

Official Transcript of Proceedings
NUCLEAR REGULATORY COMMISSION

Title: Advisory Committee on Reactor Safeguards
Open Session

Docket Number: (n/a)

Location: teleconference

Date: Friday, July 10, 2020

Work Order No.: NRC-0962

Pages 1-182

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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675TH MEETING

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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OPEN SESSION

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FRIDAY

JULY 10, 2020

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The Advisory Committee met via Video-
Teleconference, at 11:30 a.m. EDT, Matthew W. Sunseri,
Chairman, presiding.

COMMITTEE MEMBERS:

MATTHEW W. SUNSERI, Chairman

JOY L. REMPE, Vice Chairman

WALTER L. KIRCHNER, Member-at-large

RONALD G. BALLINGER, Member

DENNIS BLEY, Member

VESNA B. DIMITRIJEVIC, Member

JOSE MARCH-LEUBA, Member

DAVID A. PETTI, Member

PETER RICCARDELLA, Member

1 ACRS CONSULTANT:

2 MICHAEL CORRADINI

3 STEPHEN SCHULTZ

4

5 DESIGNATED FEDERAL OFFICIAL:

6 CHRISTOPHER BROWN

7 CHRISTIANA LUI

8 QUYNH NGUYEN

9 MICHAEL SNODDERLY

10

11 ALSO PRESENT:

12 ANTONIO BARRETT, NRR

13 BRUCE BAVOL, NRR

14 JOSHUA BORROMEO, NRR

15 TRAVIS BOYCE, NRR

16 ANNA BRADFORD, NRR

17 BEN BRISTOL, NuScale

18 LARRY BURKHART, ACRS

19 MARK CHITTY, NuScale

20 PAUL DEMKOWICZ, Idaho National Laboratory

21 MICHAEL DUDEK, NRR

22 SARAH FIELDS, Public Participant

23 CRAIG HARBUCK, NRR

24 JORDAN HOELLMAN, NRR

25 PAUL INFANGER, NuScale

1 MARIELIZ JOHNSON, NRR
2 SHANLAI LU, NRR
3 MICHAEL MELTON, NuScale
4 SCOTT MOORE, Executive Director, ACRS
5 ETIENNE MULLIN, NuScale
6 TONY NAKANISHI, NRR
7 STEVEN NESBIT, EPRI
8 RYAN NOLAN, NRR
9 REBECCA NORRIS, NuScale
10 REBECCA PATTON, NRR
11 TOM SCARBROUGH, NRR
12 JEFFREY SCHMIDT, NRR
13 JOHN SEGALA, NRR
14 ALEXANDRA SIWY, NRR
15 ANDREW SOWDER, EPRI
16 DINESH TANEJA, NRR
17 CARL THURSTON, NRR
18 CHRISTOPHER VAN WERT, NRR
19 YUKEN WONG, NRR
20 PETER YARSKY, RES
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P R O C E E D I N G S

11:45 a.m.

CHAIR SUNSERI: This is Chair Sunseri.
It's 11:45 and we are going to reconvene the ACRS
meeting. Let's start with a roll call.

Ron Ballinger?

MEMBER BALLINGER: Here.

CHAIR SUNSERI: Dennis Bley?

MEMBER BLEY: Here.

CHAIR SUNSERI: Vesna Dimitrijevic?

MEMBER DIMITRIJEVIC: Here.

CHAIR SUNSERI: Walt Kirchner?

MEMBER KIRCHNER: Here.

CHAIR SUNSERI: Jose March-Leuba?

MEMBER MARCH-LEUBA: I'm here.

CHAIR SUNSERI: Dave Petti?

MEMBER PETTI: Here.

CHAIR SUNSERI: Joy Rempe? Joy Rempe?
Pete Riccardella?

MEMBER RICCARDELLA: I'm here.

CHAIR SUNSERI: Okay, we have a quorum.
So, let me first start off by saying I appreciate
everyone's patience with the Committee as we work
through the previous P&P agenda. We ran slightly over
and we needed to take a short break before we

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1 reconvened this session, so I do appreciate everyone's
2 patience on that.

3 We are going to start the letter, the
4 report preparation phase of our review of the boron
5 distribution issue regarding the NuScale DC
6 application. This is going to be a little different
7 than what we have historically done.

8 We don't have a draft letter yet to
9 review, so I've asked Walt. He's going to conduct,
10 Member Kirchner is going to conduct a facilitated
11 discussion of what the content of that letter should
12 be with the members.

13 During that discussion, we are going to
14 have transcription going on. So, we have a
15 transcriber that will capture this discussion so that
16 we will have the information available to us as we
17 prepare our report, and it will also be of public
18 interest, I am sure, as well.

19 So, we will keep the transcription running
20 until the point of which we have either ended our
21 discussion or are ready to put up some kind of draft
22 letter in front of everyone, which I don't anticipate
23 that happening until very late this afternoon, if at
24 all.

25 So, let me ask members, are there any

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1 questions with where we're proceeding before we get
2 started? Okay, and let me just confirm that the
3 public line is open.

4 MR. SNODDERLY: The public line is open.

5 CHAIR SUNSERI: Okay, and with this, I
6 will now turn it over to Member Kirchner, lead for the
7 NuScale DCA review.

8 MEMBER KIRCHNER: Thank you, Mr. Chairman.
9 Good morning, everyone. I want to keep my opening
10 remarks brief because, as the Chairman has indicated,
11 we would wish to have a facilitated discussion with
12 the Committee, but before we get there, I want to do
13 the following.

14 I just want to thank both the applicant
15 and the staff. I know there has been a lot of work
16 done in a very compressed time. We are aware of that
17 and appreciate it.

18 The preparations over the last several
19 months, the presentations I should say, have been very
20 informative, and that will help our discussion today.

21 I again think we're at a point now -- I
22 don't want to get into my personal views at this
23 point. There will be a chance for me to also join the
24 conversation in a bit, but I'd like to summarize where
25 I think we are.

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1 We had a very nice summary from Meghan
2 McCloskey of NuScale yesterday morning. Thank you,
3 Meghan. That was a good summation of where things
4 are, and we had excellent presentations from the
5 staff.

6 I would single out -- I shouldn't single
7 out anyone, but I do want to point out that in Jeff
8 Schmidt's presentations, we had what I'll call figures
9 of merit for gauging the boron dilution issue, and it
10 appears, at least in this member's opinion, that the
11 design changes that have been made by the applicant
12 certainly address the DHRS cooling part of the
13 equation.

14 I think in general, the concern now turns
15 to the post-ECCS boron dilution of the downcomer,
16 dilution of the downcomer, and I'm going to turn next
17 to Jose March-Leuba, who has been our lead on this
18 issue. He is going to try and establish some points
19 of reference, I'll call them, as to where we are.

20 And I'm then also going to turn to Member
21 David Petti who has put together a nice flowchart that
22 may also help facilitate focusing our discussion, and
23 then turn to you, the members, for your input, and
24 also to our two consultants.

25 And with that, I will hand the microphone

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1 over to Jose.

2 MEMBER MARCH-LEUBA: Here I am. Mike, did
3 you get my write up?

4 MR. SNODDERLY: Yes. Sandra, if you could
5 share your screen? In that same folder where Dr.
6 Petti's flowchart, I have placed Dr. March-Leuba's BD
7 summary. Could you please bring that up? Thank you.

8 MEMBER MARCH-LEUBA: All right, so while
9 Sandra is working on that, I think what --

10 MEMBER KIRCHNER: Jose, just one quick
11 thing. In my opening remarks, I didn't -- I wanted to
12 call special attention both to Dr. Peter Yarsky's
13 presentation and a differing view from Dr. Shanlai Lu.
14 Those both were excellent and will help inform our
15 discussions, so thank you both.

16 MEMBER MARCH-LEUBA: So, before the
17 Committee writes a letter, we have to have an
18 underlying agreement on what the facts are as we know
19 them today.

20 To start with, there is very little
21 documentation on this issue. All -- almost everything
22 you're going to see now on my write up is either I
23 rationalized myself or it was said orally by either
24 the applicant or the staff, okay. Sandra, are we
25 making any progress?

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1 MS. WALKER: It's loading.

2 MEMBER MARCH-LEUBA: Yeah, there it goes.
3 Now, I made an effort to not put any numbers in here
4 that I wasn't 100 percent sure they were not
5 proprietary, so I think -- I'm pretty sure this is not
6 proprietary, but at any moment, if anybody sees
7 something proprietary, please let's stop sharing the
8 screen and we'll go into closed session, okay.

9 So, again, this is trying to establish
10 facts so we can then transfer them to our letter,
11 right? On the positives, they're having two design
12 modifications.

13 Number one is the riser holes which
14 prevent downcomer deboration during controlled passive
15 cooling events, and both the applicant and the staff
16 have done analysis that show that they're effective.
17 That's good. That's excellent.

18 An additional problem was ECCS actuation
19 too late, and for that, they changed the ECCS end
20 points, and through exhaustive analysis, both the
21 applicant and the staff confirmed that that problem
22 has been solved.

23 So, we have two positives, okay? When you
24 end up into uncontrolled passive cooling events, you
25 don't deborate anymore, and ECCS involves, not mainly,

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1 the RRV opens early enough so that the rush of
2 deborated water does not get into the core.

3 Sandra, can you move up to 17, line 17?
4 All right, however, the modifications fix those two
5 problems. Late ECCS actuation or deboration of the
6 downcomer or with circulation with DHRS did not fix
7 the problem with ECCS actuation.

8 So, after ECCS actuates, we now know from
9 NuScale, they admitted yesterday, it's not only
10 possible, it will deborate, and it will deborate in a
11 few hours. NuScale or the staff have not performed an
12 accurate calculation of how many hours it takes.

13 So, they used conservative numbers from a
14 calculation that was performed for something else,
15 okay, but we know it deborates and we know it
16 deborates certainly within the 72-hour period we
17 considered.

18 We also know that the downcomer volume
19 that has been deborated now is 14 times larger than
20 the core volume. So, if we push any of that downcomer
21 into the core and some mixing occurs, which it will
22 even though we don't have any evidence that it does
23 because we don't have any calculations, you still have
24 14 volumes, 14 core volumes coming behind it. So,
25 even if the fresh run mixes and gets some boron, you

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1 keep bringing deborated water behind it. It is
2 unreasonable to say that you are not going to end up
3 with a non-deborated, a non-borated core if you start
4 CFDS or CVCS.

5 Furthermore, there were some statements
6 yesterday that we don't believe that 20 dollars, that
7 there are -- it's going to shut down by 10 dollars.

8 There were a lot of blanket statements
9 orally by the applicant, but when the staff asked the
10 applicant to calculate what is the probability, what
11 conditions would result in criticality in the core
12 using the standard methodologies that they would ask
13 Browns Ferry, or Brunswick, of Susquehanna to use, the
14 return to power is predicted and a critical boron
15 concentration that requires minimum deboration.

16 And I can't tell you the number because
17 that's proprietary, but it does not require to
18 deborate the whole downcomer down to zero. I mean, it
19 is a very small deboration of the downcomer that gets
20 you to the CVC.

21 Furthermore, the return to power is
22 possible for the whole cycle, beginning of cycle,
23 middle of cycle, and end of cycle. The end of cycle
24 was analyzed. Maybe that's Chapter 15.0.6, I believe,
25 and we agree that was GDC-27.

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1 We agree that that was okay, that that
2 could not violate SAFDLs and everything would be okay,
3 but BOC and MOC return to power has not been analyzed.
4 The consequences are known, but the potential core
5 damage cannot be discarded.

6 You have 20 dollars worth of reactivity
7 with 14 times the volume of the core coming into the
8 core, coming into the core, coming into the core. It
9 has not been analyzed, okay, but the consequences are
10 terrifying.

11 Furthermore, the MCNP calculation, when
12 the staff asked the --

13 MEMBER KIRCHNER: For the record, Jose,
14 the consequences are unanalyzed.

15 MEMBER MARCH-LEUBA: The consequences are
16 unanalyzed, but 20 dollars worth of reactivity coming
17 into the core are terrifying, okay. I mean, it is --

18 MEMBER KIRCHNER: One more time, we need
19 to -- let's be objective, and this is just one
20 member's view. We're on the record.

21 CHAIR SUNSERI: And I would just add,
22 Jose, I mean, you are asking us or describing to us
23 facts as you put it, as you said. I don't know that
24 it's been established that the 20 dollars is a fact.
25 It's a supposition on your part. We heard a

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1 supposition from others of a different value, so --

2 MEMBER MARCH-LEUBA: Oh, no, no, hold on
3 a minute. Hold on a minute. That is a fact. At the
4 beginning of cycle, you have 1,200 ppm of boron in the
5 holders, and the boron coefficient varies from seven
6 to 14, and the recommended value to use from NuScale
7 is ten.

8 So, 1,200 ppm of boron results in 12,000
9 pcm of reactivity, which is 20 dollars, maybe 25
10 dollars. Some people said 21 dollars. Some people
11 said 29 dollars, and the staff in their SER says it's
12 29 dollars. That is a fact.

13 MEMBER RICCARDELLA: I object to the word
14 terrifying. I don't think that's a fact.

15 MEMBER MARCH-LEUBA: Okay, that terrifying
16 is not a fact, but if you insert that much reactivity
17 into the core and you don't do an analysis that tells
18 me that you have sufficient feedback reactivity, what
19 do you think is going to happen? I don't have an
20 analysis.

21 MEMBER BLEY: Jose?

22 MEMBER MARCH-LEUBA: Yes, sir?

23 MEMBER BLEY: Maybe this would go better
24 if you stick to your bullets.

25 MEMBER MARCH-LEUBA: Yeah, okay. So, back

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1 to the ability to make the core critical with this
2 front. When the staff asked NuScale to calculate how
3 far the deborated front had to move into the core
4 before it would get critical, using the standard
5 methodology that any other reactor would have to use,
6 which includes this stack rod, for example, they
7 calculated that when you get, and I don't remember the
8 exact number and it's proprietary, but a few feet into
9 the core, not even halfway to the core, it would reach
10 criticality.

11 As the flow progresses toward the end to
12 the top of the core, a tremendous amount of reactivity
13 gets inserted into the core and nobody has bothered to
14 analyze that condition.

15 Okay, Sandra, can you move to line 36, to
16 the top? There have been some arguments made by the
17 applicant and the staff that no mechanism exists to
18 drive the deborated downcomer water into the core, and
19 to me, they are unconvincing.

20 First and foremost, they are opinions from
21 the applicant, not calculations and not documented.
22 So, we are to the point at which designing the safety
23 of the reactor based on engineers' opinions, I don't
24 know where we're at for that now, okay. Secondly,
25 actuation of non --

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1 MEMBER KIRCHNER: Jose, this is Walt. I
2 don't want to quibble with words, but I'm going to say
3 that engineering judgment, not calculations. Clearly
4 the applicant and the staff have thought about this
5 very hard. We may have a differing view of their
6 interpretation, but I would not use the word opinion.
7 Let's give them the benefit of the doubt that good
8 engineering judgment is being applied to this issue.

9 MEMBER MARCH-LEUBA: It is undocumented,
10 unreviewed, and as far as we've been told orally by
11 these members, there are no calculations behind it.

12 I mean, we were told in the record in
13 early June that no calculation had been performed for
14 this. We were told on the record that no calculation
15 exists. This is my opinion.

16 I mean, calling it engineering judgment is
17 the same thing, but no calculation performed, no
18 calculation recorded, no calculation documented, no
19 calculation reviewed.

20 In my opinion, if you actuate any of the
21 three non-secondary systems that I talked about
22 yesterday, it would create sufficient extra pressure
23 in the top of the downcomer to push the 14 core
24 volumes of deborated water into the core, and on line
25 42 --

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1 MEMBER KIRCHNER: No, stop. Stop, Jose.
2 Remember, you prefaced this by facts, so let's stick
3 to facts. That's what's available. There is no -- we
4 haven't -- there is no way that has been demonstrated
5 for the 14 --

6 MEMBER MARCH-LEUBA: It is on --
7 (Simultaneous speaking.)

8 MEMBER KIRCHNER: -- times the core volume
9 to be instantaneously introduced to the core. So --

10 MEMBER MARCH-LEUBA: No, no, you said --

11 MEMBER KIRCHNER: And that's where we get
12 into what you're driving at, but don't --

13 MEMBER MARCH-LEUBA: You said
14 instantaneous. I never said instantaneous. When you
15 turn in CFDS, that's 100 gpm of liquid on the top of
16 the CMV, which then drives flow positive to the left
17 on the RRV, which now raises the level on the
18 downcomer and pushes the bottom of the downcomer into
19 the riser to raise the level higher, and that
20 calculation has been performed --

21 MEMBER KIRCHNER: That's a rate-dependent
22 thing if it's driven by external forces --

23 MEMBER MARCH-LEUBA: It is --

24 MEMBER KIRCHNER: -- and it may be a U-
25 tube manometer oscillation if it's driven by upsets

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1 within the system, so that's --

2 MEMBER MARCH-LEUBA: Have you --

3 MEMBER KIRCHNER: -- available. That's
4 available, I agree with you, but it's not clear that
5 all 14 volumes go through the core.

6 MR. NGUYEN: Excuse me, Chairman, we may
7 have a factual clarification that may aid in
8 discussion.

9 MR. BORROMEO: Yeah, hi, this is Josh
10 Borromeo from the staff. The volume of deborated
11 downcomer is 14 times the volume. It's the downcomer
12 plus the containment, and that's above the RV.

13 MEMBER MARCH-LEUBA: Above the RV, okay.
14 So, and all of that water is deborated, correct, you
15 are sure?

16 MR. BORROMEO: That's what Shanlai stated
17 in his presentation yesterday.

18 MEMBER MARCH-LEUBA: All right, what is
19 your opinion?

20 MR. BORROMEO: I haven't reviewed that.

21 MEMBER MARCH-LEUBA: Okay, my opinion is
22 all of that water is deborated. The bottom line is
23 whether it includes the CMV or not. It is a lot of
24 water that you can push into the core. Even if you
25 have some mixing, you are going to flash everything.

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1 But I won't say the 14 anymore, okay, but
2 you do confirm that between downcomer and whatever is
3 on the core, on the containment above RRV, you have
4 that much volume of possibly unborated water? So,
5 where were we?

6 So, if you have -- I'm on line 42, okay?
7 So, there are four -- yes, sir?

8 MEMBER BLEY: A question. All of that
9 deborated water used to be borated --

10 MEMBER MARCH-LEUBA: Correct.

11 MEMBER BLEY: -- without putting it in the
12 flooding system.

13 MEMBER MARCH-LEUBA: Correct.

14 MEMBER BLEY: And all of that boron that
15 used to be in that water remains in the core region,
16 right, or mostly?

17 MEMBER MARCH-LEUBA: In the core and
18 riser, correct.

19 MEMBER BLEY: Yeah, so back to what Walt
20 was saying, this really is a rate problem. Depending
21 on how fast you put in the borated water, either the
22 core sees unborated water or there's mixing, and if
23 there's good mixing, and we don't know that now, it
24 will never be worse than it started if you had
25 complete mixing.

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1 MEMBER MARCH-LEUBA: It is an interesting
2 theory. You have to have complete mixing with the
3 core and all of the riser because either can
4 accumulate in the core, either accumulated in the core
5 and riser.

6 So, you will have to mix all of that
7 deborated water. You have to mix it not just with the
8 core where it's coming through, but the other 15-foot
9 of riser. It's possible. It is possible. I don't
10 see any analysis that tells me that.

11 MEMBER KIRCHNER: Yeah, so, Jose, Dennis
12 is right. It's a rate and mixing problem, and
13 depending on what upsets the status quo, that will be
14 a major factor in the rate of mixing and injection, so
15 --

16 MEMBER MARCH-LEUBA: Okay.

17 MEMBER KIRCHNER: It's a difficult
18 problem, as Jose said, without a lot of documentation.

19 MEMBER MARCH-LEUBA: I'll agree. I'll
20 agree with everything you said, and now but I will ask
21 you, Walt and Dennis, have you seen any calculation of
22 what --

23 (Simultaneous speaking.)

