for rulemaking.

1 MR. LEYSE: Okay. Okay. Yes. No, I
2 appreciate that, and I guess I -- yes. No, I
3 appreciate your question and wanted to do the best
4 answer, but since this is regarding -- also regarding
5 Oyster Creek, and I think, as Richard Webster pointed
6 out, I really do think that there is -- you know, I've
7 presented data and I understand that these are generic
8 issues.
9 The metal/water reaction is most certainly
10 a generic issue, and the way how that will affect the
11 peak cladding temperatures, you know, I believe is a
12 generic issue, so I'm not going to disagree with that.
13 But, at the same time I do think this is a
14 pretty important issue that should be addressed
15 concerning Oyster Creek and Nine Mile Point Unit
16 Number One, especially since they have the BWR[/]2
17 ECCS, and some of this -- like the quotes[,] like from
18 McConnell, from [Aerojet] and just some of these old
19 tests were done 40 years ago and things really haven't
20 changed. It's pretty much a very similar system to
21 what they had back then.
22 And another thing. I don't know if this
23 -- I actually -- I want to qualify this. I think the
24 metal/water reaction is a generic issue, but I have
25 come across [a document] that was just placed in ADAMS

1 on January 27th of 2011, so it's actually placed in
2 ADAMS since our last teleconference.
3 It's a General Electric document and it
4 states, "Metal/water reaction is not important for
5 most BWRs as PCTs are below 1200 Kelvin, 1700 degrees
6 Fahrenheit. It is only significant for BWR[/]2 large
7 breaks."
8 Now, I find myself in an awkward position
9 because I actually disagree with that statement.
10 However, at the same time I just want to submit this
11 to -- this is a statement from General Electric, and I
12 think this -- it shows that, at least from their point
13 of view, from General Electric's point of view that
14 the metal/water reaction is plant-specific, you know,
15 for Oyster Creek and Nine Mile Point Unit Number One
16 since those are the only two BWRs that are under
17 regulation by the NRC.
18 So, at least from General Electric's point
19 of view, I doubt if they would want to -- I doubt if
20 they would want to, you know, go along with -- approve
21 -- I guess I should say I doubt that they approve of
22 my petition, but at least from their point of view it
23 seems that the metal/water reaction is only something
24 to be considered at BWR[/]2's.
25 And this document to -- it's Enclosure

1 Number Two of -- it's the Track G Application for
2 Emergency Core Cooling Systems, Loss of Coolant
3 Accidents Analysis for BWR 2-6. So, that's two
4 through six.
5 That's a GE document, and I'll give you
6 the ADAMS Accession Number. That's ML110280325, and
7 the page number is 2-9, and it's Table 2.5-, and then
8 it's a -- of that table, it's at 3.2.5 metal/water
9 reaction rate.
10 Now, I also want to add that I believe
11 this is all based off of the Cathcart-[Pawel]
12 Correlation. They're talking about best estimate
13 models and again, you know, obviously, that's
14 something I say is [non-conservative], just everything
15 I've just said and what I've said about the CORA-16
16 [experiment].
17 But at least from General Electric's point
18 of view this is an issue that is only specific to
19 Oyster Creek and Nine Mile Point Unit Number One, and
20 although I disagree with it, I do want to submit it to
21 you as something that may give you a reason to be able
22 to proceed with this.
23 It may be a reason for you to say that
24 this is actually [non-generic], because I think it's
25 very important that you do review this petition and --

1 and I'm just giving you an option for you to be able
2 to say, well, at least according to General Electric
3 this is plant-specific, and maybe this is a reason we
4 can say that this is a [non-generic] safety issue, and
5 that may be something you want to consider.
6 But, at the same time, you know, I think
7 what Richard Webster said -- I can't duplicate what he
8 said, but he basically said that there should be no
9 reason why someone cannot pursue an issue both in the
10 rulemaking front and also in the enforcement action
11 [front] simultaneously.
12 And I think, unless you have any other
13 questions, that is pretty much all I have to say, and
14 I would like to turn things over to Ray Shadis unless
15 there are any questions.
16 CHAIRMAN QUAY: I see none here.
17 Mr. Shadis, are you still on the phone?
18 MR. SHADIS: Yes, I am. Yes, I am.
19 Thank you for the opportunity to comment.
20 I have in front of me the document that Mr. Leyse was
21 referring to that just appeared in ADAMS at the end of
22 January.
23 It appears to be a topical licensing
24 report. It's NEDO-33005 Rev 0 and, yes, from all I
25 can make of the tables that he referenced, their

