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Vogtle Units 3 and 4

Docket Number: [52-025 and 52-026]

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Date: Wednesday, March 28, 2012

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Pages 1-21

“Corrected Transcript: Corrections denoted within brackets []”

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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10 CFR 2.206 PETITION REVIEW BOARD (PRB)

CONFERENCE CALL

RE

VOGTLE UNITS 3 AND 4

+ + + + +

WEDNESDAY

MARCH 28, 2012

+ + + + +

The conference call was held, Frank Akstulewicz, Chairperson of the Petition Review Board, presiding.

PETITIONER: MARK LEYSE

PETITION REVIEW BOARD MEMBERS

FRANK AKSTULEWICZ, Deputy Director for Licensing Operations, Division of New Reactor Licensing, Office of New Reactors

DENISE McGOVERN, Petition Manager for 2.206 petition

ANDREA RUSSELL, Petition Coordinator

RAJ GOEL, Office of New Reactors, Containment and Ventilation Branch

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1 ANNE-MARIE GRADY, Office of New Reactors, Containment
2 and Ventilation Branch

3 RALPH LANDRY, Office of New Reactors, Division of
4 Safety Systems and Risk Assessment

5 MALCOLM PATTERSON, Office of New Reactors, PRA and
6 Severe Accidents Branch

7 EDWARD FULLER, Office of Research

8 MARSHA SIMON, Office of General Counsel

9
10 ON BEHALF OF THE LICENSEE

11 CHUCK PIERCE, Director, Regulatory Affairs,
12 Southern Nuclear Operating Company

13 AMY AUGHTMAN, Licensing Manager, Southern
14 Nuclear Operating Company

15 WESLEY SPARKMAN, Licensing Supervisor, Southern
16 Nuclear Operating Company

17 JOHN GIDDENS, Licensing Manager, Special
18 Projects, Southern Nuclear Operating Company

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P R O C E E D I N G S

(1:04 p.m.)

MS. MCGOVERN: Okay. The agenda for today is for Mr. Leyse to address the petition review board for his 2.206 petition regarding the Vogtle Accident Scenarios in the AP1000 Hydrogen Igniter system. We'll have introductions then the PLD Chairman will speak, then Mr. Leyse will have an opportunity to make his remarks, and then Mr. Akstulewicz will close the meeting.

So thank you, everybody, for attending this meeting. My name is Denise McGovern and I am one of the NRC Project Managers for the Vogtle Electric Generating Plant Units 3 and 4, and I'm also the ~~petitioning~~ [petition] manager in this case.

A Petition Review Board, or PRB has been assigned to review this petition. Frank Akstulewicz is its Chairperson and we are here today to allow the petitioner, Mark Leyse, to address the board regarding his letter dated February 28th, 2012.

As part of the Petition Review Board, or PRB's review of this petition, Mr. Leyse has requested the opportunity to address the PRB. This meeting is scheduled from 1:00 to 2:00 p.m. Eastern Time and the meeting is being recorded by the NRC Operations Center

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1 and will be transcribed by a court reporter.

2 The transcript will become a supplement to
3 the petition. The transcript will also be made
4 publicly available. I would like to open this meeting
5 with introductions. As we go around the room, please
6 be sure to clearly state your name, your position, and
7 the office that you work for within the NRC for the
8 record. I will start. Denise McGovern, Office of New
9 Reactors.

10 MR. FULLER: I'm Ed Fuller of the Office
11 of Research.

12 MR. PATTERSON: Malcolm Patterson ~~of~~
13 ~~the~~[a] Reliability and Risk Analyst in the Office of
14 New Reactors.

15 MS. GRADY: Anne-Marie Grady, the Office
16 of New Reactors Containment and Ventilation Branch.

17 MR. GOEL: Raj Goel, NRO in Containment of
18 Ventilation Branch.

19 MR. LANDRY: Ralph Landry, the Office of
20 New Reactors.

21 MR. MCKIRGAN: John McKirgan, Office of
22 New Reactors.

23 MS. SIMON: Marsha Simon, Office of
24 General Counsel.

25 MR. TONACCI: Mark Tonacci, Office of New

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1 Reactors.

2 MS. SNYDER: Amy Snyder, Office of New
3 Reactors.

4 MS. RUSSELL: Andrea Russell, 2.206
5 Coordinator for the Agency.

6 CHAIR AKSTULEWICZ: I'm Frank Akstulewicz.
7 I'm the Deputy Director for Licensing Operations in
8 the Division of New Reactor Licensing and the PRB
9 Chairperson.