24 MEMBER KIRCHNER: -- already documented
25 it. We've also -- and it was presented in view graphs

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1 by the applicant, and it's one of your upper bullets.
2 So, they did look at what the intrusion of clean
3 unborated water front into the core would do. And as
4 you point out --

5 MEMBER MARCH-LEUBA: No, they have not.

6 MEMBER KIRCHNER: -- by the time it
7 penetrates the core, probably just a foot-and-a-half
8 or so, I won't hang up on the exact number, you would
9 go critical and return to power again. It's in your,
10 one of your facts above, so they did --

11 (Simultaneous speaking.)

12 MEMBER KIRCHNER: -- do analysis.

13 MEMBER MARCH-LEUBA: Are you talking about
14 the MCNP calculation?

15 (No audible response.)

16 MEMBER MARCH-LEUBA: Okay, my point to all
17 of the members is --

18 MEMBER RICCARDELLA: Educate me. What is
19 MCNP?

20 MEMBER MARCH-LEUBA: MCNP is the Monte
21 Carlo --

22 MEMBER KIRCHNER: Monte Carlo, yeah,
23 neutron particular code. It's the benchmark standard,
24 Pete, in the industry. By the way, it's a Los Alamos
25 code.

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1 MEMBER RICCARDELLA: All right, thank you.

2 MEMBER MARCH-LEUBA: And that MCNP
3 calculation, it probably was extremely conservative.
4 I'll give you that.

5 So, as I said yesterday, there are four
6 non-safety grade systems, no, safety grade systems and
7 four non-safety grade systems which can inject borated
8 water in the core. Three of them put the water on top
9 of the downcomer and push the deborated water into the
10 core, okay.

11 So, if the ECCS injection line fails and
12 is not repairable, for example, if it breaks its high
13 containment, all recorded mechanism created unborated
14 core flow into the core, and not a single one of them
15 has been analyzed.

16 The SER has a very short paragraph that
17 makes a high calculation that says that the injection
18 of reactivity from this event will be roughly one
19 dollar per minute depending on whether one or two CFDS
20 pumps are started, okay, and if two CFDS pumps are
21 started, then it takes half the time, and that one
22 dollar keeps coming like the tide, okay.

23 The argument the staff makes there, and
24 this is not on the bullets, is that because it's only
25 one dollar per minute, the core will reach thermal

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1 equilibrium with that reactivity, and that feedback
2 reactivity will compensate for the positive reactivity
3 and everything will be okay, but no calculation is
4 performed of that.

5 I mean, 20 dollars of feedback reactivity
6 is a lot when one considers that what we call the
7 power defect, which is the fuel temperature at nominal
8 conditions, it's only three dollars.

9 So, three dollars of reactivity is all the
10 feedback you get from the fuel if you reach 100
11 percent power, and we're putting 20, 25.

12 And there are other feedback mechanisms.
13 There is a super cool and there is -- and you shut
14 down maybe at .98. There are other things that you
15 can create for, and if you do the analysis, you might
16 see that you can survive it, but I have not seen any
17 analysis. You have not seen any analysis.

18 We have been told in the June full
19 committee meeting that such analysis does not exist,
20 or didn't exist in June, so this is basically what the
21 paragraph on 48 says.

22 MEMBER KIRCHNER: May I add something?

23 MEMBER MARCH-LEUBA: Yes.

24 MEMBER KIRCHNER: My concern is, having
25 looked at this very hard like you have and a lot of

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1 other people have, what we have here after ECCS
2 actuation is a depressurized system, and we have a
3 standing manometer design at that point. We've got
4 two levels, one in the core, one in the downcomer.

5 So, with the perturbation of the system,
6 for example, the containment fill and drain system
7 being actuated, as Jose says, that will come in at a
8 certain rate that a static analysis would suggest is
9 about a dollar a minute or something as the staff has
10 reported, if the system returns to power in any way,
11 it will probably then create the potential for an
12 oscillation.

13 And then it's my -- this is not fact now.
14 I'm going into kind of just judgment and experience
15 with other systems, in this kind of situation where
16 you will get oscillations driven by power, the
17 feedback with power.

18 So, that's a concern and that's something
19 to be avoided, and that doesn't seem to have been
20 addressed either even --

21 MEMBER MARCH-LEUBA: It really has. It
22 has been addressed. I mean, the Peter Yarsky white
23 paper addresses those possibilities.

24 MEMBER KIRCHNER: Well, so, anyway, go on,
25 but --

1 MEMBER MARCH-LEUBA: Since you brought it
2 up --

3 MEMBER RICCARDELLA: But Walt, wouldn't
4 those oscillations also enhance mixing?

5 MEMBER KIRCHNER: They would.

6 MEMBER MARCH-LEUBA: Possibly.

7 MEMBER KIRCHNER: And this is where it
8 would be good to analyze whether they amplify or they
9 are self-extinguished, so to speak.

10 MEMBER RICCARDELLA: I understand. Thank
11 you.

12 MEMBER MARCH-LEUBA: Not a single
13 calculation exists that A, manometer type of
14 oscillation will assist. I would claim, and I don't
15 want to waste your time, Walt, but you're not right on
16 this.

17 The creation of voids in the core that has
18 not produced any change in the manometer because it
19 doesn't change the weight of the column. The creation
20 of voids creates oscillation when you have another
21 circulation loop, and the riser is uncovered and you
22 have another --

23 MEMBER KIRCHNER: Well, I disagree, but we
24 have -- neither of us analyzed the problem.

25 MEMBER MARCH-LEUBA: Yeah, yeah.

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1 MEMBER KIRCHNER: But the potential is
2 certainly there and --

3 (Simultaneous speaking.)

4 MEMBER KIRCHNER: -- if you had a large
5 return to power, you definitely would get an
6 oscillation.

7 MEMBER MARCH-LEUBA: If it's fast and you
8 have dynamic loads, but if you are going through a
9 slow raising power like we claim it as, one dollar a
10 minute, it will be minimal. And Peter analyzed it in
11 his paper and he --

12 MEMBER KIRCHNER: I don't claim it's a
13 dollar a minute. I'm just saying the potential exists
14 for it, so it --

15 MEMBER MARCH-LEUBA: Okay.

16 MEMBER KIRCHNER: -- remains unanalyzed.

17 MEMBER MARCH-LEUBA: All right, Dennis had
18 a question.

19 MEMBER BLEY: Yeah, I had a question and
20 a comment. So far, I don't have any objection to
21 anything I've seen in the written document you have
22 before us, except I agree with Walt. I'd change
23 opinion to engineering judgment.

24 Two other minor things, I know you like
25 talking in terms of dollars, but dollars are much more

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1 complicated than they might appear to somebody
2 listening to the discussion, and the amount of dollars
3 you get into the core region really has to do with all
4 of this flow, and possible mixing, and the rate at
5 which things are going.

6 And the other thing is you talk about 100
7 gpm, and just for everybody, that sounds like more
8 than it is. It's a couple of garden hose flow vents
9 really, but it's still 100 gpm.

10 MEMBER MARCH-LEUBA: And that's why it's
11 coming in slowly. It takes 2,000 seconds to fill the
12 whole core. I mean, what --

13 MEMBER KIRCHNER: Dennis' point though is
14 a good one for the record. These static equivalent
15 dollars of reactivity worth, this is a kinetics
16 problem. This is a dynamic problem.

17 It's not a static problem, so there is no
18 way physically to instantaneously introduce that much
19 reactivity, so it all depends, as Dennis said earlier,
20 on rate and mixing.

21 MEMBER BLEY: But the paper doesn't say
22 any of that so far. That's just been in the
23 discussion.

24 MEMBER MARCH-LEUBA: I wrote this paper
25 this morning at 7:00 a.m., okay, so let's not give it

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1 too much credit. The rate of -- if you enter CFDS,
2 there are three, two other ways that you could insert
3 deborated water into the core.

4 CFDS is the one that was addressed in the
5 SER and they calculated the flow rates, and estimated
6 that the front, if it doesn't mix, would take 2,000
7 seconds to cover the whole core, and that would result
8 in roughly one dollar a minute of reactivity
9 insertion, which is not dynamic.

10 I mean, that essentially causes static.
11 So, at every second as the ramp comes in, the reactor
12 will reach an equilibrium condition where it produces
13 sufficient feedback to compensate for however much
14 reactivity you have introduced.

15 And the only number we know for reactivity
16 is when before the front starts and the k-effective is
17 whatever, whenever the front reaches to the top and
18 you have a deborated condition in the core, that
19 number has been calculated in Chapter 4 of the FSAR
20 and is 10 pcm per ppm and is roughly 20 dollars.

21 So, at the outset, how -- whether the ramp
22 is linear, or exponential, or something in between, I
23 don't know, but all --

24 MEMBER KIRCHNER: But that, again, Jose,
25 that's a very misleading thing to go to. That's just

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1 a static number. That's the potential maximum worth
2 if you somehow instantaneously replaced the black
3 boron concentration with a cold front in the entire
4 core. That's nice, but it's not relevant here to the
5 discussion.

6 MEMBER MARCH-LEUBA: I don't understand
7 you, Walt. Anyway, can I continue?

8 MEMBER KIRCHNER: You can continue, but,
9 you know, we really need to be careful here because
10 there's no credible mechanism to take what's
11 essentially a heavily borated core and replace it
12 instantaneously with cold deborated water. That's the
13 only way you could get to that number you're citing.

14 MEMBER MARCH-LEUBA: I --

15 MEMBER KIRCHNER: So, I don't find that
16 very relevant to this discussion.

17 MEMBER MARCH-LEUBA: Okay, Walt, let's try
18 to convince you because -- okay, so let's do a miracle
19 and we start injecting this ramp one dollar per
20 minute, we know that, slowly, and 2,000 seconds, and
21 according to you, nothing happened to the core, and
22 2,000 seconds later --

23 MEMBER KIRCHNER: No, the core is going to
24 react to that. It's not --

25 MEMBER MARCH-LEUBA: But listen --

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1 MEMBER KIRCHNER: -- going to --

2 MEMBER MARCH-LEUBA: Listen, listen, yeah.

3 MEMBER KIRCHNER: It's not going to be
4 passive.

5 MEMBER MARCH-LEUBA: Yeah, listen to my
6 question. Two thousand seconds later after all of
7 those core reactions, the whole front will have moved
8 all the way to the top of the core. What --

9 MEMBER KIRCHNER: Where will that have
10 gotten critical and returned to power long before
11 then.

12 MEMBER MARCH-LEUBA: Well, that's my
13 point. That's my point. Shandeth, you are muted.
14 That's my point, that you're never going to get here,
15 but --

16 MEMBER KIRCHNER: At this point though,
17 let's stick with the facts as you have stated. Let's
18 not do the analysis here in real time. Let's go
19 through the rest of your --

20 MEMBER MARCH-LEUBA: Walt, Walter --

21 MEMBER KIRCHNER: -- talking points.

22 MEMBER MARCH-LEUBA: You're questioning
23 basic physics, okay? If --

24 MEMBER KIRCHNER: I'm not questioning
25 them. That's what's theoretically available. I'll

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1 agree with you.

2 MEMBER MARCH-LEUBA: Try to think --

3 MEMBER KIRCHNER: Let's move on and go
4 through this.

5 MEMBER MARCH-LEUBA: Try to think through
6 this, through the problem, okay?

7 MEMBER KIRCHNER: I've thought through it
8 as much as you have, so go through the --

9 MEMBER MARCH-LEUBA: Okay, but at least
10 let me put it on the record for all of the people that
11 are willing to listen, okay? At the end of the 2,000
12 seconds, you will have, the front will have reached
13 the top of the core, and the k-effective, the
14 calculations from NuScale tells us, will be 12,000 pcm
15 higher than it was at the beginning.

16 That's what the boron -- so if nothing
17 happened to the core and you are able to reach, the
18 front is able to reach to the top of the core, the k-
19 effective will be 12,000 pcm higher, and that --

20 MEMBER KIRCHNER: What I'm trying to say
21 is I agree with you, but in a physics sense, in a real
22 system when you analyze it, that's not what will
23 happen. The core will react to that --

24 MEMBER MARCH-LEUBA: Yeah.

25 MEMBER KIRCHNER: -- and go critical

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1 before as we -- you already -- and on the top, which
2 is out of view right now, the MCNP calculation
3 suggests that the reactor goes critical within a foot-
4 and-a-half or something of the entrance of the front
5 into the core.

6 So, you're not going to get that entire
7 core deborated. It's going to go critical and return
8 to power, and then what do you think is going to
9 happen? It's going to --

10 MEMBER MARCH-LEUBA: Well, what I think is
11 going to happen is the front will continue to borate
12 because you're still pushing it. You will continue to
13 put more borated water and it will increase, and it
14 will increase the k-effective which will have to be
15 compensated by some feedback from fuel temperature
16 voids, and it will continue to go up, and up, and up.

17 At the end, if you are able, if you
18 haven't been able, all of this racing of the core
19 slowly, in equilibrium because it's going slowly, if
20 you've been able to provide feedback, at the end, you
21 will have 12,000 pcm extra caused by the boron and you
22 will have to compensate those 12,000 pcm by reactivity
23 feedback from fuel temperature and void.

24 And I'll tell you that the total
25 reactivity feedback I have available from fuel, when

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1 I reach the 100 percent operating power temperatures,
2 is three dollars.

3 MEMBER KIRCHNER: That's a static problem
4 you're describing. This is a dynamic situation.

5 MEMBER MARCH-LEUBA: It is -- okay, my
6 argument is I don't know what happens. I haven't seen
7 a calculation that shows that it's not a problem.

8 MEMBER KIRCHNER: Good.

9 MEMBER MARCH-LEUBA: And the potential --

10 MEMBER KIRCHNER: I accept that.

11 MEMBER MARCH-LEUBA: And the potential
12 exists. These are outrageously high reactivity
13 numbers.

14 MEMBER KIRCHNER: Okay.

15 MEMBER MARCH-LEUBA: The potential exists
16 for --

17 MEMBER KIRCHNER: I agree. That's it.
18 The potential exists, that's why we're concerned, that
19 we could have a reactivity insertion accident, return
20 to power, and potential core damage. I would prefer
21 we phrase it like that and not say we have -- make
22 these statements about dollars of reactivity that are
23 available.

24 MEMBER BALLINGER: This is Ron. Let me
25 ask a metallurgical question. Once the reactor goes

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1 critical again, don't we start adding heat?

2 PARTICIPANT: Yeah.

3 MEMBER KIRCHNER: That's my point.

4 MEMBER BALLINGER: When we start adding
5 heat, don't we mix the daylights out of things?

6 MEMBER KIRCHNER: Well, to be analyzed,
7 Ron.

8 MEMBER MARCH-LEUBA: What do you mean by
9 that? Okay, what I'm telling you is whenever -- to
10 achieve three dollars worth of reactivity feedback
11 from the fuel, you need to raise it to the temperature
12 of 100 percent operating power. That's what is called
13 the power defect, okay.

14 And if you have the fuel at the conditions
15 of 100 percent power with no flow, the calculations
16 hasn't been performed, but I can tell you the specific
17 facts for the limits are going to be difficult to meet
18 with fuel at 100 percent power conditions and no flow,
19 and this is only three dollars. You got more water
20 coming.

21 This cannot be left unanalyzed, just
22 period. It cannot be left unanalyzed. The potential
23 is to be very bad.

24 MEMBER KIRCHNER: And I think there, we
25 agree, Jose. Let's go through the rest of the paper

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1 here.

2 MEMBER MARCH-LEUBA: All right, so --

3 MEMBER KIRCHNER: We're in the analysis
4 mode, not in the facts mode.

5 MEMBER MARCH-LEUBA: Okay, so we've said
6 that we don't have an analysis to guarantee that if
7 you start any of these three non-safety grade systems,
8 the CVCS or CFDS, we don't know if it is safe or not,
9 okay. I mean, we don't have any analysis. The
10 potential exists that it can be really bad, and we
11 don't have any analysis, okay.

12 And yesterday, the applicant said, well,
13 don't worry about it. We will start putting some
14 borated water in the downcomer and we will monitor the
15 core. When it gets critical, we'll stop putting it
16 and we'll let it mix, and then we'll let it wait for
17 an hour and then add more, and we will continue to
18 monitor --

19 MEMBER KIRCHNER: Jose, Jose, they did not
20 say that, so --

21 MEMBER MARCH-LEUBA: Yes, they said that.

22 MEMBER KIRCHNER: -- let's --

23 MEMBER MARCH-LEUBA: Yes, they said that.

24 MEMBER KIRCHNER: They said they would
25 respond with these systems that were available to

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1 them. They didn't do the scenario you just did, so
2 let's --

3 MEMBER MARCH-LEUBA: They said the only
4 instrumentation they will have available to perform
5 the recovery was the core monitoring instrumentation,
6 which is the source range, hopefully the source range
7 flux sensors, and the only time those respond is when
8 you reach criticality. So, that's what they were --

9 MEMBER KIRCHNER: That's correct.

10 MEMBER MARCH-LEUBA: -- proposing
11 yesterday.

12 MEMBER KIRCHNER: Yeah.

13 MEMBER MARCH-LEUBA: Yeah, that's correct.
14 So, they will -- they say that you could -- I mean,
15 they were thinking on the fly because they don't have
16 procedures and they have not thought what you can
17 possibly do as they say, but if we keep adding borated
18 water to the downcomer, it will eventually mix because
19 when the source range detectors tell us that we're
20 critical, we'll stop. Jesus Christ, okay.

21 MEMBER KIRCHNER: Jose, let's be
22 professional, objective, and to the facts. Let's
23 stand down.

24 MEMBER MARCH-LEUBA: These are the facts.
25 These are the facts. The proposal that we had

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1 yesterday is we can possibly develop some procedures
2 that add borated water to the downcomer until we
3 detect criticality in the core, at which point, we'll
4 do something.

5 MEMBER KIRCHNER: Yes, so, agreed, so
6 let's investigate that further. You haven't covered
7 your instrumentation.

8 MEMBER MARCH-LEUBA: Yeah, I know. So, in
9 line 63, I wanted to make a point, a clear point that
10 even though the procedures are developed, are at the
11 COL stage, I think it's incumbent on the applicant and
12 the staff to figure out that there is one clear
13 success path to position to move forward and later to
14 modify.

15 Because whenever you have a LOCA inside
16 containment, the only possible way to fix that is to
17 take the module to the refueling station. To take the
18 module to the refueling station, you have to be in
19 Mode 4 where you are requested to have something like
20 1,700 ppm of boron, which you don't, and you need to
21 add boron.

22 And any way you add borated water, if you
23 have a break on the injection line, it creates this
24 possibility of recriticality. So, I don't see a clear
25 success path to transition to Mode 4.

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1 MEMBER KIRCHNER: I do. I thought we were
2 doing facts. I withheld my own. I have a suggestion
3 to avoid this, but I thought we were doing facts and
4 not --

5 MEMBER MARCH-LEUBA: Okay, it is fantastic
6 that you have some, and let me use the word again,
7 opinion, or engineering judgment. I want to see a
8 final safety analysis report written under Appendix B
9 requirements that tells me what they're going to do.

10 MEMBER KIRCHNER: Okay, right. So, let me
11 interject it then because I withheld earlier. Look,
12 the problem, as we're agreed, we feel -- once again,
13 I'm repeating myself. We feel with the riser holes,
14 they have solved the issues of deborating the
15 downcomer in the DHRS. That's for the record, the
16 decay heat removal system mode.