1 concern with the metal/water reaction is limited to
2 the BWR[/]2's and so therefore, with that particular
3 aspect of the general topic of peak cladding
4 temperature, with that particular aspect, it is site-
5 specific, and in order to, you know, pass on assurance
6 to our constituents, we would really like to see that
7 either addressed, that aspect alone, if necessary,
8 addressed through the 2.206 process so that it could
9 be addressed expeditiously or, you know, if we can't
10 see that, at least to have that section for those two
11 plants taken up in particular in the rulemaking
12 process.
13 But I don't know how you can find a safety
14 issue that is more plant-specific than a safety issue
15 in which the vendor says it really only applies to the
16 two plants named in the Petition.
17 So, I guess that's the -- that's the
18 extent of my comments and again, I do appreciate the
19 opportunity to make comment.
20 MR. LEYSE: And, yes, I want to thank Mr.
21 Shadis for his comments. Mark Leyse speaking.
22 CHAIRMAN QUAY: Okay. At this time does
23 the staff here at headquarters have any questions for
24 either Mr. Leyse or Mr. Shadis?
25 (No response.)

1 CHAIRMAN QUAY: Seeing none, before I
2 conclude the meeting, members of the public may
3 provide comments regarding the Petition and ask
4 questions about the 2.206 Petition process.
5 Remember, as stated in the opening, the
6 purpose of this meeting is not to provide an
7 opportunity for the Petitioner or the public to
8 question or examine at the Petition Review Board
9 regarding the merits of the Petition Request.
10 Are there any members of the public that
11 wish to make comments?
12 MR. SHADIS: And Mr. Chairman, this is Ray
13 Shadis again. I guess I need to make clear, I'm
14 probably the member of the public that you're speaking
15 of, and I really had no part in preparing this 2.206,
16 the one that's currently before you, but I did want to
17 comment on it and comment on it as a member of the
18 public.
19 CHAIRMAN QUAY: Okay. Thank you. I
20 understand that, but other members of the public may
21 have joined us, so I just wanted to make sure.
22 Okay. At this point, Mr. Leyse, thank you
23 for taking the time to provide the NRC staff with
24 clarifying information on the Petition you've
25 submitted.

1 Before we close, does the court reporter
2 need any additional information for the meeting
3 transcript?
4 COURT REPORTER: No, I do not.
5 CHAIRMAN QUAY: Okay. With that, we will
6 conclude this phone call. Thank you.
7 MR. LEYSE: Yes. I just wanted to thank
8 Mr. Miller and the Petition Review Board and also Mr.
9 Dudley and the others from Rulemaking. Mark Leyse
10 speaking.
11 CHAIRMAN QUAY: Okay. Thank you, Mark.
12 MR. LEYSE: Thank you.
13 CHAIRMAN QUAY: Good afternoon, everyone.
14 (Whereupon, at 2:50 p.m. the above-
15 entitled matter was concluded.)
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April 4, 2011

MEMORANDUM TO: Harold K. Chernoff, Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

FROM: G. Edward Miller, Project Manager ***/ra/***
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

SUBJECT: MEMORANDUM TO FILE: TRANSCRIPTS FOR 10 CFR 2.206 PETITION REGARDING OYSTER CREEK AND NINE MILE POINT, UNIT NO. 1 PEAK CLADDING TEMPERATURE AND ECCS PERFORMANCE

The Purpose of this memorandum is to provide and make publically available, the transcripts associated with the petition submitted by Mr. Mark E. Leyse regarding the Oyster Creek Nuclear Generating Station and Nine Mile Point, Unit No. 1. The petition was submitted pursuant to Title 10 of the *Code of Federal Regulations*, Section 2.206. Enclosure 1 contains the transcript from the petitioner's first opportunity to address the petition review board (PRB) which occurred on January 13, 2011. Enclosure 2 contains the transcript from the petitioner's second opportunity to address the PRB which occurred on February 17, 2011. Both transcripts have been corrected based upon review by the NRC staff and the petitioner, as supported by the audio recording of the call. Changes made to the petitions are marked in square brackets.

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