10 MS. MCGOVERN: We have completed
11 introductions at the NRC headquarters. At this time,
12 are there any NRC participants from headquarters on
13 the phone line? Are there any NRC participant from
14 the Regional Office on the phone? Are there any NRC
15 representatives from the site on the phone?

16 Okay. Are there any representatives for
17 the licensee on the phone?

18 MR. PIERCE: Chuck Pierce. I'm the
19 Regulatory Director for Southern Nuclear.

20 MS. AUGHTMAN: And Amy Aughtman, Licensing
21 Manager.

22 MR. SPARKMAN: Wes Sparkman, Licensing
23 Supervisor.

24 MR. GIDDENS: John Giddens, Licensing
25 Manager, Special Projects.

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1 MS. MCGOVERN: Okay. Mr. Leyse, will you
2 please introduce yourself for the record?

3 MR. LEYSE: Sure. Mark Leyse.

4 MS. MCGOVERN: Okay. It is not required
5 for members of the public to introduce themselves for
6 this call, however, if there are any members of the
7 public on the phone that wish to do so, they may at
8 this time, so please state your name for the record.

9 Okay. I'm hearing none. I would like to
10 emphasize that we need to for you to speak clearly and
11 loudly to make sure that the court reporter can
12 accurately transcribe this meeting. If you do have
13 something that you would like to say, please start by
14 stating your name for the record.

15 For those dialing into the meeting, please
16 remember to mute your phones to minimize any
17 background noise or distractions. If you do not have
18 a mute button, you can do this by pushing the *6 on
19 your phone, to unmute, push *6 again. Thank you.

20 At this time, I'll turn the meeting over
21 to the PRB Chairman, Frank Akstulewicz.

22 CHAIR AKSTULEWICZ: Thank you, Denise.
23 Good afternoon. Welcome to this meeting regarding the
24 2.206 petition submitted by Mr. Leyse. I'd like to
25 share some background on our process. Section 2.206

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1 of Title X of the Code of Federal Regulation describes
2 the petition process, the primary mechanism for the
3 public to request enforcement action by the NRC in a
4 public process.

5 This process permits anyone to petition
6 NRC to take enforcement-type action related to NRC
7 licensees or license activities. Depending upon the
8 results of this evaluation, NRC could modify, suspend,
9 or revoke an NRC-issued license, or take any other
10 appropriate enforcement action to resolve a problem.

11 The NRC staff's guidance for the
12 disposition of 2.206 petition request is in Management
13 Directive 8.11, which is publicly available. The
14 purpose of today's meeting is to give Mr. Leyse, as he
15 has requested, an opportunity to provide additional
16 explanation and support for the petition before the
17 Petition Review Board's initial consideration and
18 recommendation.

19 This meeting is not a hearing, nor is it
20 an opportunity for the petitioner to question, or
21 exam[ine], the PRB on the merits, or issues, presented
22 in this petition request. ~~Those~~ [No] decisions
23 regarding the merit of the petition will be made at
24 this meeting.

25 Following this meeting, the Petition

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1 Review Board will conduct its internal deliberation.
2 The outcome of that internal meeting can be discussed
3 with the petitioner. The Petition Review Board
4 typically consists of a Chairman, and a Petition
5 Manager, and a PRB Coordinator.

6 Other members of the board are summoned by
7 the NRC staff based on the content of the information
8 in the petition request. At this time, I would like
9 to introduce the board.

10 I am the Petition Review Board Chairman.
11 Denise McGovern is the Petition Manager of the
12 petition under discussion today, and Andrea Russell is
13 the Office's PRB Coordinator.

14 Our technical staff includes Anne-Marie
15 Grady from the Office New Reactors Containment and
16 Ventilation Branch, Raj Goel, from the Office of New
17 Reactors Containment and Ventilation Branch, Malcolm
18 Patterson, from the Office of New Reactors, PRA and
19 Severe Accidents Branch, Ralph Landry, from the Office
20 of New Reactors, Division of Safety Systems and Risk
21 Assessment.

22 We also obtain advice from our Office of
23 General Counsel, represented by Marsha Simon. As
24 described in our process, the NRC staff may ask
25 clarification questions in order to better understand

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1 the petitioner['s presentation and to reach a
2 reasoned decision whether to accept or reject the
3 petitioner's request for review under the 2.206
4 process.

5 I would like to summarize the scope of the
6 petition under consideration and the NRC activities to
7 date. On February 28th, 2012, Mr. Leyse submitted to
8 the NRC, a petition under 2.206 regarding the Vogtle
9 Electric Generating Plant Units 3 and 4.