17 The analysis by the applicant and the
18 staff, I think, are sound. A figure of merit was used
19 by the staff on critical boron concentration at 72
20 hours, and they showed what, in my engineering
21 judgment, not my opinion, is a sufficient margin to
22 critical boron concentration.

23 Now, we're on the ECCS side of the
24 scenarios. I had both the applicant and the staff
25 estimate that the deborating of the downcomer would

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1 take hours. It probably would happen faster than the
2 envelope of 72 hours.

3 So, does one leave the system in this
4 passive mode or does one intervene? I suspect that
5 one can make a calculation just like was done for the
6 decay heat removal side of the equation and look at
7 the time that is available before, with margin, like
8 a 200 ppm equivalent at beginning of life, maybe 100
9 ppm margin again at middle of cycle.

10 Calculate what the time is to that point
11 and then just institute a tech spec that says you have
12 insufficient margin and you intervene. If they
13 intervene early, they can get out of this dilemma. If
14 they leave it passively --

15 (Simultaneous speaking.)

16 MEMBER KIRCHNER: -- for a long time, then
17 you're exactly right. Then the, as you once put it
18 very eloquently, it's a very delicate set of
19 operations to get out of the fix you're in. So, I do
20 believe there is a fix, and I've suggested this
21 before.

22 I don't know if tech specs is the way you
23 accomplish this, but you have done the analysis, and
24 they have done analysis, and you know when you have
25 insufficient margin in the downcomer in terms of --

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1 versus critical boron concentration, and one
2 intervenes.

3 And if one intervenes early enough, then
4 we don't have this potential of inserting this cold
5 front of deborated water in, a potential reactivity
6 insertion accident and potential core damage. So --

7 MEMBER MARCH-LEUBA: And Walt --

8 MEMBER KIRCHNER: -- that's my fix.

9 MEMBER MARCH-LEUBA: Yeah, I see. I
10 understand what you're saying. I have two questions
11 for you. First, where can I -- in which part of the
12 SER would I find the review of that procedure? That
13 procedure does not exist, right?

14 MEMBER KIRCHNER: No, it doesn't exist.
15 Like I said, now I'm going beyond facts to solutions.

16 MEMBER MARCH-LEUBA: And question two is
17 what safety-grade power would you be using to do that?
18 Okay, I'm sorry I was facetious with that. I have a
19 better solution, by the way.

20 MEMBER KIRCHNER: They do have a highly
21 reliable electrical power supply. We've reviewed
22 that.

23 MEMBER MARCH-LEUBA: So --

24 MEMBER KIRCHNER: The options exist for
25 them to intervene.

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1 MEMBER MARCH-LEUBA: And AC power will
2 likely exist and they have DC generators, but those
3 are not the rules. I mean, if it's important to
4 safety, it has to be safety grade, and we don't --
5 we're run analysis with what they say is safety grade,
6 and it's not safety-grade power to actuate any of this
7 equipment.

8 CHAIR SUNSERI: Walt --

9 MEMBER MARCH-LEUBA: You can only actuate
10 them if they are bad for you. If they are good for
11 you, you cannot take credit for it.

12 MEMBER KIRCHNER: Well, let's get out of
13 Chapter --

14 CHAIR SUNSERI: Walt, Walt, Walt, this is
15 Matt. Walt and Jose, I want to just know when are we
16 -- we need to wrap up the --

17 MEMBER MARCH-LEUBA: Okay.

18 CHAIR SUNSERI: -- the discussion from
19 Jose and allow other members to speak on this. And
20 I'm not trying to cut you off, but I'm starting to
21 hear circular discussions here, and we're going around
22 and around on the same old stuff.

23 And I don't mean to be so casual with this
24 important stuff, but I'd like to hear what other
25 members have to say about this.

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1 MEMBER MARCH-LEUBA: Can I finish this?
2 I'm almost done --

3 CHAIR SUNSERI: Yeah, yeah.

4 MEMBER MARCH-LEUBA: -- if Walt doesn't
5 interrupt me, okay.

6 CHAIR SUNSERI: Yeah.

7 MEMBER MARCH-LEUBA: So, instrumentation,
8 bottom line, there is no instrumentation that could
9 measure boron redistribution, period. There is a
10 single point where you can measure boron concentration
11 and it's not likely to work when you are --

12 I have seen no evidence that it works when
13 you are in post-ECCS conditions, so the operator is
14 flying blind, okay.

15 I find the suggestion by the applicant
16 yesterday that they could use the source range flux
17 detectors to detect criticality and therefore assume
18 what the boron distribution is extremely dangerous.

19 Sandra, can you move to the next section?
20 And I thought this was not going to be an open
21 session. Well, positive void coefficient you heard me
22 say before nobody knows what the void coefficient is
23 when this front comes in.

24 I can argue that there is a critical boron
25 concentration above which it is positive. We know the

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1 void coefficient is positive for concentrations larger
2 than 1,200 to 1,400 ppm. I cannot say the void
3 coefficient is negative when this front comes in, and
4 I have not seen an evaluation and I think that is
5 negligent. Risk evaluation --

6 MEMBER KIRCHNER: Jose, Jose, since you've
7 used static reference points, I'll use one. The cold
8 front coming in will have a negative void coefficient.
9 It's only the boron, presence of boron that makes void
10 coefficient positive, and that's only under certain
11 circumstances.

12 MEMBER MARCH-LEUBA: Can you point me to
13 the calculation that shows that it's negative?

14 MEMBER KIRCHNER: Jose, you've made the
15 point about the availability of calculations enough
16 times. I'm just saying that cold water in an under-
17 moderated core like this, forget there's any boron
18 present, is a negative void coefficient.

19 MEMBER MARCH-LEUBA: And I claim the
20 contrary when you have a highly heterogeneous core
21 with boron on top, but let's not waste time with --

22 (Simultaneous speaking.)

23 MEMBER KIRCHNER: I said -- you're not
24 listening to me. I said when you have deborated
25 water, the void coefficient is negative.

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1 MEMBER MARCH-LEUBA: You don't have
2 deborated water. You have half of the core is
3 deborated and half of the core is highly borated, and
4 half of the --

5 MEMBER KIRCHNER: I understand that.

6 MEMBER MARCH-LEUBA: -- core happens to be
7 on top. Okay, and so I just haven't seen a
8 calculation, okay? I haven't seen a calculation, so
9 we don't know whether it's positive or negative. So,
10 taking credit for negative reactivity feedback when
11 that one dollar per minute ramp comes in is
12 unsupported by facts, period.

13 Risk evaluation, the applicant chose not
14 to do a risk analysis for deboration conditions,
15 period. I mean, and in the diverging opinion that we
16 heard yesterday, a cognizant staff engineer that has
17 been reviewing this from the beginning thinks that the
18 core damage frequency is seven orders, up to seven
19 orders of magnitude larger than what is advertised.

20 That's what he thinks, and he has some
21 calculation, hand calculation of that. I just cannot
22 comprehend why this risk was not part of the scope of
23 the PRA.

24 What we cannot say, and I thought we were
25 going to be doing this in a closed session among ACRS

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1 members, but if they have drilled four holes at the
2 RRV location, you will not have a boron deboration
3 issue, and you will not have to do all of these
4 calculations and you won't have to justify anything.

5 And it has minimal impact on anything
6 else, so I just cannot comprehend why they didn't do
7 it and that's what's driving me crazy.

8 So, my recommendation, right now, we don't
9 have any calculation whatsoever that suggests that
10 this situation is safe. Deboration the downcomer,
11 parking up to 20 dollars worth of reactivity at the
12 core inlet waiting for perturbation is, frankly,
13 irresponsible.

14 So, my recommendation is the staff should
15 care about the downcomer deboration and not certify it
16 as safe because they don't have the analysis to
17 justify that it is safe. Okay, I'm done. Matt, your
18 turn.

19 MEMBER KIRCHNER: Thank you, Jose. Thank
20 you very much actually, and for the spirited
21 discussion. I think I would like to turn, Mr.
22 Chairman, next to Dave Petti, who has given this also
23 considerable thought. And Dave, if you would like to
24 use the viewgraph you prepared, I think the staff is
25 ready to put it up.

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1 MEMBER PETTI: Sandra, please put it up.
2 So I tried to categorize all the different things
3 we've heard, and we hear in words. And I'm a visual
4 person so I like these sorts of things because it
5 helps my thinking.

6 MEMBER KIRCHNER: Dave? Dave --

7 MEMBER PETTI: Yes.

8 MEMBER KIRCHNER: -- pardon my
9 interruption. Can you speak more directly into your
10 microphone? We're getting a weak audio signal.

11 MEMBER PETTI: Is this better? Can you
12 hear me?

13 MEMBER KIRCHNER: Somewhat. Just a little
14 more --

15 MEMBER PETTI: Oh, I know what the problem
16 is, hold on. It's a fan from the other computer
17 drowning out this. Give me a minute to move my
18 computer around. Is this better?

19 MEMBER KIRCHNER: Yes.

20 MEMBER PETTI: Okay. So, on the top left
21 of the figure are the two event sequence families, if
22 you will. Those associated with decay heat removal
23 and then ECCS.

24 Come down from the decay heat removal by
25 show in yellow what the changes were in the design,

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1 the setpoint changes in the riser holes that we talked
2 about, the two analytical bounding methods that were
3 presented by NuScale and confirmed by the Staff. And
4 so, that's sort of okay for those events.

5 If you come down for the ECCS or LOCA
6 event, before ECCS actuation, the setpoint changes in
7 the riser holes had to do the same thing. The real
8 question, as we've heard already, is what happens
9 after actuation of the ECCS and the deboration.

10 I just want people to realize that the
11 results that were presented by NuScale in the March
12 meeting were DBA calculations using conservative rule
13 sets. We heard about it in the March 2020
14 Subcommittee.

15 And those were okay, but they really
16 weren't addressing this issue, they were really
17 looking at the core and potential return to power.
18 And so, as is typical in DBA calculations, a bunch of
19 conservative assumptions were made that are highly
20 stylized in terms of when you think about what's
21 actually, what actually would happen versus what
22 happens in a stylized step, Chapter 15 analysis.

23 And the real question that came up as a
24 result of that, these recovery actions path of
25 strategy. And we'll come back to that.

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1 But after actuation there's a whole series
2 of potential beyond design basis events that one needs
3 to consider the influence of the down, of deblowing
4 the downcomer.

5 The NRC Staff, Dr. Yarsky, put together a
6 very nice White Paper I thought that did exactly what
7 Dennis and we were talking about earlier about looking
8 across the spectrum of events. Are there any events,
9 how could we have water get into the core, deborated
10 water get into the core.

11 And he systematically went through all of
12 the different options. And he used engineering
13 judgement which I think is a good thing here.

14 But as we heard more about his analysis
15 and his engineering judgment, what struck me was that
16 a simple one-dimensional RELAP calculation with point
17 kinetics ain't going to get you there. And I'm
18 worried that intuition, lots of us have intuitions
19 based on code calculations.

20 And those intuitions can be long because
21 this is not like other reactors. We heard about the
22 mixing and the oscillatory flow behavior, how much and
23 how fast can the downcomer water come in.

24 There are all of these kinetically
25 activity issues. This is not a simple analysis. If

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1 it were a simple analysis I think someone would have
2 been able to develop some recovery actions that need
3 calculations to help guide what it is you're going to
4 do.

5 And so, that multi-dimensional analysis is
6 a 3-D, probably a RELAP-5 3-D or TRACE 3-D calculation
7 and I think it's probably space time kinetics.

8 I do appreciate the verbal discussion we
9 had yesterday with Dr. Yarsky where he, in the White
10 Paper talked about all these things and took what I
11 call the flow mixing approach and walked through how
12 we thought things would evolve.

13 Then verbally we went into this sort of
14 other end of the spectrum. Okay, let's assume we have
15 a stratified core with a very black area with the
16 borated water and unborated water coming in from the
17 bottom.

18 And he talked about the physics effects,
19 trying to look at it from both extremes. So the
20 question is, when you add this, when you boil this all
21 down, where are we really. I think it's hard to say.

22 I appreciate the comments about having to
23 do an analysis, but I don't think it's easy. This is
24 probably pushing nuclear codes more in a way that have
25 not been used in the past because of the uniqueness of

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1 the system.

2 And so, getting to those recovery actions
3 is something that can't happen at the DCA stage but is
4 going to have to happen at the COL stage. And it's
5 going to take some calculations.

6 So that's, it's the red box where all the
7 discussion was. And we got a lot of different
8 opinions and engineering judgment on what actually
9 will happen there.

10 I'm not convinced that if three-
11 dimensional calculations are done that it just doesn't
12 confuse us on a higher plain, if you will. Because
13 people will argue that, well, it's a co-calculation
14 and I don't like this co-calculation for this reason,
15 I don't like it for that reason.

16 I appreciate Dr. Yarsky's analysis because
17 it was at a higher level and tried to stick with first
18 principles in the approach. I found my profession as
19 I found the analytical, a bounding method showed
20 NuScale refreshing.

21 And so, that was just sort of where I
22 thought we ended up. And so I thought this sort of
23 captured it, tried to capture it, to know where the
24 problem is and where the problem is not.

25 MEMBER MARCH-LEUBA: Dave, I have --

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1 MEMBER KIRCHNER: Thank you, Dave.

2 MEMBER MARCH-LEUBA: -- a couple of
3 comments. Guys, go ahead, Walt.

4 MEMBER KIRCHNER: Yes, go ahead.

5 MEMBER MARCH-LEUBA: Everything I've been
6 talking about is a purple box on the top corner. I
7 didn't even know anything to be done to DBA.

8 So, everything I went through, obviously
9 I did not do a good job of communicating, is --

10 MEMBER KIRCHNER: No, Jose, I think you
11 did.

12 MEMBER MARCH-LEUBA: Well --

13 MEMBER KIRCHNER: I agree with you, Jose,
14 that we don't need to go beyond DBA space to have the
15 purple box concerns.

16 MEMBER PETTI: Right.

17 MEMBER MARCH-LEUBA: Yes.

18 MEMBER PETTI: Because I think what my
19 point is, that you can't use the rule sets of DBA to
20 develop those actions, you're going to have to go best
21 estimate which is kind of DBA --

22 MEMBER KIRCHNER: I agree, Dave.

23 MEMBER PETTI: So what I would have done
24 last night, I thought about this, is put a dotted line
25 from the red box up to the recovery because that's

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1 what's going to inform recovery because you need the
2 actual response of the core not the stylized DBA
3 response, if you will.

4 MEMBER MARCH-LEUBA: Right. But my
5 question to you, Dave, is what, number one is
6 establish a fact. Do you believe that after ECCS is
7 actuated the downcomer will deborate?

8 MEMBER PETTI: Yes.

9 MEMBER MARCH-LEUBA: And it will do so
10 within 72 hours?

11 MEMBER PETTI: Yes.

12 MEMBER MARCH-LEUBA: So I hear a yes. And
13 then, what confidence do you have, the operator can
14 move into Mode 4 to start the recovery from the
15 accident.

16 What basis do you have to have confidence
17 that once you put yourself in this, first of all its
18 unstable, but precarious condition where you have all,
19 nothing but the water in the core, what confidence do
20 you have that the operator can move into Mode 4 and 5?

21 I have no confidence. I mean, I think, my
22 gut feeling, we figure out a way to do it. I just
23 have no documentary evidence that it can do that.

24 MEMBER PETTI: So to me, this gets down to
25 a question of how much do you need to make the

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1 assessment. Does Dr. Yarsky's approach cover all the
2 basis and provide reasonable assurance.

3 MEMBER MARCH-LEUBA: Well --

4 MEMBER PETTI: Absolutely. Because when
5 I hear calculations, my mind thinks you're looking for
6 a much greater level of assurance than I, as I have
7 understood reasonable assurance.

8 MEMBER MARCH-LEUBA: We were captured
9 under the discussion yesterday with Dr. Yarsky. But
10 I still disagree with the statement in the SER on the
11 statement that Walt makes, that if you put \$1 per
12 minute of the activity with as much as 20 behind it,
13 that because it's slow miraculous feedback will
14 happen. And it will compensate for all those,
15 eventually \$20 when you reach it in 20 minutes.

16 I strongly disagree with that standard, I
17 did. Because it's, basically it's completely
18 baseless. He does not say that that's about to
19 happen.

20 What he says is that there won't be a
21 prompt criticality event, which will immediately cause
22 fuel failure. But he does not make a study of, do you
23 put in dollars and dollars in there, how much feedback
24 do you need to compensate for it.

25 Especially because he doesn't know where

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1 the word coefficient is. Nobody has calculated it.
2 He doesn't know what coefficient is, nobody has
3 calculated it.

4 CHAIR SUNSERI: This is Matt. And I know
5 that there will be probably all kinds of reasons why
6 I'm not right on this but, at least in my mind, from
7 a operating perspective, I mean, the assumption here
8 is that you're putting on to be a course led trained
9 system or whatever.

10 And you're just kind of letting run at 100
11 gallons per minute. And --

12 (Simultaneous speaking.)

13 CHAIR SUNSERI: So, can you hear me now?

14 MEMBER KIRCHNER: Go ahead, Matt.

15 CHAIR SUNSERI: Okay. So, I mean, there
16 is other ways to do that just besides turning on the
17 system and letting it run.

18 And I disagree with the fact that the
19 source range instrument if they're not going to be
20 that useful. I mean, we use them all the time to
21 monitor the approach to criticality.

22 So, I mean, why couldn't the operator turn
23 on the DRS, or whatever the system is, the flooding
24 system, monitor source range instrument, look for flex
25 doubling. If they think there is an approach to

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1 criticality, turn on the system and let it mix a
2 little bit. There are ways to recover this without
3 just turning it on and letting it run.

4 MEMBER BALLINGER: Well, yes, this is Ron.
5 I've been struggling with this for weeks now. And I'm
6 listening to people argue over, it's 100 gallons a
7 minute, if it's 50 gallons a minute, if it's this many
8 pcm or that many pcm.

9 The red box, at least in the metallurgist
10 outlook, is a quagmire, right. And we're reduced to
11 the point where it's the purple box that's important
12 in cutting off the head of the snake, which is the red
13 box.

14 And that is, now we're in to, we have a
15 tendency sometimes, applicants do, have a tendency to
16 say, we're going to push this off to the COL stage.
17 And that's all well and good.

18 It's just that what I worry about is that
19 when you say, in this particular case, that we push it
20 off to the COL stage, we need to be sure that in fact
21 if we do push it off to the COL stage that there
22 actually is a path to recovery considering human
23 reliability, now we're into all of that sort of
24 subjective stuff.

25 But it's important in this case, unlike

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1 other DCAs that we've seen, or at least that I've
2 seen, we're pushing certain things off to the COL
3 stage. You can do it because there's a pretty good,
4 there's a pretty good reasoning that in fact at the
5 COL stage it will be solved.

6 So my question would be, is it possible to
7 cut the head off of the red box snake by the recovery
8 actions path and can we assure ourselves that if that
9 is the COL stage that somebody wants to build one of
10 these things doesn't end up getting themselves in a
11 box with no exit.

12 You know, and that's a very simplistic
13 kind of discussion, but anyway.

14 MEMBER PETTI: So, Ron, my answer, which
15 is in some text that I've, well, that guys I think got
16 a copy of, is that you have to go into the quagmire to
17 inform the purple box. Because right now, any other
18 approach you're not going to know.

19 And so while we would like to have a
20 strategy, not necessarily a defined path or action,
21 it's called wildly overcoming a strategy, it's under-
22 informed right now until you, unless you can get into
23 the red box in some way.

24 MEMBER BALLINGER: Yes. I mean, I have no
25 doubt that we're going to get into the red box.

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1 MEMBER PETTI: Yes. I mean, I'm with you,
2 I'd like to --

3 MEMBER BALLINGER: My question is --

4 MEMBER PETTI: -- that.

5 MEMBER BALLINGER: My question is, I guess
6 I'm thinking along the same lines as Matt. That we
7 got to be sure that if we get into the red box and
8 never get out of the red box, to anybody's
9 satisfaction, to our satisfaction, that the recovery
10 path is still an option that will work. And that it
11 will work in a reliable fashion.

12 I know I keep saying PRA and human
13 reliability, but that's where we end up being.

14 MEMBER RICCARDELLA: Okay, I agree. This
15 is --

16 (Simultaneously speaking.)

17 MEMBER RICCARDELLA: I agree with Dave
18 Petti that we need to eventually, we need to get into
19 the red box and do that analysis to inform the purple
20 box. But I guess the question is, how much of that is
21 really necessary at the DCA stage.

22 They're not going to do the procedures
23 that are the recovery actions until the COL stage.
24 And there's plenty of time to do all of the analyses
25 in the red box between the DCA and the COL stage.

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1 That's my opinion.

2 MEMBER DIMITRIJEVIC: Okay, I would like
3 to give some Chapter 19 perspective from the risk.
4 Can I do this, will everybody --

5 CHAIR SUNSERI: Go ahead, Vesna.

6 MEMBER RICCARDELLA: Okay. This is, I was
7 going to write this but I was hoping that I will have
8 a chance to ask Pete some questions.

9 So from the, but since I don't, and I did
10 not even provide the comment to describe that, but I
11 have it in front of me.

12 The PRA needs a clear, for PRA is very
13 good with facts because we need a pretty clear
14 definition, you know, to develop model, what's
15 happening.

16 So we need to understand process in order
17 to, process is not in the pH sense, like you guys are
18 discussing but is what is actually happening, which
19 could produce those power exclusion. In what we call
20 scenarios, right.

21 So, so the facts is that at this moment
22 I'm not sure because I heard the two contradictory
23 presentations. One is to say, and Pete did his study
24 assuming that we have a stuck rod. Right.

25 Is the version opinion assume that this

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1 can also could without stuck rods. So, that's a very
2 important question from this perspective because stuck
3 rod put everything in the low frequencies.

4 So, I don't know, do we, I don't, at least
5 I don't in this moment know the issue is, prolong ECCS
6 injection issue without stuck rod.

7 MEMBER KIRCHNER: Vesna, I think, and Jose
8 will join in, I think you can have this potential
9 return to criticality without the stuck rod.

10 MEMBER DIMITRIJEVIC: Okay, that's, I just
11 want to say fact is that I don't know that for sure
12 because I heard the two different, I mean, analyzing
13 is, by the Dr. Yarsky, was clearly done for small-
14 break LOCAs with stuck rod.

15 All right, so that's my first question.
16 And very important from this perspective.

17 The second question is, main point here is
18 connected, it can happen with the delay ECCS injection
19 and also with prolong ECCS injection. Right?

20 And maybe stuck rod rule is different for
21 those two, I don't know.

22 In any case, in both cases, I mean, it
23 could be different events and it could be different
24 assumptions, but I don't really have any good feeling
25 about time brackets we are talking. Because sometimes

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1 I hear less than 72 hours, sometimes I hear 14 days
2 for prolong ECCS injection.

3 And it is a very important to know, I know
4 we cannot really determine the time because it's
5 depending of entering conditions that we have nearly
6 some feeling of what time bracket we are discussing.
7 So, I don't think that this is answered in this
8 moment, Pete, so I don't think I know this fact.

9 The second thing is, at least I am telling
10 what facts I don't know. Maybe some of the Committee
11 feels different about this.

12 Then we discuss CVCS or CFDS non-safety
13 injection. Obviously we can have delay CVCS and
14 potential CFDS to delay ECCS injection. And those are
15 very likely to happen because if ECCS does not
16 actuate, the operator help to actuate one of those
17 systems, CVCS in the normal LOCA and CFDS if you have
18 a LOCA outside of the containment.

19 I am not sure that, is it clear to me, is
20 that the issue or not. In the PRA presentation it was
21 defined not as the issued. That's one of the
22 scenarios very common in PRA.

23 And then when it comes to prolong ECCS
24 injection, where they stated that they don't see the
25 way to bring the water into the core, there was, in

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1 this divergent opinion there was the estimate or some
2 probability. That probability is very important.

3 The way to do, to bring this water, the
4 way to actuate those system there have to be some way
5 that something else fails to indicate to the operator.
6 So he doesn't even know.

7 We did not even see any discussion of the
8 way, how that reactor cool. And then when it comes to
9 recovery, all intervention, all, we really have not
10 any discussion on the instrumentation or what actually
11 needs to be done. And that's the fact.

12 So we know very little about that, put the
13 human error out of commission or all recovery from
14 this state. And that's definitely fact because I
15 didn't see anything specific on this. That covers
16 instrumentation with Jose.

17 So the facts I am missing is the, well, is
18 the stuck rod related both to delay and prolong ECCS
19 injection, what are the time brackets in these things,
20 CVCS delay injection or the injection after prolong,
21 the ECCS operation, which will be out of commission,
22 and then what type of recoveries, with what indication
23 we are talking about. So this is the summary of what
24 I feel I am missing in order to make Chapter 19
25 conclusions.

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1 MEMBER KIRCHNER: Thank you, Vesna.
2 Colleagues? Dennis, do you want to comment?

3 MEMBER BLEY: Well, sure. I look at
4 Dave's chart and I got to, I quibble with some parts
5 of it but the end points, the purple box and the red
6 box is clearly where we end up.

7 But I got back to Jose's presentation of
8 facts. And mostly I agree with those facts. There's
9 a couple of places where I think we polish the words
10 a bit.

11 But the place he ends up, Jose's analysis,
12 if you'll forgive me, is kind of like the Staffs.
13 It's an analysis without any analysis. And it's
14 expert judgement as well.

15 Oh, and it's a bounding case, I agree with
16 that. And I think that's sufficient to say this needs
17 to be dug into further.

18 The idea of making it a carve out doesn't
19 bother me. The idea of doing that helps because we'd
20 include the development of recovery actions.

21 And my problem, like I think most
22 everybody else's is, the documentation saying, this
23 remains a problem, isn't in the FSAR in way that makes
24 it clear. And the documentation that this really
25 needs to be a high priority for development of

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1 procedures and recovery actions is also not in a clear
2 way in the FSAR.

3 So I think bringing it up in our letter
4 is, either as a carve out or some other way to make
5 sure it gets covered before they build one of these
6 things I think is important.

7 MEMBER BALLINGER: Yes. This is Ron.

8 MEMBER BLEY: Thank you guys.

9 MEMBER BALLINGER: I think Dennis has got
10 it. The purple box is going to be what we end up in.
11 The red box is great if you're a lawyer, but at some
12 point we are going to get to the point where it's your
13 PhD arguing with my PhD.

14 And without very, very, very extensive
15 analysis, which may actually not be possible, to the
16 degree that it needs to be done, the FSAR or whatever
17 document they have really needs to be very clear about
18 what Dennis is talking about. Because in thinking
19 through what you put in that, you have to, in your
20 mind, believe that there is a recovery path.

21 Again, I'm told that Occam was not a
22 metallurgist, but I thought I saw him in freshman
23 chemistry.

24 MEMBER KIRCHNER: Thank you, Ron. Other
25 Members of the Committee?

1 MEMBER REMPE: So, this is Joy. And I
2 tend to agree with what Dennis had said. And I have
3 a small nit.

4 And I checked the DCA to make sure I'm not
5 saying something proprietary, but in things I've seen
6 from Jose, as well as what I see Dave, it wasn't just
7 setpoint changes they actually do have a different
8 mechanism now too for initiating ECCS. Which I find
9 to be much more reliable and I'm very pleased to have
10 seen. And I hope that we can capture that.

11 But I didn't mention it earlier but there
12 were like many comments made in what Jose had said
13 that I hope we can capture, he's captured that I think
14 would make it easier to go forward with the letter
15 writing. Because there's only a couple of places
16 where we really need to be changed.

17 I really hate to see this as a carve out
18 but I don't see other ways to do it unless somebody
19 wants to change something.

20 MEMBER BALLINGER: This is Ron, one last
21 thing. I think I need to remember that we're talking
22 about Chapter 15 and we're talking about, basically
23 beyond design basis. And just need to remember that
24 I think.

25 (Simultaneous speaking.)

1 MEMBER MARCH-LEUBA: Sorry --

2 MEMBER KIRCHNER: Ron, I don't think we're
3 beyond design basis, we're in the AOO design basis
4 space when we get to the purple box.

5 MEMBER BALLINGER: Got it. Got it, okay.
6 But we're still in Chapter 15?

7 MEMBER KIRCHNER: Well, or coming out of
8 Chapter 15 with a successful glide path.

9 MEMBER BALLINGER: Right. Yes. Yes,
10 indeed.

11 MEMBER PETTI: Right. And I think in my
12 opinion the key rule is that the rule set and the
13 codes you use to demonstrate compliance in Chapter 15
14 is going to help you get the purple box. Because you
15 need to know the actual response to the plant. Which
16 means you got to go into your best estimate tools,
17 which are typically BDDA.

18 MEMBER BALLINGER: Yes. Yes.

19 MEMBER PETTI: That's what I meant to say.
20 I mean --

21 MEMBER BALLINGER: Yes.

22 MEMBER PETTI: -- not perfectly.

23 MEMBER BALLINGER: Yes. But my question
24 is, from the conversation I've heard so far, does
25 anybody really believe that no matter how good our

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1 best estimate tools are, are they adequate for this
2 task?

3 MEMBER KIRCHNER: Oh, that's a, I hate to
4 take up the defense of that but I will. This is Walt
5 Kirchner for the record.

6 Yes, there's a tool set that can be
7 applied. We do have very good systems, analysis
8 codes, whether it's TRACE or RELAP, that can do the
9 kind of multi-dimensional core treatment where there's
10 mixing and there are issues related to that, as well
11 as mixing coming into the core.

12 We have CFD tools that are at one's
13 disposal, if you want to look at boron concentrations.
14 And we have reactor kinetics and neutronics codes that
15 are, I think, up to the task.

16 The biggest challenge for most of the
17 systems codes, Ron, is that because of numerical
18 diffusion boron is difficult to account for
19 accurately. So if you remember that both the
20 presentations by the applicant and the staff review
21 and their work, a lot of the boron estimates are being
22 done as side calculations.

23 MEMBER BALLINGER: Right. Yes, I do, I
24 remember that.

25 MEMBER KIRCHNER: And so on. The basic

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1 tool set is there. Certainly MCNP, for example, was
2 mentioned earlier.

3 That's a static code. But you can do
4 extraordinarily good analysis --

5 MEMBER BALLINGER: Okay.

6 MEMBER KIRCHNER: -- of K effective with
7 that.

8 MEMBER BALLINGER: So, what you're saying
9 is --

10 MEMBER KIRCHNER: As Jose pointed out --

11 MEMBER BALLINGER: What you're saying is
12 there is a, that there would be a positive outcome.

13 MEMBER REMPE: So, Walt, I --

14 MEMBER KIRCHNER: I think so.

15 MEMBER REMPE: -- validate those codes for
16 this type of situation. Do you think --

17 MEMBER KIRCHNER: Well, that's where I was
18 going.

19 MEMBER REMPE: Okay.

20 MEMBER KIRCHNER: The problem right now
21 is, and again, the Applicant and the Staff pointed
22 this out, is that when you, you add the boron
23 tracking, so to speak, into the equation, that's the
24 part that's not well validated.

25 MEMBER BLEY: Walt, could I --

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1 MEMBER KIRCHNER: Tool set, like Peter,
2 you know, Peter could, well, he's not, we shouldn't
3 turn to Peter here, but I think there's a basic tool
4 set that will allow you to bound the problem.

5 MEMBER BALLINGER: But is this a short-
6 term, aka, a year problem or is it --

7 MEMBER KIRCHNER: No, these are --

8 MEMBER BALLINGER: -- a decade problem?

9 MEMBER KIRCHNER: You have to setup an
10 input model, you have to check that, you got, these
11 are, you know, some of it could be done in the
12 relatively short-term, I believe. I'm talking months.

13 Obviously, some side calculations have
14 been done in the intervening past months. So there is
15 a, what I would say, I would characterize it, there's
16 a basic tool set available that would allow you to
17 frame and probably bound the problem for purposes of
18 the purple box there on the top.

19 MEMBER BALLINGER: Okay, good.

20 MEMBER BLEY: Walt, can I ask a --

21 MEMBER KIRCHNER: Go ahead.

22 MEMBER BLEY: I'm asking a question or
23 just presenting an argument. I don't know those tools
24 very well but I know that if you try to design a
25 system that would run as a coherent front up through

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1 the reactor of this water you'd play hell making it
2 work.

3 But this really is a situation that's very
4 sarcastic. I think every time you did it, if you were
5 doing experiments, it would look different. Now, how
6 different I don't know. And I don't know if these
7 tools are bounded. I think that would be a good
8 thing.

9 We're not in the role of presenting
10 solutions here. And we probably shouldn't do it. I
11 like Jose's ideas of a few more holes. But then they
12 probably looked at that, and maybe in their
13 calculations they found a problem with putting holes
14 down, though I don't know what it would be.

15 But I don't think we're planning to do
16 that, right?

17 MEMBER MARCH-LEUBA: I haven't heard
18 anything from the Applicant on that, Brian, to do
19 that.

20 MEMBER RICCARDELLA: I think, you know,
21 those holes would be in the core region. There might
22 be some complexities there where you're getting flow
23 through them during normal operation.

24 MEMBER KIRCHNER: No, no, it would be
25 above the core, Pete.

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1 MEMBER RICCARDELLA: Really?

2 MEMBER KIRCHNER: If you --

3 MEMBER RICCARDELLA: Yes, I thought the
4 RRVs were --

5 MEMBER KIRCHNER: No, you can put them --

6 MEMBER RICCARDELLA: -- right on top of
7 the core.

8 MEMBER KIRCHNER: Well, the design, this
9 is a nice design. So if you look at things, what they
10 did was, they made sure that any penetrations of the
11 containment and into the reactor vessel boundary were
12 always above the core level.

13 So you wouldn't put holes below the core
14 level, you would put them upper, at the lower steam
15 generator level.

16 MEMBER RICCARDELLA: So you say there's
17 room --

18 MEMBER KIRCHNER: Or as Jose said --

19 MEMBER RICCARDELLA: -- between top,
20 between top of fuel and --

21 MEMBER KIRCHNER: Probably just above the
22 RRVs.

23 MEMBER RICCARDELLA: What? Jose said --

24 MEMBER KIRCHNER: Just above the RRVs.

25 MEMBER RICCARDELLA: -- below the RRVs,

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1 right?

2 MEMBER MARCH-LEUBA: Yes. I said it has
3 to be there. They will have to be below the lowest
4 level, water level that you would expect. Which is at
5 or around the RRVs, which is roughly ten feet above
6 the core.

7 MEMBER RICCARDELLA: Oh, I didn't realize
8 there was that much room.

9 MEMBER MARCH-LEUBA: Yes.

10 MEMBER REMPE: So, I've not heard anyone
11 from the ACRS say the SER should be issued as is.
12 We're saying doing a carve out. Everyone has kind of
13 said something is missing.

14 Add a true statement is there a Member
15 that's not yet spoken that feels like it's just fine?

16 CHAIR SUNSERI: I just don't know the --
17 (Simultaneous speaking.)

18 CHAIR SUNSERI: -- yet.

19 MEMBER REMPE: I didn't hear, I heard two
20 responses.

21 CHAIR SUNSERI: Go ahead, Dave.

22 MEMBER PETTI: I don't know that we're
23 there yet, one way or the other.

24 MEMBER REMPE: Even your, Dave, has said,
25 hey, there is some things that are, you know, going to

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1 be complicated in the future. Are you still say, yes,
2 maybe they could issue it and they don't need a carve
3 out or they don't need something else. You're okay
4 with the SE?

5 MEMBER PETTI: What I'm saying is, to get
6 to the purple box, you can't get there today.

7 MEMBER REMPE: So that kind of sounds like
8 the SE, which kind of says go ahead and it's just
9 fine, you're differing with that.

10 And I'm kind of getting back to what
11 Dennis kind of tried to say yesterday about, there's
12 either going to be a letter that's not real positive
13 about the SE or there's going to be some differing
14 opinions. And I'm kind of trying to say, nope, there
15 may be differing opinions on what's needed but all of
16 us so far have said, no, the SE needs to have
17 something else done, don't issue it without some
18 changes.

19 MEMBER KIRCHNER: No, I said that. And I
20 think that's --

21 MEMBER PETTI: No, I --

22 MEMBER KIRCHNER: -- a premature --

23 MEMBER PETTI: Yes.

24 MEMBER KIRCHNER: -- conversation. Joy,
25 the ACRS can issue a letter with or without the SE.

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1 MEMBER REMPE: Well --

2 MEMBER KIRCHNER: So I don't think we have
3 to tie the conversation to yes or no on the SE. Let's
4 address, first, whether we can come to a consensus as
5 Dennis had outlined, and others, and then talk about
6 yes or no, issue the SE.

7 Because we can always, and we have in the
8 past --

9 MEMBER REMPE: You're right, I overstated
10 what I'm saying. We're not happy with what we've
11 seen, but again, the Staff wrote up some things, well,
12 there was a White Paper, but this topic, as far as the
13 focus area goes, nobody is happy with what we've seen
14 from the Staff.

15 MEMBER KIRCHNER: No.

16 MEMBER REMPE: Changes throughout.

17 MEMBER KIRCHNER: No.

18 MEMBER PETTI: No, no, I don't think
19 that's --

20 MEMBER KIRCHNER: That's not correct at
21 all.

22 MEMBER REMPE: Ah. Okay. So then we're
23 not there yet, I thought maybe we were.

24 MEMBER KIRCHNER: No, we're not there yet.
25 We've had very good input from the Staff. And I think

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1 that input, I will reinforce my opening comments.

2 If you look at Dave's picture, both the
3 design changes, the setpoint changes and such that
4 were proposed by the Applicant, appear to address that
5 whole set of sequences very successfully. And that's
6 all to the good.

7 And then we've heard from the Staff from
8 the, also on the right-hand side. And so, yes.

9 MEMBER REMPE: But I thought even Dave was
10 saying that with the recovery actions that haven't yet
11 been defined, I mean, Walt you had said, maybe a text
12 needed to be added. And I think, what I was kind of
13 interpreting what Dave was saying was, the
14 confirmatory action might need to have more because
15 right now they just, they need to identify something.

16 But if they had to be --

17 MEMBER KIRCHNER: Well -

18 MEMBER REMPE: -- maybe a more in-depth
19 decision --

20 MEMBER KIRCHNER: -- again, as Dennis
21 pointed out, we're not in the business of doing design
22 fixes or changes. But I think --

23 MEMBER REMPE: I think that changes the
24 Staff --

25 (Simultaneous speaking.)

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1 MEMBER KIRCHNER: One doesn't, one just
2 doesn't leave the system in post-ECCS actuating,
3 continuing to deborate. But let me stop there.

4 CHAIR SUNSERI: This is Matt. And my view
5 on it is I agree. I think it's still a little early
6 to be talking about carve outs and how we're going to
7 address this thing because, at least in my mind what
8 the situation is, is the Staff has completed their
9 safety evaluation report.

10 And through all of their deliberations and
11 engineering analysis and interactions with the
12 Applicant, they have come to the conclusion that they
13 are reasonably assured that the systems that exist, as
14 identified in the design certification documentation,
15 there's a reasonable assurance that those systems can
16 be operated to overcome the situation created by the
17 event as described.

18 MEMBER MARCH-LEUBA: I don't think they're
19 saying that in the SER. And when --

20 (Simultaneous speaking.)