10 In that petition, Mr. Leyse is requesting
11 that the NRC order the licensee of Vogtle Nuclear
12 Units 3 and 4 to conduct safety analyses of severe
13 accident scenarios in which the AP1000 hydrogen
14 igniter system would be actuated too late, either due
15 to flawed emergency response guidelines or plant
16 operator error, after a local hydrogen concentration
17 of 8 percent, or greater, was reached in the
18 containment, which would cause a fast hydrogen
19 deflagration, and after a local detonatable
20 concentration of hydrogen developed in the
21 containment, which could cause a hydrogen detonation.

22 Allow me to discuss our activities to
23 date. On March 6th, the Petition Manager contacted
24 the petitioner to discuss the 2.206 process and to
25 offer the petitioner an opportunity to address the PRB

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1 by phone or in person.

2 The petitioner requested to address the
3 PRB by phone prior to internal meeting to make the
4 initial recommendation to accept or reject the
5 petition for review.

6 On March 13th, the petitioner was offered
7 the opportunity to address the PRB on March 28th,
8 which is today, from 1:00 to 2:00. On March the 14th,
9 the petitioner informed the Petition Manager, via
10 email, that he would accept that opportunity to
11 address the PRB.

12 As a reminder to phone participants,
13 please identify yourself if you make comments, as this
14 will help us in the preparation and review of the
15 transcript. Thank you.

16 Mr. Leyse, I'll turn it over to now to
17 invite you the opportunity to provide any information
18 you believe the PRB should consider as part of this
19 petition.

20 MR. LEYSE: Thank you. Mark Leyse
21 speaking. First, I want to add that the 2.206
22 petition also requests that the licensee of Vogtle
23 Units 3 and 4 also conduct safety analyses of severe
24 accident scenarios in which the AP1000 passive
25 autocatalytic hydrogen recombiner system would

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1 malfunction by having unintended ignitions after a
2 local hydrogen concentration of 8 percent or greater
3 was reached in the containment, which could cause a
4 fast hydrogen deflagration, and after a local
5 detonatable concentration of hydrogen developed in the
6 containment, which could cause a hydrogen detonation.

7 That additional request, it's not in the
8 beginning of the petition, it's in a section that has
9 information on how passive autocatalytic hydrogen
10 recombiners could malfunction and start behaving like
11 hydrogen igniters in a severe accident, and that
12 information is on Pages 9 and 10 of the petition.

13 So I just wanted to let you know that that
14 is also one of the requests. Okay. Now, I want to
15 thank the Petition Review Board for giving me the
16 opportunity to provide additional information to
17 support the requests of the 2.206 petition I submitted
18 on February 28th, 2012.

19 The petition addresses oversights of
20 Westinghouse's probabilistic risk assessment for
21 severe accidents, which could occur at AP1000
22 reactors. First Westinghouse does not consider that
23 the AP1000's containment hydrogen igniter system could
24 provide an ignition source of sufficient energy to
25 directly initiate a detonation.

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1 And second, Westinghouse does not consider
2 that the AP1000 containment's passive autocatalytic
3 recombiners could also provide an ignition source of
4 sufficient energy to directly initiate a detonation.

5 In the event of a severe accident, the
6 potential problems with the AP1000 containment's
7 hydrogen igniter system being actuated too late are
8 compounded [by] Westinghouse's flawed emergency
9 response guidelines for the AP1000, which instructs
10 plant operators to actuate the hydrogen igniters after
11 the core exit thermocouple measurements exceed 1200
12 Fahrenheit.

13 Experimental data demonstrates that core
14 exit thermocouple measurements could be ineffective at
15 detecting when the rapid zirconium steam reaction of
16 the fuel cladding would commence in an accident or
17 when a meltdown would commence.

18 Now, I will discuss information in
19 Westinghouse's probabilistic risk assessment for the
20 AP1000, Appendix 19-D, Equipment Survivability
21 Assessment. That is in ADAMS at ~~session~~ [accession]
22 number ML11171A416. Westinghouse defines two of the
23 time frames that would occur in a severe accident.

24 Time frame 1 is the core heat-up phase and
25 time frame 2 is the in-vessel severe accident phase.

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1 Westinghouse states that, "Time frame 1 is defined as
2 the period of time after core uncovering and prior to
3 the onset of significant core damage as evidenced by
4 the rapid zirconium water reactions in the core. This
5 is the transition period from design basis to severe
6 accident environment."

7 And for time frame 2, Westinghouse states
8 that, "The onset of rapid zirconium water reactions of
9 the fuel rod cladding and hydrogen generation defines
10 the beginning of time frame 2. The heat of the
11 exothermic reaction accelerates the degradation,
12 melting, and relocation of the core."