21 MEMBER MARCH-LEUBA: -- surface --

22 CHAIR SUNSERI: -- SER if they didn't
23 haven't reasonable assurance that --

24 MEMBER MARCH-LEUBA: When you scratch
25 under the surface you find out they have no basis for

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1 the conclusion.

2 CHAIR SUNSERI: I just said they used
3 reasonable, engineering analysis. And they've told us
4 what that evaluation is.

5 MEMBER MARCH-LEUBA: Well --

6 CHAIR SUNSERI: We heard from it
7 yesterday.

8 MEMBER MARCH-LEUBA: And that's why we're
9 here, to review the reasonable analysis. I don't see
10 any evidence that that is the case.

11 MEMBER KIRCHNER: Matt?

12 CHAIR SUNSERI: Yes.

13 MEMBER KIRCHNER: This is Walt. I forgot
14 that I also wanted to give our, I hope, did everyone
15 on the Committee have a chance to talk, and if so, I
16 would like to turn to our consultants. May I do that?

17 MR. CORRADINI: Are you asking or telling?

18 MEMBER KIRCHNER: Hearing no objection --
19 that sounds like Mike Corradini for the record. Mike,
20 go ahead.

21 MR. CORRADINI: Okay. So, a lot of things
22 have been said, and I don't think it's appropriate or
23 time effective to repeat them.

24 Let me start off with Dave's figure
25 because I think Dave's figure at least outlines quite

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1 well pathways. The one pathway that we are discussing
2 about after actuation DBA rule set conservative
3 calculations, is there is not a calculation that looks
4 at what apparently is going to be a delusion of the
5 downcomer, as time marches on, past actuation.

6 There is an analysis, 89.30. But that
7 wasn't the purpose of the analysis. And if anything,
8 it just looks to make sure that you have enough boron
9 concentration in the core to remain sub-critical.

10 Rather, it's not even conserving boron, it
11 loses boron from the system. It magically disappears.
12 Which tells me that it's probably in the downcomer but
13 I don't know how much is there.

14 So Step 1 would be, I would think, it's
15 appropriate that if we're going to talk about recovery
16 actions we have to have either a conservative or at
17 least an appropriate calculation that gives us an
18 opinion as to how rapidly we are diluting the
19 downcomer region.

20 Now, what we've been told by 89.30, and
21 I've got to be careful that we don't say words that,
22 or numbers that are inappropriate in open session, is
23 it's probably less than a day. It seems to me then I
24 would turn to an approach that Member Kirchner, that
25 Walt has discussed, which is, I don't know if the

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1 proper legality is carve out or whatever, but it seems
2 to me working the problem backwards, that if you want
3 to have a short recovery actions you either have to
4 identify now that such recovery actions have to occur
5 before you have a chance of any sort of power increase
6 or re-criticality or you come up with a strategy now
7 that says how you approach criticality and then
8 monitor your recovery actions.

9 As I think Jose indicated, there are four
10 recovery actions. Three of which require the CVCS in
11 operation. And the best of the three is essentially
12 injection into the riser region.

13 If the CVCS is not available, then you
14 have the CFDS to do it. And then you either have to
15 do, as Mark and Matt suggest, are approach to
16 criticality, which is quite reasonable and logical.
17 And actually takes, I think, a much easier approach
18 than some other required emergency actions that we
19 have reviewed in current operating reactors that have
20 to occur in tens of seconds, not in hours. Or tens of
21 hours. And you can do it that way.

22 But whatever the recovery action is has
23 got to be identified within the, at least a structure
24 for the recovery action that have got to be identified
25 within the DCA.

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1 And that leads me to the final thing which
2 is, when we were discussing with Staff yesterday, I
3 think I asked someone on Staff, is it their feeling
4 that this is inappropriate at this time but it can be
5 done in the COL stage. This is, I guess, where I
6 differ with the Staff's conclusion.

7 Is that I think something has got to be
8 defined here, either by a limitation or an additional
9 requirement, I'll call it requirement, that you
10 essentially have some sort of overall strategy that
11 then has to be backed up by a calculation. And then
12 I think we're good to go relative to the SER.

13 I can explain further but I thought I'd
14 try to be brief.

15 MEMBER MARCH-LEUBA: Mike, I like what you
16 said very much.

17 MEMBER KIRCHNER: Thank you, Mike.

18 MEMBER MARCH-LEUBA: And I think you make
19 sense. This is what we would be calling, define a
20 success path.

21 Tell me how you're planning to do it and
22 show me that you can do that. That's fine.

23 MR. CORRADINI: I think, again, it's the
24 Members' decision here. But it seems to me that we're
25 not differing with, and in fact, I don't want to

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1 redesign the system, that's the Applicant's problem,
2 not our problem.

3 So to the extent that they're happy with
4 their design as they stated, then they have to show a
5 path to recovery that can be successful given the
6 potential chance that some of these systems would be
7 inoperable given whatever the initiating event would
8 be.

9 And so, that might be the limitation that
10 I would put on the current SER as written. And the
11 design as presented.

12 MEMBER MARCH-LEUBA: It is my
13 understanding that these types of SERs cannot have
14 limitation. They either approve or disapprove this
15 litigation, but you cannot have limitations and
16 conditions it will have to be a modification of the
17 FSAR.

18 MR. CORRADINI: Okay, I'm not going to
19 deal with whatever the right word is, but I think I've
20 made my point.

21 MEMBER BLEY: Mike --

22 MEMBER KIRCHNER: Thank you, Mike.

23 MEMBER BLEY: -- a thought I had forgotten
24 about. And that is, at least a few of us have talked
25 about this.

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1 I think that the Staff's point of view,
2 and I'd like to say something about this in our
3 letter, the Staff's absolute conviction that because
4 of their guidance they don't have to consider recovery
5 as part of Chapter 15 as inappropriate.

6 I think that's normally reasonable when
7 the paths of recovery are clear. Then once you've
8 stabilized at the end of Chapter 15 there is no big
9 issue about how you go forward.

10 In a case where there is a big issue and
11 it hasn't been proved, or designed out, that you
12 really need to do something, and it's not six months
13 later, I don't think the safety analysis is complete.
14 And I think we ought to make a point of that.

15 MEMBER KIRCHNER: Thank you, Dennis. Well
16 said. Let me turn and just check, because I'm not
17 monitoring the sidebars. Steve Schultz, are you on
18 the line?

19 MR. SCHULTZ: I'm here.

20 MEMBER KIRCHNER: Steve, do you wish to
21 add anything? I lost him. I think we might have lost
22 him.

23 CHAIR SUNSERI: Steve, are you on mute?
24 Let's take a moment --

25 MR. SCHULTZ: Can you hear me now?

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1 CHAIR SUNSERI: Yes. Go ahead, Steve.

2 MR. SCHULTZ: All right. I just wanted to
3 follow-up with what Mike's last comment associated
4 with moving forward and Dennis' wrap-up associated
5 with what needs to be done with regard to procedures.

6 I do think the combination of the
7 approaches that Matt mentioned, and you, Walter,
8 mentioned, associated with ways in which the purple
9 box can be addressed ought to be filled out by the
10 committee in the letter in some fashion. Not
11 suggesting that be done but rather that there be
12 closure associated with identifying what needs to be
13 done there.

14 The impression I had from the most recent
15 meetings is that the, both the Applicant and the
16 Staff, in fact as Dennis said, are relying upon the
17 fact that they're not required to do the recovery
18 action portion until later.

19 In fact, they seem to rely too heavily on
20 what's going to happen with the Applicant later on.
21 Which is certainly, I think, bothersome.

22 Also, my impression is that the Staff and
23 the Applicant, in the audits that have been, I'll call
24 it one audit, but it's been months of activity that's
25 gone on here to address the issues that came up

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1 earlier this year.

2 And it was mentioned yesterday, at least
3 then, and before from the presentations we've had,
4 they've been having daily discussions associated with
5 these. And I can't believe in the Staff's forming
6 their engineering judgements and their overall
7 analyses and the Applicant's review of what they
8 presented.

9 There's been a lot of back and forth
10 associated with what approaches would be taken, should
11 be taken with regard to this. And yet it's not
12 documented.

13 I agree with the, I wish it was going to
14 be documented in the audit report but I don't think it
15 is going to be to the level that we would like to see.
16 So I think there is more work that needs to be done
17 there.

18 On the technical side, I think that we
19 ought to be able to, as Walter said, there are
20 methodologies that could be used. If not to draw a
21 definitive conclusion, to help move things along in
22 the right direction with understanding the issues,
23 technical issues, better on the core recovery side.

24 And I also think that there must be some
25 simple evaluations that can be done with regard to

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1 boron tracking that could help address some of the
2 best estimate beliefs of where the boron in fact is in
3 the system. It's not clear what's been done
4 specifically, even given the modifications that have
5 taken place to help with the boron mixing in the
6 downcomer during operation.

7 MEMBER BLEY: That's great. This is
8 Dennis again. And Steve just jogged another jog on my
9 memory. And it goes along with my last comment a bit
10 about safety analysis not quite being done.

11 Part 52, although it's been around for 40
12 years now, we have, we, the ACRS, the Staff and the
13 Commission have very limited experience with Part 52.
14 We've got a handful of design certs that have been
15 spread over the years, we've got less than a handful
16 of continuations toward the operating, combined
17 license.

18 And we're still early in making this thing
19 work well. I think that needs to be on everybody's
20 minds.

21 MR. MOORE: Member Kirchner?

22 MEMBER REMPE: Next could I add on? Or
23 Walt, could I add on something into that comment.

24 MEMBER KIRCHNER: Yes, and then I detest
25 Scott Moore, the Executive Director, wants to

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1 interject something too. Go ahead, Joy, if it's
2 short.

3 MEMBER REMPE: So, your comment would
4 bring up a comment that Harold Ray said about it's
5 very, Part 52 was meant for a reactor that's been
6 built. And we so far, and my understanding is that we
7 don't know evolutionary designs.

8 Isn't this one, this is a bit more than a
9 traditional evolution, it's a new design. And if
10 others with dramatically different designs, it may be
11 stretching its applicability even more. Right?

12 MEMBER KIRCHNER: Is that a statement or
13 a question?

14 MEMBER REMPE: Well, it's a question that
15 I think is a statement, but it's just another thought.

16 MEMBER KIRCHNER: It's something, Joy,
17 would you hold that because that certainly would fit
18 into our observation's lessons learned letter. And
19 maybe, so we don't divert from today's focus area, if
20 you save that, think about it and we can add that to
21 our observation's lessons learned.

22 MEMBER REMPE: You bet.

23 CHAIR SUNSERI: Hey, Walt, this is Matt.
24 It's almost 1:30, I think we need to take a lunch
25 break here pretty soon so if you can find an

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1 appropriate cutoff point --

2 MEMBER KIRCHNER: I think this is the
3 appropriate time, but I thought I detected Scott
4 wanting to make a comment.

5 CHAIR SUNSERI: Okay. All right.

6 MR. MOORE: Yes, Chairman Kirchner. Steve
7 Schultz mentioned the audit and the audit report. And
8 as the Chairman mentioned, we've asked for the audit
9 report.

10 We also have some information about the
11 audit report. Including, we've heard some about what
12 will and won't be in it.

13 And the Committee may, since they've asked
14 the Staff to be here, may want to ask the Staff what
15 will and won't be included in the audit report. But
16 I'd ask that Mike Snodderly be recognized about when
17 we will receive the audit report.

18 CHAIR SUNSERI: Yes.

19 MR. MOORE: Mike.

20 CHAIR SUNSERI: Go ahead, Mike.

21 MR. SNODDERLY: Yes, so the Staff notified
22 me this morning that they're planning on providing the
23 audit report to the Committee on July 17th. So that's
24 seven days from now. Next Friday.

25 As I've been closely watching the

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1 interactions between the Staff and NuScale during the
2 audit I have the audit plan. And I think it's
3 important to recognize that one of the most important
4 purposes, or what I saw that came out of the audits,
5 was assuring that there was sufficient material in the
6 FSAR, which is as we all know is the licensing basis
7 for the plant not the FSAR.

8 And that resulted in three important
9 submittals. The May 20th submittal, the May 28th
10 submittal, which was the supplemental response to RAI
11 89.30, and then a June 19th submittal.

12 And it was that additional material that
13 NuScale intended to address the boron distribution
14 issue. Redistribution issue.

15 So I think the Committee should be focused
16 that that is the material and the analysis that
17 supports the Staff's FSAR.

18 I expect the audit report, this is, again,
19 this is just my opinion of the expectations, that I
20 believe that the report will just mainly, the audit
21 report will just document that they did do what the
22 plant said and here's the documents they looked at.
23 And then it probably, we've referenced the resulting
24 submittals.

25 But I do not expect for that audit report

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1 to have discussions of analyses and an audit where
2 (audio interference) --

3 CHAIR SUNSERI: Mike, I think we're losing
4 your audio.

5 MR. SNODDERLY: I'm sorry, but I wanted to
6 just share my observations on the (audio interference)
7 --

8 MR. MOORE: So I can pick up from Mike.
9 I think Mike was saying, we didn't expect a lot more
10 detail in the audit report based on what we were
11 hearing then what Mike just mentioned.

12 But since the Staff is here in this
13 discussion the Committee can always ask the Staff
14 about what's in the audit report. Which is not yet
15 final.

16 That's all we really had to say. When it
17 was coming in and what we're hearing about will be in
18 the audit report. Thank you.

19 MEMBER PETTI: So, Scott, just a question.
20 I mean, that was my sense even though we didn't fully
21 understand Mike.

22 It just seems to me that there was a lot
23 of discussion in the last day about this 89.30
24 supplement and many members couldn't find it. They
25 could find earlier responses that were titled 89.30.

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1 But if we could have Mike make sure the
2 supplement gets put in the right folder and share
3 point --

4 MR. SNODDERLY: Can you hear me now? Can
5 you hear me?

6 MR. MOORE: Yes.

7 MEMBER KIRCHNER: Yes, we can, Mike.

8 MR. SNODDERLY: Okay, thank you. Yes, so
9 if, it is, I will send the link to your email, but it
10 is there under the June 3rd meeting under NuScale
11 documents. So it's not under the May 20th submittal
12 because it came in afterwards but if you look under
13 the documents folder all three 89.30 responses are in
14 there, and the supplemental response from May 28th.

15 But I'll send out a link for you all to,
16 well, so you can find it. But it's all there.

17 MEMBER MARCH-LEUBA: Hey, Walt, are we
18 going to come back to this discussion after the lunch
19 break or are you going to cut me off?

20 MEMBER KIRCHNER: Well, I was going to
21 test the Members quickly to see, obviously we're not
22 going to turn a letter around for you, the Committee
23 to review by the end of the lunch break, that's not
24 realistic or desirable I don't think.

25 So --

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1 (Simultaneous speaking.)

2 MEMBER MARCH-LEUBA: Yes, but --

3 MEMBER KIRCHNER: Do you want to continue

4 --

5 MEMBER MARCH-LEUBA: -- the schedule --

6 MEMBER KIRCHNER: Jose, do you wish to
7 continue deliberations --

8 MEMBER MARCH-LEUBA: There is very short
9 --

10 MEMBER KIRCHNER: -- in the public forum?

11 MEMBER MARCH-LEUBA: There is a very short
12 point I wanted to make. It is my impression that Dr.
13 Yarsky's conclusions are being misquoted.

14 Because Pete and I are very good friends
15 and we talk with each other. And often we know what
16 the other one is going to say and where they're not
17 saying it.

18 So I would like to explain to you what
19 actually Peter Yarsky said about the \$20 insertion
20 into the core. And maybe we have him, he can explain
21 to us what he meant. Because he's being misquoted.

22 MEMBER KIRCHNER: Okay. If we can do it
23 quickly then, because I think, wait a minute, let me
24 do a check with the Chairman.

25 CHAIR SUNSERI: Yes --

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1 MEMBER KIRCHNER: Matt?

2 CHAIR SUNSERI: -- let's hold that for
3 after lunch because --

4 MEMBER KIRCHNER: Okay.

5 CHAIR SUNSERI: -- it can only lead to
6 more discussion I think.

7 MEMBER KIRCHNER: Right.

8 CHAIR SUNSERI: And we've been at this a
9 long time. It's already 1:30 there on the east coast,
10 we need to give people a rest so they can have lunch.
11 And that would be my recommendation.

12 MEMBER KIRCHNER: Okay. Let's take the
13 break. And I just ask my colleagues, I've been taking
14 notes. I had a lot of good input.

15 If you have suggestions on, and directions
16 or input for this letter that we will pull together,
17 maybe we can collect that and then come up with a
18 tentative schedule, Matt, for us, a subset of us to go
19 off and pull together a letter for us.

20 CHAIR SUNSERI: Right. I think by the end
21 of the day, I think by the end of the day it would be
22 almost critical that we end up with a list of pretty
23 specific topics that are going to be included in the,
24 that we have consensus on to be addressed in the
25 report.

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1 MEMBER KIRCHNER: Right.

2 CHAIR SUNSERI: An outline essentially.

3 And then we can go fill in the details, the writers
4 can go fill in the details offline.

5 MEMBER KIRCHNER: Okay. Thank you.

6 MR. MOORE: And just to ask, we do want
7 the court reporter back after lunch, correct?

8 CHAIR SUNSERI: I think so, Scott. Yes.

9 MR. MOORE: Okay, thank you.

10 MEMBER REMPE: Could I ask about tomorrow?
11 What's, are we going to still try and do something
12 tomorrow too or do we know that yet?

13 CHAIR SUNSERI: If we can get to our
14 consensus on this outline by the end of the day that
15 will be the end of this week's meeting, so no session
16 tomorrow.

17 MEMBER REMPE: Thank you.

18 MEMBER KIRCHNER: Yes, I concur, Matt. I
19 really think we need the time to do, offline, to do
20 this.

21 MEMBER BLEY: Quick question for Matt or
22 Scott, or somebody. Do we have any idea how expedited
23 this transcript will be because I think this is
24 important for us to have in hand as we finish this
25 stuff up?

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1 CHAIR SUNSERI: I understand it would be
2 three days.

3 MR. MOORE: At least --

4 MEMBER BLEY: That would be fabulous. And
5 if Mike would get it to all of us right away I think
6 that would be helpful.

7 CHAIR SUNSERI: Alicia, can you confirm
8 that? I was told three days.

9 MR. MOORE: Yes, that's my understanding
10 too.

11 CHAIR SUNSERI: Yes, okay.

12 MR. SNODDERLY: I'm sorry, was I just
13 committed to something? I was, I lost myself.

14 MR. MOORE: No, just distributing the
15 transcript as soon as we get it.

16 MR. SNODDERLY: Oh. Oh, of course. Of
17 course. Yes, understood. And yes, my understanding
18 is that an expedited transcript is three days.

19 CHAIR SUNSERI: Okay, anything else before
20 we recess for lunch? All right --

21 MEMBER BALLINGER: Are we back in open
22 session?

23 CHAIR SUNSERI: We'll come back in open
24 session at 2:30 eastern. Okay. So we are recessed
25 until 2:30 eastern. Thank you all.

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1 (Whereupon, the above-entitled matter went
2 off the record at 1:39 p.m. and resumed at 2:30 p.m.)

3 CHAIR SUNSERI: Okay. This is Matt
4 Sunseri. It is 2:30, and let's start with a roll
5 call. Ron Ballinger?

6 MEMBER BALLINGER: Here.

7 CHAIR SUNSERI: Dennis Bley? Was that
8 Dennis?

9 (No audible response.)

10 CHAIR SUNSERI: Vesna Dimitrijevic?

11 MEMBER DIMITRIJEVIC: Here.

12 CHAIR SUNSERI: Walt Kirchner?

13 MEMBER KIRCHNER: Here.

14 CHAIR SUNSERI: Jose March-Leuba?

15 MEMBER MARCH-LEUBA: I am here.

16 CHAIR SUNSERI: Dave Petti?

17 MEMBER PETTI: Here.

18 CHAIR SUNSERI: Joy Rempe?

19 VICE CHAIR REMPE: Here.

20 CHAIR SUNSERI: Pete Riccardella?

21 MEMBER RICCARDELLA: Here.

22 CHAIR SUNSERI: Dennis Bley?

23 (No audible response.)

24 CHAIR SUNSERI: Last call for Dennis.

25 (No audible response.)

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1 CHAIR SUNSERI: Okay. We do have a
2 quorum, and we will reconvene. Remember we're on the
3 transcript. And I'm going to -- before we begin --
4 restart the deliberation on the report preparation, I
5 want to just say I was remiss for not giving NRC staff
6 a chance to make a comment earlier today. So I'm
7 going to call on Anna Bradford at this point for her
8 comment or statement.

9 MS. BRADFORD: Yes, thank you. Can you
10 confirm you can hear me?

11 CHAIR SUNSERI: Yes, Anna. We can hear
12 you.

13 MS. BRADFORD: Thank you very much. So I
14 appreciate the conversation earlier today and allowing
15 the staff to listen in. There's a lot really good
16 points. I just wanted to bring up a couple, I will
17 say, process thoughts that I had while you were
18 deliberating.

19 And one was someone had raised the idea of
20 a carve out for this issue. And I just wanted to let
21 you know this is really not a candidate for a carve
22 out. A carve out is a very, I'll say, specific
23 regulatory tool that can be used in certain
24 circumstances, and this is not one of those
25 circumstances.

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1 I say that because the regulations do not
2 require that the applicant give us or show us any kind
3 of procedures for recovery at the design cert stage.
4 So a carve out is when we say we cannot give them
5 regulatory finality on some regulation that is
6 required for a design certification. That's not the
7 case here. So I just don't want you guys to start
8 thinking, okay, we'll say this should be a carve out,
9 because that's really not an open path for the staff
10 to use that regulatory tool.

11 In addition, the discussion about revising
12 the SE, I would have to think about how we would
13 revise the SE because, again, the SE as it is right
14 now shows that we believe we have reasonable assurance
15 against the regulations. And that argument is laid
16 out there in the SE. So again, I'm not sure how we
17 would revise the SE in accordance with what you guys
18 were talking about earlier today. I'm not saying it
19 can't be done. I'm just struggling with what that
20 would be since, like I said, we were already making
21 our regulatory findings against the regulations.

22 And my last thought is there seems to be
23 some discomfort, I'll say, with the idea of leaving
24 some things to the COL stage. And I mean, as you all
25 know, the fact is that is allowed. There's a lot of

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1 important things that are left to the COL stage that
2 are not necessarily resolved at the DC stage.

3 Reasonable people can disagree on where
4 that line should be, what should be in the DC, what
5 should be in the COL. We talk about it all the time.
6 Industry asks about it all the time. But with this
7 particular issue, it's pretty clear that it's not
8 required at the DC stage. I will just mention there's
9 a lot of -- someone mentioned that maybe the Part 52
10 isn't quite meant -- or maybe doesn't fit exactly for
11 evolutionary designs.

12 And I will say that there are some light
13 water SMR designers that are thinking about coming in,
14 in the next few years under Part 50 and asking for,
15 first, a construction permit and then an operating
16 license. And the level of detail and design that we
17 get at the construction permit stage is going to be
18 much less than we're seeing now at the DC stage. This
19 is going to be an ongoing conversation in terms of,
20 what do we need to make reasonable assurance finding
21 at these various stages of licensing?

22 So that's all I really wanted to say. It
23 was just to point out that this is -- our approach is
24 allowed under the regulations. We think we found
25 reasonable assurance. The Committee can certainly

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1 disagree with that. If you have suggestions on what
2 the staff needs to do within the bounds that it has to
3 address that in your letter, I mean, that would be
4 much appreciated by us. That's all I wanted to say.
5 Thank you for the opportunity.

6 CHAIR SUNSERI: Thank you.

7 MEMBER MARCH-LEUBA: Can I ask a question
8 from Anna?

9 CHAIR SUNSERI: It's really -- I mean, if
10 it's a question of clarification, I will grant it.
11 But we're not going to debate.

12 MEMBER MARCH-LEUBA: It's a clarification.
13 It's not a debate.

14 CHAIR SUNSERI: Okay.

15 MEMBER MARCH-LEUBA: Okay. Anna, if,
16 during your review, you had reason to believe that the
17 risk in terms of core damage frequency reported in the
18 FSAR was incorrect and the applicant had not provided
19 any calculation or justification for a number of
20 accidents that are postulated certainly by me and by
21 one of your members, would that rise to the level of
22 high carveout? Because you don't have any reason to
23 believe that the deboration events don't read to
24 significant risk to the core.

25 MS. BRADFORD: So I think this is another

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1 thing that might fall into a gray area that could be
2 discussed. There are some things that are so
3 fundamental to the design that you can't really even
4 carve it out and still approve this, right? I mean,
5 so if we didn't have the, like you were saying, maybe
6 important information about the core or we didn't have
7 the design of the containment or something like that,
8 that's hard to carve out and still approve the design
9 as a whole. So whether --

10 MEMBER MARCH-LEUBA: But this --

11 MS. BRADFORD: -- what you were mentioning
12 falls into that, I don't know. I don't know that we
13 necessarily had those discussions, and it's hard to
14 talk about what if type scenarios like that.

15 MEMBER MARCH-LEUBA: My concern, and I
16 don't want to get into an argument, is it's not the
17 procedures. It's that there will be operator errors
18 of commission which will start CFDS after the
19 downcomer will deborate. And you decide what the
20 probability of those things are. Those things are not
21 in the risk analysis. You're missing a big chunk.
22 And one member of your staff believes it's seven
23 orders of magnitude larger than what they published on
24 the FSAR.

25 CHAIR SUNSERI: Okay. We understand your

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1 point, Jose. We're not going to -- I think we should
2 save those kind of questions for Committee
3 deliberation, not going back to the staff.

4 MEMBER RICCARDELLA: Matt, could I ask a
5 question?

6 CHAIR SUNSERI: Yes.

7 MEMBER RICCARDELLA: This is Pete. So
8 Anna, short of a carve out, is there some other way
9 that we can flag this to make sure that it's
10 considered a very important item that needs to be
11 addressed and make sure it doesn't --

12 (Simultaneous speaking.)

13 CHAIR SUNSERI: I understand what you're
14 saying. Yeah, I understand what you're saying, Pete.
15 And maybe some other members may correct me on this,
16 but let me just very high level philosophically
17 discuss what I'm about to say. So clearly, the staff
18 is bound by the regulations and that's their charter
19 to go look at the regulations in depth as they are
20 written and apply that to the application that is
21 before and make the reasonable assurance
22 determination.

23 I'm going to make a broad leap here and
24 just say Congress in its wisdom recognized that maybe
25 all regulations couldn't be written so prescriptively

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1 that they would always ensure safety. So they created
2 an independent Advisory Committee on Reactor
3 Safeguards for us to look at the results of the safety
4 evaluation that's being produced by the staff and come
5 to our independent conclusions. We don't write the
6 SER. We don't tell the staff how to do their
7 business.

8 We review their work and we fill in the
9 gaps where we see potential safety issues. We write
10 those up in our letters, and that's how we do it. So
11 it, your point is, yes, we can point out where we
12 think there are safety significant issues that need to
13 be addressed before a final license is granted, or
14 maybe even a DCA. But we'll have to figure out what
15 that message is and then we'll it in our letter.

16 MEMBER RICCARDELLA: So you're saying our
17 letter in itself is a way to flag it?

18 CHAIR SUNSERI: Our letter goes -- it is
19 part of the rule.

20 MEMBER KIRCHNER: It's a crucial part of
21 our function, Pete. And I have had in the last few
22 days input and contact from people I haven't heard
23 from for years. So these proceedings are actually
24 being paid attention to. An ACRS letter does have
25 impact.

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1 CHAIR SUNSERI: I hope that addressed your
2 question, Pete.

3 MEMBER RICCARDELLA: It does.

4 CHAIR SUNSERI: Okay. Thank you. Any
5 other members have anything they want to add at this
6 point?

7 (No audible response.)

8 CHAIR SUNSERI: All right. Thank you,
9 all. And I will now turn the floor over to Walt for
10 a continuation of the report preparation.

11 MEMBER KIRCHNER: So colleagues, what I
12 would like to do is capture your major comments. I
13 was not able to do justice to taking notes and also
14 participate in the meeting. So Sandra is standing by.
15 We had some very good input.

16 What I would like to do in this open forum
17 is just capture any major items that you feel the
18 letter should address, and we can do this in
19 shorthand, perhaps cryptic form. And we will collect
20 those, and then a smaller group will take this
21 information and ensure that we reflect in a draft
22 letter on the topic of boron dilution. So with that,
23 I hesitate to put people on the spot. Dennis, are you
24 there?

25 (No audible response.)

1 MEMBER KIRCHNER: I know we missed him
2 because he had several salient comments. Well, let me
3 just go them through the roster. Ron Ballinger, what,
4 if any, major comments or input do you want to see
5 reflected in this letter?

6 MEMBER BALLINGER: I think the -- I think
7 other people are going to say the same thing. But I
8 would like to be sure that in the letter, we stress
9 that there needs to be a well identified recovery
10 path. I'm not sure what well means, but you get my
11 point, I think.

12 MEMBER KIRCHNER: Okay. Let's see.

13 MEMBER BALLINGER: That's it.

14 MEMBER KIRCHNER: Go ahead. I'm just --
15 I'm doing this from memory, so bear with me while I go
16 through the roster. Dennis, are you on the line?

17 (No audible response.)

18 MEMBER KIRCHNER: Does anyone want to take
19 a stab at Dennis' earlier comments? What I remember
20 --

21 VICE CHAIR REMPE: Walt, can I help you?

22 MEMBER KIRCHNER: -- that the FSAR and the
23 SER were really not clear in identifying this
24 particular issue.

25 CHAIR SUNSERI: Hey, Walt, I think --

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1 VICE CHAIR REMPE: Walt --

2 CHAIR SUNSERI: -- Joy has some --

3 MEMBER KIRCHNER: Go ahead, Joy.

4 VICE CHAIR REMPE: I actually took the
5 notes on that session and put them on Jose's thing
6 because I wanted to make sure we got it. But it was
7 the guidance about --

8 MEMBER KIRCHNER: Okay.

9 VICE CHAIR REMPE: -- not having to
10 identify recovery. The staff is just following the
11 regulations, and it's not required that they have to
12 identify that, right?

13 MEMBER MARCH-LEUBA: Yeah, the part I --

14 VICE CHAIR REMPE: Is that what you think
15 he said?

16 MEMBER MARCH-LEUBA: The part I liked
17 about Dennis' talk earlier -- and I wish he was here.
18 Maybe we should wait for him. He said that for normal
19 reactors, you end up in a safe and stable condition
20 and there's a clear path to get out of it. Here, we
21 don't. And it is a tricky path, especially for some
22 failures, and that's what he said, that --

23 (Simultaneous speaking.)

24 MEMBER KIRCHNER: Yeah, I think he was
25 getting at suggesting -- go ahead, Jose. Sorry.

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1 MEMBER MARCH-LEUBA: Yeah, this is not the
2 same situation.

3 (Simultaneous speaking.)

4 MEMBER KIRCHNER: He's suggesting the
5 completeness of the Chapter 15 analysis. If you come
6 out of a Chapter 15 analysis to most reactor in the
7 existing fleet and such, when you do those Chapter 15
8 analyses, and all of us have been involved in them in
9 one way or other, usually -- let me make up something
10 on the spot. You reflood the core. You're done,
11 right? And the event is terminated. You've reached
12 the safe, stable condition.

13 Here what I note was, for example, and the
14 applicant did a good job. They were able to point out
15 that the core was very well borated. So that was one
16 of their, if you will, not only was the core covered,
17 the SAFDLs were not violated. And there was actually
18 a higher concentration of boron than at shut down or
19 when the transient was initiated.

20 But it begs the question, is that set of
21 metrics completed? Because, again, I come back to the
22 staff's presentation yesterday where for the DHRS
23 system performance, they demonstrated that there was
24 significant margin above critical boron concentration
25 in the downcomer at 72 hours after those DHRS event

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1 paths, both at beginning of core and BOC and -- sorry,
2 beginning of cycle, I misspoke, and middle of cycle
3 with good margin. It just begged the question of me
4 that why don't we see that for the post-ECCS of boron
5 dilution because it would suggest that you could
6 analyze the trajectory of the event after ECCS
7 injection and look at the boron dilution of time.

8 And at some point -- and it will vary with
9 the event analyzed. But basically, you'll see that
10 the boron concentration is diluted. And at some
11 point, you're at some level above critical boron
12 concentration for the core inlet. And it suggests at
13 least to me that's a trigger point. You better
14 intervene.

15 But we didn't see that. We only saw it
16 for the successful path that addressed the design
17 changes that were made that included the set points
18 and the holes in the riser, et cetera. So I think
19 Dennis was hinting at the fact that --

20 CHAIR SUNSERI: Hey, Walt. Dennis is on
21 the line now, I believe.

22 MEMBER KIRCHNER: All right. Now I'll
23 stop talking. Dennis, I was trying to reconstruct
24 your input from this morning about the FSAR and FSER
25 not having the visibility on this matter. And I think

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1 you were hinting at the suggestion that the Chapter 15
2 stylized analyses, for this reactor being somewhat
3 different, were, I'll put words in your mouth,
4 somewhat incomplete.

5 MEMBER BLEY: Yeah, I thought I did more
6 than hint. The history of our regulations and how we
7 address these things really evolve over many years.
8 And I think the staff is over-reading their guidance.
9 I think whatever -- and I haven't looked up the
10 guidance on this point. I think whatever guidance
11 they have that says, you stop once everything is
12 initially stable, is historically based on the fact
13 that at that point, hands off and almost any hands on,
14 you're going to take it back to a normal condition.

15 This is an unstable point, at least as far
16 as we know because nobody has done the analysis to
17 prove it's not. And therefore, I don't see that it's
18 -- because it's recovery, it belongs in the next phase
19 of licensing. By the way, Part 52, it's this the
20 sixth or seventh exercise of it. If you're on Part
21 50, you wouldn't be putting things off. You'd be
22 selling them on the spot. And I think this one that
23 most of the designers of this process have said, no,
24 we aren't there yet. Let's finish this analysis.

25 CHAIR SUNSERI: So Dennis, what Walt has

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1 been doing is we have a white sheet of paper up on the
2 screen there, and Sandra is recording the key points.
3 So do you want to summarize for Walt and Sandra what
4 that message is so she can capture it on this piece of
5 paper?

6 MEMBER BLEY: Okay. Let me try. And this
7 is something I think Walt, Vesna, and I and Jose
8 talked about some weeks ago is that we think -- I
9 think completion -- let's go, Sandra -- completion of
10 the analysis in Chapter 15 --

11 MS. WALKER: I'm sorry. For some reason,
12 the audio kept breaking up.

13 MEMBER BLEY: Oh, sorry. Completion --
14 can you hear me? I'll call in on the phone if this
15 isn't working. It's worked up till now.

16 CHAIR SUNSERI: I can hear you, Dennis.

17 MEMBER KIRCHNER: Yeah, you sound good.

18 MEMBER BLEY: Completion of the Chapter 15
19 analysis for events involving long-term deboration of
20 the downcomer should have a path to -- instead of to,
21 through recovery explained in the DCA, something like
22 that. Anybody is free to fiddle with it.

23 MEMBER KIRCHNER: Good. Thank you,
24 Dennis.

25 MEMBER BLEY: Not only are you free to

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1 fiddle with it, I don't know if everyone agrees with
2 this point. But it seems clear to me that you don't
3 leave yourself tottering on the tip of a cone.

4 CHAIR SUNSERI: Just for clarity, what
5 Walt's trying -- and you were on the first part.
6 Walt's just trying to capture everybody's main points,
7 and then we'll go through and get consensus on these
8 things. And they don't have to be perfect because
9 we've got the transcript but just enough information
10 there so we know what it is and not forgetting about
11 it. That's kind of the theme of this exercise we're
12 going through.

13 VICE CHAIR REMPE: So could I note that
14 when you try to introduce this point, Dennis, a few
15 minutes ago, you also mentioned that the guidance or
16 the regulation may not be appropriate at this point
17 for this more evolutionary design or something.
18 You're going to have to say it better than me. But I
19 think that that's an important point you raised that
20 I think ought to be covered in the letter because
21 Anna, and maybe you missed it, had said it's what the
22 regulations say. Anna Bradford made a comment at the
23 beginning of meeting, and I think you may have missed
24 that part too.

25 (Simultaneous speaking.)

1 MEMBER BLEY: I missed the first minute.

2 CHAIR SUNSERI: We'll have the transcript.

3 We can go back and look at his exact words, what he

4 said. We don't have to capture it all right here.

5 But if you want, just put a note for what the point is

6 and then we can do that.

7 VICE CHAIR REMPE: Guidance or regulation

8 may need to be modified or something like that, just

9 something about we understand why the staff did what

10 they did.

11 MEMBER MARCH-LEUBA: If I may say so, that

12 last statement should be a third bullet and really the

13 first and second are the same concept.

14 MEMBER KIRCHNER: Jose, yeah, we could

15 just keep them for now.

16 MEMBER MARCH-LEUBA: Okay.

17 MEMBER KIRCHNER: Offline, we can condense

18 and make sure we capture everything.

19 CHAIR SUNSERI: So once Dennis is done,

20 the next member would be Vesna.

21 MEMBER KIRCHNER: Yeah, Vesna, you had --

22 I know you have something you said perhaps written

23 down. But if you could just summarize it, we

24 certainly can collect from all members any input

25 offline. But for this purpose --

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1 MEMBER DIMITRIJEVIC: Yeah, this will be
2 difficult to dictate. So I'm just going to summarize
3 and then -- I mean, I have it written on my piece of
4 paper. I will start putting it in the vote, but I'm
5 not finished. So then I will send you the file.

6 MEMBER KIRCHNER: Summarize here and it
7 will --

8 MEMBER DIMITRIJEVIC: So main summary here
9 is the Chapter 19 on multiple places, thanks to Jose,
10 we have stated that we cannot make conclusions. And
11 the risk is properly identified and the safety goal is
12 met. And we cannot conclude the design is safe until
13 this boron thing is addressed, right? Everybody
14 remembers that, right?

15 (Simultaneous speaking.)

16 MEMBER DIMITRIJEVIC: So therefore, the
17 question is, how can we close the Chapter 19 if we
18 cannot really after this discussion say, oh, this is
19 not a risk concern? I don't think at this moment we
20 are ready to say this is not a risk concern. The main
21 of these things is because also the same thing, the
22 beginning of this meeting that we're going to clearly
23 identify scenarios leading to this boron power
24 excursion.

25 So I don't think we have succeeded in that

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1 either because those scenarios are not in this moment
2 clearly identified, at least not from my point of view
3 that I can feel comfortable that they don't present
4 significant risk concerns. I don't think that the
5 risk is as high as presented yesterday to us because
6 there is so many assumptions there that may be
7 questionable. The one other thing is the -- the one
8 important thing is for how long it takes to get in
9 this. What does it mean, prolong? How long is that?

10 And the second thing is, how would
11 operator make this error of commission? Is that
12 sabotage event? Does he have got the wrong
13 indication? Why would an operator when he has
14 successfully since he had decided to start, for
15 example, charging?

16 So then we haven't alternatively addressed
17 or discussed this operator action in order to estimate
18 how likely that action is or not likely. I mean, if
19 he wants to sabotage, he can withdraw the rods. I
20 mean, why would he do it? So then Jose's point is
21 then he tries to go in the different mode of
22 operation, the change the state, that he will be
23 instructed or required to do that. But we don't
24 really have operating procedures how to shut down or
25 in this moment. So we cannot deliberate what he's

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1 doing.