13 Westinghouse maintains that the core exit
14 gas temperature would reach 1200 Fahrenheit in time
15 frame 1 before the onset ~~to~~ [of] the rapid zirconium
16 steam reaction of the fuel cladding. However,
17 experimental data demonstrates that this would not
18 necessarily be the case.

19 In the LOFT LP-FP-2 experiment, an
20 experiment simulating a ~~sever~~ [severe] accident, core
21 exit temperatures were measured at around 800
22 Fahrenheit when in-core thermocouples measured fuel
23 cladding temperatures exceeding 3300 Fahrenheit. So
24 after the onset of the rapid zirconium steam reaction,
25 core exit temperatures were measured at around 800

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1 Fahrenheit.

2 This is discussed on Pages 16 through 18
3 of the petition. An OECD Nuclear Energy Agency report
4 titled, Core Exit Temperature Effectiveness in
5 Accident Management of Nuclear Power Reactor,
6 published in 2010, states that in LOFT LP-FP-2,
7 "During the rapid oxidation phase, core exit
8 temperatures appeared, essentially, to be disconnected
9 from core temperatures."

10 That's a quote from Page 50 of the OECD
11 Nuclear Energy Agency report, which is discussed in
12 the petition. Clearly, there are problems with
13 Westinghouse's emergency response guidelines for the
14 AP1000. As I already said, plant operators are
15 instructed to actuate the hydrogen igniters after the
16 core exit thermocouple measurements exceed 1200
17 Fahrenheit, which would most likely be sometime after
18 a meltdown had commenced.

19 Now I want to provide an example of
20 another problem with Westinghouse's plan to have plant
21 operators rely on core exit thermocouple measurements
22 in the event of a severe accident, and that is that
23 plant operators might re-flood an overheated core when
24 they did not realize that the core was, in fact,
25 overheated.

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1 Consider a scenario in which there were
2 similar temperature[s] differences between in-core and
3 core exit temperature as were observed in LOFT LP-FP-
4 2. If plant operators were to re-flood the core when
5 core exit temperatures were well-below 1200
6 Fahrenheit, the core could already be overheated, fuel
7 cladding temperatures could be over 3300 Fahrenheit;
8 where zirconium melts.

9 In such a case, there would also be some
10 liquefaction of core components because of eutectic
11 reactions taking place at temperatures as low as 2200
12 Fahrenheit. For example, the eutectic reaction
13 between zirconium and stainless steel.

14 Anyway, unintentionally re-flooding an
15 overheated core could be very dangerous. In a severe
16 accident during the re-flooding of an overheated core,
17 up to 300 kilograms of hydrogen could be generated in
18 one minute.

19 Regarding the re-flooding of an overheated
20 reactor core, a second OECD Nuclear Energy Agency
21 report titled, In-Vessel Core Degradation Code
22 Validation Matrix Update, 1996 to 1999, published in
23 2000, states, "Several of the integrated core damage
24 progression tests have been re-flooded, resulting in
25 production of significant amounts of steam, with

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1 further oxidation and hydrogen generation, as observed
2 in some CORA", that's C-O-R-A, "tests, and in LOFT LP-
3 FP-2."

4 "This renewed heat-up is important
5 regarding accident management as the additional
6 hydrogen might threaten containment integrity and
7 increased fission product release would increase the
8 source term. The increasing fuel temperatures, being
9 counterintuitive, might confuse the operators into
10 taking inappropriate action."

11 So with Westinghouse's plan to have plant
12 operators rely on core exit thermocouple measurements,
13 in the event of a severe accident, operators could
14 unintentionally re-flood an overheated core, which
15 would rapidly generate additional hydrogen at rates as
16 high as 5 kilograms per second, which could, in turn,
17 compromise the containment if the hydrogen were to
18 detonate.

19 And I just want to repeat the last
20 sentence of the quote up above, "The increasing fuel
21 temperatures, being counterintuitive, might confuse
22 the operators into taking inappropriate action."

23 So with Westinghouse's plan, the operators
24 would just be relying on this core exit thermocouple
25 measurement, there wouldn't even be a chance for them

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1 to be confused by what's going on in the core,
2 potentially, they would have misinformation. They
3 would think that a meltdown had not yet commenced,
4 that the core was, in fact, not overheated, and they
5 would follow that procedure.

6 Anyway, in the petition, I also discuss
7 data from experiments simulating design basis
8 accidents. That's on Pages 14 to 16. Two of the main
9 conclusions from such experiments, which were
10 conducted at four different facilities, are ~~the~~ [that]
11 core exit temperature measurements display, in all
12 cases, a significant delay, up to several hundred
13 seconds, and that core exit temperature measurements
14 are always significantly lower, up to several hundred
15 Celsius, than the actual maximum cladding temperature.