2 So therefore, in this moment, you cannot
3 really estimate how likely is the operator to make
4 this settle for this most likely state. That state,
5 there is so many things in there, and PRA scenarios
6 which have not been addressed. One of those is, for
7 example, if we have a charging break outside of
8 containment. Then the operator will definitely should
9 start.

10 After the ECCS operation and everything
11 goes, operator will start containment flooding and
12 drain system. And that could happen after prolonged
13 ECCS operation. Now I the PRA presentation, it will
14 say that the injection in this case is very low and
15 would not change. But we cannot see any relation of
16 that.

17 Also, this is happening not in ATWS
18 scenario. So this is happening in the all-rods-in
19 scenario. And this is a very important question for
20 me. What is a rod seam because having one rod out is
21 already getting your sequencing where the for rod four
22 orders of magnitude down.

23 So I just want to say that we have not
24 really defined scenarios. Definitely, there is no
25 support. The most -- the LOCA, I've been very

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1 impressed with Pete, that it's all defined for small
2 LOCA and rod-out.

3 And the thing is that I don't think at
4 this moment I have enough conclusion to say that
5 Chapter 19 agrees that this is a low risk with a big
6 matching to the safety goals. And then we have
7 identified all risk in sight. And without discovering
8 recovery actions or the actions which can get us into
9 trouble, we cannot even -- in the Chapter 19, the
10 first table says that important risk inside should be
11 identified. And for example, I has a section on human
12 actions. Also, the human actions is important for the
13 risk should be identified.

14 However, in the text of Chapter 19, it
15 clearly says there is no important human actions.
16 There is no action of commission to be considered. We
17 have been complaining about that from the different
18 reasons. But when it comes to this boron, obviously
19 is Chapter 19 acceptable with the statements they
20 make?

21 So my point is that what we wrote in the
22 Chapter 19 letter, I'm not sure we can close in this
23 moment with the information which we have. And I'm
24 interested what other members think about how do we
25 proceed from now. But I will put a lot of those

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1 things in the statement and then we can -- you guys
2 can consider them.

3 MEMBER PETTI: So Vesna, I have a
4 question. Are you saying -- you say we, so I'm a
5 little confused. Are you saying that the PRA missed
6 sequences of the kind that we are talking about --
7 that we've been talking about?

8 MEMBER DIMITRIJEVIC: No, what I'm saying
9 the sequences in the PRA exist, but they only --
10 success criteria is only make up, not the reactivity
11 excursion. They just consider are they on time to
12 cover the core, not the boron and the reactivity
13 insertions. They're not considered in any of those
14 scenarios.

15 MEMBER PETTI: So the phenomenology behind
16 the risk assessment --

17 MEMBER DIMITRIJEVIC: Yes.

18 MEMBER PETTI: -- is not correct?

19 MEMBER DIMITRIJEVIC: And I don't know if
20 it's correct. If this is -- if boron is not an issue,
21 then it's correct.

22 MEMBER PETTI: Right, right.

23 MEMBER KIRCHNER: So it may not be
24 complete.

25 MEMBER PETTI: Right. And I'm just trying

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1 to figure out how to characterize that in my mind,
2 yeah. Thanks.

3 MEMBER DIMITRIJEVIC: So from that
4 perspective, actually if you control F boron dilution
5 in the Chapter 19, you will only find the very short
6 discussion about the deborated water, some simple
7 things. But no boron -- not any or no discussion at
8 all about this downcomer boron dilution.

9 MEMBER BLEY: And the things we heard
10 discussed this week aren't documented in the normal
11 place.

12 CHAIR SUNSERI: So Vesna, I have a
13 question.

14 MEMBER MARCH-LEUBA: We need to capture
15 that.

16 CHAIR SUNSERI: In my mind -- go ahead.

17 MEMBER MARCH-LEUBA: No, go ahead, Matt.
18 Finish it. But what I was saying is we need to
19 capture. There were two or three concepts, and we
20 need to capture them in bullets. And then both of
21 them or whatever, we'll write a letter. So I heard
22 there were two concepts. One is the boron dilution
23 topic is not properly captured in the PRA. This
24 dilution issue or topic is not properly captured in
25 the PRA.

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1 MEMBER DIMITRIJEVIC: Well, Jose, what
2 means properly? I mean, it's not captured.

3 (Simultaneous speaking.)

4 MEMBER MARCH-LEUBA: Okay.

5 MEMBER DIMITRIJEVIC: What do you mean
6 properly?

7 MEMBER MARCH-LEUBA: Yeah. Sandra, please
8 delete --

9 MEMBER DIMITRIJEVIC: Right now, we don't
10 have it properly to capture that.

11 MEMBER MARCH-LEUBA: Please delete
12 properly.

13 MEMBER DIMITRIJEVIC: And because that's
14 a red box in Dave's diagram. So I don't know. Can it
15 be properly? Let me ask you something, Jose, because
16 I wanted to ask you that. Is this -- the prolong ECCS
17 dilution, is this also an issue if all rods are in?
18 I mean --

19 MEMBER MARCH-LEUBA: Yes, yes.

20 MEMBER DIMITRIJEVIC: -- the dilution is
21 going to happen, but can you add enough reactivity to
22 get in trouble?

23 MEMBER MARCH-LEUBA: Yes. What I --

24 MEMBER DIMITRIJEVIC: Even if all rods are
25 in?

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1 MEMBER MARCH-LEUBA: Even with all rods
2 are in, you will get critical. What I don't know
3 because a calculation has not been performed is if the
4 power will be high enough to cause damage to the core
5 because the calculation has not been performed. But
6 the reactor will go critical, yes.

7 MEMBER DIMITRIJEVIC: Pete has said in his
8 paper that even with one rod out, he will not go
9 critical. So now the question is --

10 MEMBER MARCH-LEUBA: And that's why I said
11 earlier before lunchtime I think he's being misquoted.
12 But we'll talk about that whenever Walt wants to talk
13 about it.

14 MR. LU: Yes, we have his white paper and
15 we can use that as a reference.

16 MEMBER MARCH-LEUBA: Yeah, but the white
17 paper is being misunderstood.

18 MEMBER DIMITRIJEVIC: Well, he has stated
19 that in his conclusions on Chapter 36, he said that
20 Doppler feedback, blah, blah, blah, that there will
21 not be any damage from the excessive energy
22 disposition.

23 MEMBER MARCH-LEUBA: Okay. I disagree
24 with that statement.

25 MEMBER DIMITRIJEVIC: I know, but this is

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1 another assumption that one rod is out, so --

2 MEMBER MARCH-LEUBA: Since we're talking
3 about this, Pete has not a single calculation to
4 support what you guys have said.

5 MEMBER DIMITRIJEVIC: Well, now let's ask
6 another question. How about the delay ECCS actuation?
7 Is there also, you think, enough criticality can be
8 added, because that's happened in that accident is the
9 all rods are in.

10 MEMBER MARCH-LEUBA: We can talk offline.
11 I haven't thought about that one. Critical delay ECCS
12 actuation means less deboration. But you have to tell
13 the specific transient.

14 MEMBER DIMITRIJEVIC: I will try to put
15 these things in the -- you are also aware that -- I
16 mean, I noticed you discussing this containment flood
17 and drain multiple times. You are aware that there is
18 actually scenario which is assume to lead to success.
19 When we have a break outside containment in charging
20 lines, so charging is not going to be insulated. Is
21 that operator still instructed to start containment
22 flood and drain after some time? That timing is not
23 defined in the PRA or in HRA, but it comes after
24 prolonged ECCS operation in my opinion.

25 MEMBER MARCH-LEUBA: I am willing, ready,

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1 and able to have an offline meeting with you. And you
2 ask me what your transient is, and I'll tell you what
3 I think happens. But right now, I haven't thought
4 about that one, so I don't have an answer.

5 MEMBER BLEY: This is Dennis. May I
6 interrupt the process question for Matt?

7 CHAIR SUNSERI: Yes, go ahead, Dennis.

8 MEMBER BLEY: Or Walt, I'm not sure who
9 this goes to. In two weeks, we're going to have
10 another meeting ostensibly to get three letters out.
11 But at least for me, the Dr. Lu paper and Peter
12 Yarsky's paper, I really can't say I've studied those
13 to the point that I'm comfortable drawing any
14 conclusions from them. I'm hoping we're planning at
15 least a half of day meeting back with the staff and
16 the applicant to discuss any issues we have been we
17 try to complete the letter. Is that true?

18 MEMBER KIRCHNER: Well, we haven't asked
19 them to make any formal presentations, Dennis. But
20 should the -- as a result of this process, if we feel
21 we need to request through Scott of support from the
22 staff and/or the applicant, I think we can do that.
23 So --

24 MEMBER BLEY: Well, I just --

25 CHAIR SUNSERI: I agree, Walt. What I

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1 would suggest here is we get through the list of
2 things and then we identify where we feel like there's
3 holes in our knowledge that would be enhanced or
4 whatever, how you want to say it.

5 MEMBER KIRCHNER: Right, right. For the
6 presentations.

7 CHAIR SUNSERI: And be very specific on
8 what we want from them. I mean, that's where I would
9 go with it.

10 MEMBER KIRCHNER: Yes. Is that fair
11 enough, Dennis?

12 MEMBER BLEY: Yes.

13 MEMBER KIRCHNER: Yeah, because I just
14 don't want to just say, oh, we want presentations
15 again from the staff and the applicant, without the
16 specificity that Matt's referring to.

17 MEMBER DIMITRIJEVIC: Walt, just to wrap
18 it up, I don't think it's my job to make conclusion
19 that this is not a risk -- I can have more days to try
20 to estimate this. But that shouldn't be my job. The
21 main thing is the PRA made the point.

22 It says, in their opinion, the boron
23 dilution of downcomer is not a risk issue, period. So
24 now the only question is we can -- at least their
25 conclusions which I was trying to do and then say, do

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1 we have enough to conclude that they made the right
2 conclusions? That's it. I mean, they have made
3 conclusions that this is not a risk issue in the
4 Chapter 19. Okay. That's it.

5 CHAIR SUNSERI: So Walt, if I were
6 following alphabetical order, you would be next. But
7 since you're the Chair --

8 MEMBER KIRCHNER: I'm going to pass, yeah.

9 CHAIR SUNSERI: -- you should go last so
10 as to not to unduly influence with the power of the
11 position, huh? How's that sound?

12 MEMBER KIRCHNER: Yes. What power of
13 position? Okay. I think Jose is next.

14 CHAIR SUNSERI: We'll go to Jose next,
15 yes.

16 MEMBER MARCH-LEUBA: Okay. Sandra, I
17 apologize. You're going to have to type a lot because
18 I have a five-page document I'm going to try to
19 summarize it in few words. So Sandra, are you ready?
20 Type, the design modifications solved the issue of --
21 solve, like in resolve. Okay. Solve the issue of
22 uncontrolled passive cooling and late ECCS actuation.

23 MS. WALKER: I'm sorry, Jose. I missed
24 that.

25 MEMBER MARCH-LEUBA: Yeah. So self

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1 control is uncontrolled, U-N controlled, lack of
2 control, uncontrolled, uncontrolled. We know anyway.
3 No. Type where you are. Type, late ECCS actuation.
4 I think we know what we mean.

5 MEMBER KIRCHNER: Yeah.

6 MEMBER MARCH-LEUBA: Go to the next one.
7 Next -- not accusation. Okay. We know what we mean.
8 Okay. Keep typing. Next bullet. The design
9 modifications actuation. Are you ready? The design
10 modifications do not prevent and type upper case DC
11 for downcomer, D-C, deboration. Okay.

12 And can you move backwards? It shouldn't
13 say, do not prevent. Say, do not completely prevent.
14 Next bullet. The applicant and the staff argue that
15 no mechanism exists to drive deborated DC water into
16 the core. Deborated, D-E-B-O-R -- okay. Unborated,
17 say unborated. Okay. It's good. Deborated water --

18 MEMBER KIRCHNER: Jose? Jose?

19 MEMBER MARCH-LEUBA: -- into the core.

20 MEMBER KIRCHNER: Jose, I don't think they
21 quite say that. They kind of say --

22 MEMBER MARCH-LEUBA: We'll argue that
23 after I type it, and we will --

24 (Simultaneous speaking.)

25 MEMBER KIRCHNER: All right. All right.

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1 But I'm just trying to be factual. I'm not trying to
2 debate positions. Okay.

3 MEMBER MARCH-LEUBA: Deborated water into
4 the core and cause damage, period. We believe -- no,
5 don't put believe. Can you delete that, please? No
6 calculations support this statement. All right.
7 That's good. Let's move to the next. I will skip
8 recovery because we already covered it.

9 MEMBER KIRCHNER: Jose, would you let me
10 just make a suggestion?

11 MEMBER MARCH-LEUBA: Yes, sir.

12 MEMBER KIRCHNER: I know where you're
13 going with that previous bullet. They actually do
14 look at -- it's the latter part of your bullet that's
15 operative here. They don't believe that they would
16 experience any core damage. I don't think they ever
17 said that no deborated water would find --

18 MEMBER RICCARDELLA: Walt --

19 MEMBER KIRCHNER: -- its way to the core.

20 MEMBER RICCARDELLA: -- how about if you
21 put the word, significant, before deborated?

22 MEMBER MARCH-LEUBA: Yeah, I thought --

23 MEMBER RICCARDELLA: Would exist to drive
24 --

25 MEMBER MARCH-LEUBA: -- what I typed --

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1 MEMBER RICCARDELLA: -- significant
2 amounts of deborated water into the core.

3 MEMBER MARCH-LEUBA: Yeah.

4 (Simultaneous speaking.)

5 MEMBER MARCH-LEUBA: I mean, in my
6 statement, I was saying that no mechanism exists to
7 inject sufficient deborated water into the core to
8 cause damage.

9 MEMBER RICCARDELLA: Yeah, there you go.
10 There you go.

11 MEMBER MARCH-LEUBA: That's what I was --
12 (Simultaneous speaking.)

13 MEMBER KIRCHNER: That's better. That's
14 better because they did look at it. We need to be
15 factual.

16 MEMBER MARCH-LEUBA: On the next line, can
17 you instead of say, and cause damage, can you say, to
18 cause damage? After core, instead of, and cause
19 damage, say, to cause damage on the last line.

20 MS. WALKER: I'm sorry. On the last line?

21 MEMBER MARCH-LEUBA: Yeah. On the fifth
22 one, on the last line, it says, water into the core
23 and cause damage.

24 MS. WALKER: Okay.

25 MEMBER MARCH-LEUBA: It should say, water

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1 into the core to cause damage.

2 MS. WALKER: Okay, sorry.

3 MEMBER MARCH-LEUBA: Hey, take a little
4 break. Can you go into layout and put line numbers?
5 So that way, we can tell you where to go. All right.
6 New paragraph, line 23. No instrumentation exists to
7 measure boron redistribution, period. The existing
8 instrumentation -- no, no, the same paragraph. The
9 existing instrumentation may not be operable under
10 ECCS conditions, under, under. You know what I'm
11 doing. This is just a reminder.

12 New paragraph. The void reactivity
13 coefficient -- the void, V-O-I-D, bubbles, bubbles,
14 reactivity coefficient has not been calculated,
15 period. These conditions are an unusual geometry, and
16 the possibility of a positive coefficient -- the
17 possibility of a positive being greater than zero --
18 positive coefficient cannot be discarded without a
19 calculation.

20 MEMBER KIRCHNER: Jose, while this --

21 MEMBER MARCH-LEUBA: Yes.

22 MEMBER KIRCHNER: -- being typed, just an
23 observation. I know this is not our final letter.
24 I've learned over the years to not use no, never, or
25 all. Instrumentation does exist, but I'll let this

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1 pass for the time being. I know the point you're
2 trying to make.

3 MEMBER MARCH-LEUBA: Boron redistribution
4 will require multiple locations to measure the boron.
5 We only have one --

6 MEMBER KIRCHNER: But we're saying --

7 MEMBER MARCH-LEUBA: -- that one doesn't
8 work.

9 MEMBER KIRCHNER: -- here no
10 instrumentation exists. And there is only --
11 unfortunately, only one-point sample, if it's
12 operable.

13 MEMBER MARCH-LEUBA: Yeah, yeah. Sandra,
14 on Line 23, can you say, no effective instrumentation
15 exists on Line 23?

16 MEMBER KIRCHNER: I'm not going to debate
17 these, Jose. I just wanted for the record to make it
18 clear that we're just capturing thoughts here. This
19 is not a final statement or position by the Committee
20 by any means.

21 MEMBER MARCH-LEUBA: All right. Sandra,
22 final paragraph and you're almost done with me. Yeah,
23 type, Chapter 19 of the SER states that CFDS -- F-D-S
24 -- operation is not a risk concern, period. No
25 calculation is provided to support it.

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1 Instead of is, can you say, has been on
2 the other line, 29? No calculation has been provided.
3 And I don't know if -- thank you, Sandra. I'm asking
4 Vesna now. Did you already make the point that they
5 claim that no operator errors of commission can
6 possibly do any damage to the core? And that is on
7 the SER, and I think that's unsupported by
8 calculations.

9 MEMBER DIMITRIJEVIC: They didn't make any
10 claims on the boron event.

11 MEMBER MARCH-LEUBA: No, no, not boron
12 dilution. On the generic Chapter 19, I believe they
13 say --

14 MEMBER DIMITRIJEVIC: Yes.

15 MEMBER MARCH-LEUBA: -- look at the
16 possible --

17 (Simultaneous speaking.)

18 MEMBER DIMITRIJEVIC: No, they say they
19 didn't identify any errors of commission, and we
20 argued that on the crane operation. But no discussion
21 was connected to the boron.

22 MEMBER MARCH-LEUBA: I am concerned of all
23 the operator errors of commission of starting these
24 nonsafety grade systems, especially if incorrect
25 information is provided in the FSAR to the COL. The

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1 FSAR states in many places that CFDS can be used as a
2 backup for CVCS, many places. And now they're telling
3 us that to the COL, we will actually do this
4 calculation and find out if we were wrong. But that
5 statement is not supported by calculations. But I'll
6 leave that to you, Vesna. I'm done.

7 MR. MOORE: Jose, this is Scott.

8 (Simultaneous speaking.)

9 MR. MOORE: Yeah, this is Scott. On Line
10 15, Jose, did you want and control to be uncontrolled?

11 MEMBER MARCH-LEUBA: Yes, can you -- yes.
12 And Sandra, can you delete and? And by that, it's the
13 generic DHRS actuation. But most people don't know
14 what DHRS is, so --

15 MEMBER KIRCHNER: Yeah, and I cautioned
16 everyone that these are not statements from the
17 Committee. We're just gathering input, and we're not
18 going to edit them in real time to make them perfect.
19 This is not a Committee letter. We're just gathering
20 input. So I think --

21 MEMBER MARCH-LEUBA: And for the record,
22 what I mean by uncontrolled, I mean hands off.

23 MEMBER KIRCHNER: Yes.

24 MEMBER MARCH-LEUBA: It's passive. The
25 operator doesn't touch it.

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1 MEMBER KIRCHNER: Yeah. Okay. Thank you,
2 Jose. On the roster, I think Dave Petti is next.

3 MEMBER PETTI: I'm not exactly sure what
4 to say. I will tell you that I am concerned about a
5 couple of things. The staff made a reasonable
6 assurance finding. Some of these bullets imply they
7 didn't do their job properly because they didn't do a
8 calculation. They did an assessment, an engineering
9 assessment. You could argue whether that's good
10 enough or not. But the implication based on the words
11 is that they were somehow negligent in their --

12 MEMBER KIRCHNER: No, so Dave, let's
13 capture this. I don't want to collect a lot of
14 negatives. I want to collect just issues that were of
15 concern. So you're concerned that we're overreacting
16 or overstating the case, let's capture it.