16 Now, I just want to say, a delay of
17 several hundred seconds could be quite a long time,
18 especially in a fast-moving accident, like, for
19 example, a large break loss of coolant accident; that
20 would be a very significant amount of time.

21 Clearly, for severe accidents,
22 Westinghouse's plan for AP1000's plant operators to
23 rely on core exit temperature measurements to monitor
24 the condition of the core and to wait for a core exit
25 temperature measurement of 1200 Fahrenheit to signal

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1 when to actuate hydrogen igniters, and implement other
2 procedures, would be neither productive nor safe.
3 Thank you.

4 CHAIR AKSTULEWICZ: Thank you, Mr. Leyse.

5 At this particular time, I'll open the floor here at
6 headquarters for the staff to ask any questions of a
7 clarifying nature. So remember, please identify
8 yourself before you ask your question.

9 MR. LANDRY: This is Ralph Landry. Mr.
10 Leyse, during your discussion you mentioned the ~~core~~
11 [CORA] test?

12 MR. LEYSE: Yes.

13 MR. LANDRY: And I don't recall that in
14 your petition. Where in your petition is your
15 reference to the ~~core~~ [CORA] test?

16 MR. LEYSE: If I recall correctly, there
17 is no reference to the ~~core~~ [CORA] test in the
18 petition. What I'm doing in mentioning the ~~core~~
19 [CORA] test, that was in a quote from an OECD Nuclear
20 Agency report and that is referring to the fact that,
21 in some of the CORA tests, they were re-flooded and
22 there was a significant amount of hydrogen that was
23 generated.

24 In fact, when I also referred to LOFT LP-
25 FP-2 in this context, I'm referring to, not the

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1 difference between in-core temperatures and core exit
2 temperatures, I'm talking about an aspect of LOFT LP-
3 FP-2 that was also not mentioned in the 2.206.

4 That's just that, during re-flood, you
5 generate an enormous amount of hydrogen in a very
6 short period of time, and I'm just putting this into
7 [a] context that, ~~his~~ [if] plant operators for the
8 AP1000 were to re-flood an overheated core based upon
9 waiting, say, the core exit temperature were only, as
10 I said, like LOFT LP-FP-2, say it were around 800
11 Fahrenheit, they didn't realize the core was over
12 heated already and they re-flooded, they could
13 generate an enormous amount of hydrogen, up to 300
14 kilograms per minute.

15 So that's the reason why I mentioned the
16 CORA tests and also LOFT LP-FP-2 in this different
17 context.

18 CHAIR AKSTULEWICZ: Okay. Anybody else?
19 Okay. We seem to have no additional questions here at
20 headquarters. I'll ask the licensee if they have any
21 specific questions they would like to direct at you at
22 this time.

23 MR. PIERCE: No questions.

24 CHAIR AKSTULEWICZ: Okay. Since we don't
25 have anybody on for the region, I will ask one more

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1 time if there are any members of the public who joined
2 us in the course of conversation in the presentation
3 and remind them that they may provide comments
4 regarding the petition and ask questions about our
5 process at this time.

6 So if there are any, would they please
7 identify themselves and ask their question? Okay.
8 I'm hearing none. Mr. Leyse, I'd like to thank you
9 for taking time to provide the NRC staff with
10 additional clarifying information on the petition
11 you'd submitted.

12 Before we close, does the court reporter
13 need any additional information for the meeting
14 transcript?

15 COURT REPORTER: If I could get a service
16 list sent to me that would be great.

17 CHAIR AKSTULEWICZ: Okay. Thank you.

18 MR. LEYSE: Mark Leyse speaking. First, I
19 would like to thank the Petition Review Board again
20 for giving me this opportunity to provide additional
21 information, but I would be happy to email you
22 information that I provided today so you have the
23 references, especially for that paper that we just
24 discussed. It does mention the CORA tests. Would
25 that be beneficial for you?

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1 CHAIR AKSTULEWICZ: Just a moment, we're
2 going to go on mute for a second [short interval of
3 silence]. All right, Mr. Leyse, this is Frank
4 Akstulewicz. Feel free to submit the information you
5 described in our discussion today.

6 MR. LEYSE: Okay. Sure. Mark Leyse, yes,
7 thank you.

8 CHAIR AKSTULEWICZ: Okay. And unless
9 there are any other final concluding comments, I will
10 close the meeting and terminate this phone call. We
11 stand adjourned.

12 (Whereupon, the hearing in the above-
13 entitled matter was concluded at 1:35 p.m.)
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