17 MEMBER PETTI: Yes, that's the concern,
18 Sandra, is that the statements are overly negative
19 relative to the staff's reasonable assurance finding
20 and the engineering assessments that support that. I
21 did write some words that you all saw that tried to be
22 more balanced in this regard. But we can take those
23 offline later.

24 In my opinion, what we're down to is
25 differences of opinion between two experts -- two or

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1 three experts, Dr. Yarsky, Jose, and whose name I
2 can't remember, the dissenting opinion.

3 MEMBER RICCARDELLA: Dr. Lu.

4 MEMBER PETTI: Dr. Lu. Thank you. So --

5 MEMBER MARCH-LEUBA: I cannot run the
6 calculations for them. All I know --

7 (Simultaneous speaking.)

8 MEMBER PETTI: But you are dismissing the
9 role of engineering assessment. If you --

10 (Simultaneous speaking.)

11 MEMBER PETTI: It would be -- I don't mind
12 a statement that says, a calculation to confirm or
13 deny the engineering assessment would be very
14 valuable. But when you say, this isn't supported,
15 this isn't supported, this isn't supported, it makes
16 it sound like they didn't do a damn thing for the last
17 four weeks. These guys have been busting their butt
18 to try to get this done, I'm sure working night and
19 day.

20 And that's what I'm concerned about is the
21 tone of the letter, how it can be misinterpreted,
22 because you know people are looking. They've already
23 been looking at our previous letters in the press. We
24 have to be extremely careful with how we craft the
25 picture.

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1 I agree with the item on Line 3. We
2 should -- it'd be nice to have a well identified
3 recovery path. I don't think any of us disagree with
4 that. But there's not enough information to, I think,
5 meet the well identified path at this point.

6 MEMBER MARCH-LEUBA: The problem, Pete --
7 I mean, Dave, is that the argument for saying that
8 CFDS has no risk concern when you go to bottom -- and
9 I talked to the staff, Pete, and the applicant. And
10 their argument is in their mind, they honestly believe
11 that the core will mix. There will be sufficient
12 turbulence to mix the front, and the front won't
13 exist.

14 That's their bottom line argument because
15 if they're calculation with the front moving through
16 the core unimpeded and clean, not mixed, they cannot
17 support it. So that's their argument. Their argument
18 is it will mix, but they haven't written that
19 anywhere. They don't even make that argument, not
20 even in oral arguments. Well, they do. And how do
21 you calculate that? So their argument --

22 MEMBER PETTI: I see them --

23 MEMBER MARCH-LEUBA: -- of CFDS --

24 MEMBER PETTI: -- make that argument in
25 the white paper.

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1 MEMBER RICCARDELLA: Yeah, the white paper
2 makes that argument, Jose.

3 CHAIR SUNSERI: Jose, you've made that
4 point. We understand that. We get it. Saying it
5 over and over again is not helping any. It's impeding
6 Dave's ability to get his points on the table. Let
7 Dave get his points on the table. Go ahead, Dave.

8 MEMBER KIRCHNER: Go ahead, Dave.

9 MEMBER PETTI: I think that's the major
10 point beyond what's in the email that you guys have
11 that to get to a well identified recovery path I think
12 is going require analysis of the stuff in the red box
13 that we talked about this morning. That isn't going
14 to happen quickly. We talked about that.

15 MEMBER BALLINGER: This is Ron. I guess
16 I was the one that put the statement on Line No. 3.
17 I think we have to be satisfied in our minds that
18 there's a well defined recovery path. I don't know
19 that they need to write it down and make sure and show
20 it to us. I mean --

21 MEMBER PETTI: So a strategy --

22 MEMBER BALLINGER: -- somehow we need to
23 be --

24 MEMBER PETTI: -- perhaps is really --

25 MEMBER BALLINGER: Yeah, in other words,

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1 we need to be satisfied that down the line when they
2 build one of these things, somebody says, oh, my gosh.
3 We can't recover. So we need to be satisfied, I
4 think, that a recovery path exists. That's what I was
5 trying to get at.

6 MEMBER PETTI: Yeah, and I don't disagree
7 with that. The question is, I mean, and this gets
8 into this legalistic thing, now or before, is it a
9 high COL item?

10 MEMBER KIRCHNER: Dave, any further
11 comments?

12 MEMBER PETTI: No.

13 MEMBER KIRCHNER: Okay. I'm thinking
14 alphanumerically here.

15 CHAIR SUNSERI: Hold on a second. Did we
16 get that? Did we get that?

17 MEMBER KIRCHNER: Did we get what you
18 wanted, Dave?

19 MEMBER PETTI: Yeah, that's fine.

20 MEMBER KIRCHNER: Okay.

21 CHAIR SUNSERI: Okay. Joy would be next.

22 MEMBER KIRCHNER: Joy would be next.

23 VICE CHAIR REMPE: Okay. So rather than
24 start something who I guess I -- I'll tell you what
25 I'm trying to say. You tell me whether how to best do

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1 it. In a way, it's kind of building off of your
2 chart, Dave, and some other things that I heard. But
3 if I hadn't seen other people's input, it's difficult
4 to have in my opinion from what I've heard.

5 It's difficult to obtain -- it may be
6 difficult to have a well justified recovery path
7 because, one, we didn't see a write up that was
8 documented and available for us to review. And in my
9 opinion, it may be difficult to actually -- detailed
10 codes may not be available that are validated. And we
11 sent an awful lot of time arguing about engineering
12 judgment or expert opinion.

13 And so yeah, you might say it's a COL
14 item. But on the other hand, I'm thinking that we're
15 kind of just touching the tip of what they're going to
16 have to deal with in the future. And you could almost
17 put it as an add on to Ron's point on Line 3 that it
18 may be difficult to resolve with available validated
19 methodologies. Is that going to be offensive to you,
20 Ron, if I add something like that there?

21 MEMBER RICCARDELLA: I'm impossible to
22 offend.

23 VICE CHAIR REMPE: That's good to know.
24 I'll try and use that --

25 (Simultaneous speaking.)

1 MEMBER BALLINGER: I've been offended by
2 professionals. You can't do anything.

3 VICE CHAIR REMPE: Ooh, I could try. It's
4 a challenge. On your thing about the existing
5 instrumentation, I know you're talking about boron
6 distribution. And I heard Matt earlier today talking
7 about, well, the operators can infer it from the flux
8 monitors.

9 And if you've got chugging going back and
10 forth, the kicker I'm trying to get to is that they're
11 going to have to infer what's need. And it may be
12 more difficult because not only you may have changes
13 in your boron distribution, but I'd also think you
14 might be having fluctuations in the water itself. And
15 so -- and that's kind of also talking about a well
16 identified recovery path. It could be also difficult
17 to infer what's needed. And I don't know whether you
18 want to add that to your point, Jose, on 22. Or just
19 it's not only validated (audio interference) but with
20 existing --

21 MEMBER MARCH-LEUBA: I see --

22 VICE CHAIR REMPE: -- available plant
23 instrumentation.

24 MEMBER MARCH-LEUBA: I see where you're
25 going. The only possible way out they have without

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1 thinking much about it because they have not thought
2 much about it and we're thinking at a COL stage. They
3 say that we can use the period-based trip -- or not
4 trip. In this case, it would be an alarm to identify
5 criticality and then we would stop.

6 I don't know what the inertia will do.
7 And certainly it raises significant questions about
8 GDC-27, a return to power. And especially from the
9 point of view of HRA, human reliability assessment,
10 that's not a simple operation that you can give ten to
11 the minus four probability that the operator will do
12 right.

13 VICE CHAIR REMPE: Well, if you're --
14 (Simultaneous speaking.)

15 VICE CHAIR REMPE: -- what they're going
16 to do with existing instrumentation for a different
17 application and I can think about what we tried to do
18 with the SPNDs at TMI to understand when the core was
19 relocating or what we're trying to do at Fukushima, a
20 lot of variables. It's not so easy. And so it's
21 going to -- so you can decide where to put it, but --
22 (Simultaneous speaking.)

23 MEMBER MARCH-LEUBA: It is conceivable
24 that the operator will thread the needle and do it
25 right. But it's not inconceivable that one of those

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1 ten times, he'll do it wrong.

2 (Simultaneous speaking.)

3 VICE CHAIR REMPE: Anyway, so I don't
4 know. Do you want to add it on to yours? I mean --

5 MEMBER MARCH-LEUBA: Okay. You do it.

6 VICE CHAIR REMPE: -- you're talking about
7 boron distribution.

8 MEMBER MARCH-LEUBA: I've been putting in
9 too much stuff.

10 VICE CHAIR REMPE: Okay. Well, maybe
11 we'll just add it on number 3. And Sandra, right now,
12 maybe I have a slow response this time. But I just
13 see validated. So why don't you say, validated
14 analysis codes. Okay? Maybe you're doing it, Sandra,
15 but my computer is not -- I see something happened.
16 Yeah, there it is.

17 And existing plant instrumentation. And
18 then because we spent so much time arguing about
19 expert opinion or engineering judgement, maybe put in
20 parenthesis there's variability with experts and
21 engineering judgement and you get my point. I mean,
22 bring in a new set of experts and you get a different
23 answer.

24 MEMBER KIRCHNER: Well, that always is
25 true. I don't that's going to find its way into our

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1 letter.

2 VICE CHAIR REMPE: I know, but I've
3 listened to many arguments between experts this week.
4 It's just my own frustration. Anyway, go ahead.

5 MEMBER KIRCHNER: Well, what was relevant
6 to that, Joy, again, on a factual level is whether
7 there was an issue about the PERT that was used for
8 the PRA. And that's where there was perhaps something
9 was missed. But generically, I don't think we want to
10 take that topic on.

11 VICE CHAIR REMPE: Well, right now, you're
12 talking about -- I've heard today about, well, they
13 used engineering judgment. And again, engineering
14 judgment, unless it's just so obvious, undocumented
15 engineering judgment or that we couldn't review is
16 difficult to have confidence. Okay? How about that?

17 MEMBER KIRCHNER: Just be careful you
18 don't undermine the Committee.

19 VICE CHAIR REMPE: Good point.

20 (Simultaneous speaking.)

21 VICE CHAIR REMPE: Maybe that's another
22 point. Anyway, I said enough. Maybe put in
23 parenthesis, engineering judgment, and I'll let the
24 letter writers figure out what to do with that.

25 MEMBER BALLINGER: You know, folks, that's

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1 always our opinion. It's always our engineering
2 judgment.

3 CHAIR SUNSERI: That's why we were chosen
4 hopefully.

5 MEMBER BALLINGER: That's why we were
6 chosen.

7 CHAIR SUNSERI: I'm going to turn from Joy
8 to Matt Sunseri.

9 (Simultaneous speaking.)

10 MEMBER KIRCHNER: Oh, no. Wait a minute.
11 My alphabet is scrambled today. Pete Riccardella?

12 MEMBER RICCARDELLA: Yeah, I had --

13 MEMBER KIRCHNER: Could you do the Italian
14 pronunciation for us, Pete?

15 MEMBER RICCARDELLA: Riccardella. That
16 was the Italian spelling before my ancestors ended up
17 at Ellis Island or wherever it was. Anyway, it's --
18 I had a bunch of points, but most of them, I think,
19 have been covered. I'd just maybe add to couple of
20 them in what was Line No. 8. Now it's, I guess, No.
21 9.

22 To me, at the end of that, there's --
23 after it says, how much of what we're talking about is
24 required to demonstrate adequate protection at the DCA
25 stage? How much of the analysis in that red box is

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1 really required at this stage I'm asking. And then
2 kind of along the lines of what Joy was talking about,
3 all these lines where we talk about no calculations
4 have been done, no calculations have been done. But
5 there has been what I think is a very impressive
6 engineering judgment, a 30-page white paper by an
7 expert in the field.

8 And I don't think we should just discount
9 that as, oh, there's no calculations, no hard
10 calculations. I read that report and admittedly not
11 an expert in that area, but it was very convincing to
12 me. So somehow no calculations, but a well documented
13 engineering judgment.

14 MS. WALKER: What was the last part?

15 MEMBER RICCARDELLA: Engineering judgment.
16 That's all I have.

17 MEMBER MARCH-LEUBA: Sorry, Pete. But I
18 need to again emphasize that I strongly disagree with
19 one of Pete's conclusions. I think he would agree
20 with me if he was informed. He did not say that when
21 you turn CFDS, you won't have a problem if you inject
22 cold unborated water all the way to the top of the
23 core. What is he said is he believes, engineering
24 judgment, that the water will mix and won't cause the
25 problem.

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1 MEMBER RICCARDELLA: You know --

2 MEMBER MARCH-LEUBA: But --

3 MEMBER RICCARDELLA: -- his engineering
4 judgment all involves the required calculations in
5 that red box and Dave's charts. And he's made some
6 engineering judgment about that. And I think, Jose,
7 that you and Dr. Lu are kind of ignoring that red box
8 and just saying, well, they haven't done the
9 calculations, so we're just going to assume that it
10 all goes in there. And he's tried to explain, I
11 think, based on his best judgment what will happen in
12 that red box.

13 MEMBER MARCH-LEUBA: Right. But when
14 you're taking credit for mixing because of turbulence
15 in the core, that's a stretch, man. And I'll stop
16 there.

17 MEMBER RICCARDELLA: He's taking credit
18 for that. He's taking credit for negative reactivity
19 coefficients, both Doppler and void coefficients.

20 MEMBER MARCH-LEUBA: Which he doesn't --

21 MEMBER KIRCHNER: I would just prefer that
22 nature -- Jose, nature isn't very kind. If you try
23 and propagate a level front of almost anything in a
24 liquid system, it's only with great difficult. If you
25 had oil and water, might be a little easier. They

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1 tend to separate. Otherwise, Second Law of
2 Thermodynamics, entropy, things mix.

3 MEMBER MARCH-LEUBA: I know it will mix
4 with what's in the core. But there are 14 times more
5 core volumes going behind it. Okay. I said enough.
6 I mean, I agree with Pete. This is likely to be the
7 answer. I just don't see any justification that it
8 is.

9 MEMBER KIRCHNER: Okay. That argument,
10 we've heard now. I think, Chairman Sunseri, it's your
11 turn.

12 CHAIR SUNSERI: Thank you, Walt. And I
13 think most of what I have to say is covered within
14 these bullets. But I just want to make sure that we
15 emphasize or that we at least address a balance
16 between reasonable assurance and absolute assurance
17 and that our letter strikes the right tone.

18 And what I mean by way of an example is I
19 know we're concerned about the evaporation of the
20 water out of the core. We know the scenario, right?
21 It condenses in a downcomer. It dilutes there. And
22 then we're worried about recovery about that.

23 I can think back on my experiences with
24 PWRs advance sequence where you lose natural
25 circulation cooling during some kind of loss of

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1 coolant accident. The steam generate U-tubes uncover
2 and you are in the exact same situation as here. The
3 core is heating up. The water boils. The steam goes
4 up in the steam generator tubes, condenses, falls down
5 the cold leg side of the coolant system, feeds the
6 manometer. And that diluted water then starts
7 migrating back to the core, and we count on that for
8 core cooling in that situation.

9 If we can -- and we can recover from that
10 situation. And I think there's sufficient evidence
11 that we can recover from this situation in the NuScale
12 model. And that's all I want to say at this time, and
13 I'll just leave it at that.

14 MEMBER KIRCHNER: Thank you, Chairman.

15 MEMBER PETTI: Walt --

16 (Simultaneous speaking.)

17 MEMBER KIRCHNER: So I think --

18 MEMBER PETTI: Walt, can we just capture
19 one other thing. I mean, I said it, but we were
20 talking fast.

21 MEMBER KIRCHNER: Go ahead, Dave.

22 MEMBER PETTI: I just think a statement
23 about the tremendous amount of work that both the
24 staff and applicant have put in.

25 MEMBER KIRCHNER: I'm going to close with

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1 that, Dave.

2 MEMBER PETTI: Okay.

3 MEMBER KIRCHNER: Thank you for the
4 prompt.

5 MEMBER PETTI: Thanks.

6 MEMBER KIRCHNER: Okay. So I get to that
7 clean up. I personally -- and I'm going to do
8 something I never do, but I'm going to do it today.
9 I'll use the never word. I was the reactor design
10 group leader at Los Alamos for quite a few years in
11 the '80s. I just put that on the table because I had
12 the great fortune to look at a lot of different
13 reactor designs.

14 I worked for the NRC on the module HTGR,
15 the PRISM reactor and so on. And we designed heat
16 pipe reactors. We may see them very shortly. There's
17 an application that's been accepted by the Commission.
18 So I have that background. And so I want to say this
19 statement first.

20 In the context of 10 CFR 52, this is as
21 essentially complete design as we're likely to see.
22 We know that some of the applicants coming are going
23 to try and use 10 CFR 52. There is -- if you pardon
24 me, staff, there's what I would call a loophole that
25 allows novel designs that have enhanced safety

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1 features, et cetera, to also apply under 10 CFR 52.
2 But this NuScale design I find pretty sound and
3 essentially complete. That's the words out of 10 CFR
4 52.

5 MEMBER PETTI: Walt, should Sandra capture
6 that point?

7 MEMBER KIRCHNER: Excuse me?

8 MEMBER PETTI: Should Sandra capture that
9 point? The NuScale design --

10 MEMBER KIRCHNER: Yeah, please, Sandra.

11 MEMBER PETTI: A complete DCA.

12 MEMBER KIRCHNER: This is an essentially
13 complete design in the spirit of 10 CFR 52. Spirit is
14 not the right word. In the context, please, of 10 CFR
15 52, this is an essentially complete design. It has
16 large margins compared to the existing fleet. And
17 with regard to -- now this may be better part of the
18 final letter, not the boron dilution letter. But let
19 me start with this, and then I'll narrow down my
20 comments.

21 It has large margins compared to the
22 existing fleet. Now don't type anything yet, Sandra,
23 because I haven't condensed this. But I see just this
24 one remaining issue that we've been engaged in this
25 last couple of days and for the last several months.

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1 I think basically maybe you could type now, Sandra.

2 Design changes and set point changes have
3 addressed long-term cooling under DHRS, that's an
4 acronym, capital D, capital H, capital R, capital,
5 DHRS conditions. Our remaining concern -- this is
6 more an opinion. But the concern -- yeah, just our
7 remaining concern is boron dilution after ECCS
8 actuation.

9 And now don't type anything, Sandra. I'm
10 just going to make a statement. This is the third
11 time I'm going to say it and the last. The staff
12 presented figures of merit which I think are
13 appropriate for this situation and in a way kind of
14 address what Dennis was saying about completeness of
15 the Chapter 15 analyses.

16 With regard to the DHRS, they were able to
17 demonstrate and confirm the applicant's position that
18 out to 72 hours, there was sufficient margin versus
19 critical boron concentration in the downcomer to
20 prevent the potential for a reactivity insertion
21 accident. That was good. It just begged from me
22 personally the question, where's the analysis on the
23 other side of the ledger?

24 Like, think about Dave's diagram. So he
25 checked the box, okay, on the left-hand side. Now

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1 we're on the right-hand side. We're under -- ECCS is
2 actuated. We're under conditions that could lead to
3 long-term boration. Both the applicant and the staff
4 suggest that that could take place within -- going to
5 Vesna's comments. Time frame, Vesna. Time frame is
6 hours. It's not 72 hours.

7 And so in my opinion, there is a
8 successful recovery path. And the path is based on
9 conservative analysis to just either -- I would do it
10 in tech-spec space. But hopefully down the road,
11 they'll do it in an operational procedure or EOP space
12 that within X time frame, and this can be estimated
13 with conservative margin, thou shall, if it's
14 available, start with the preferred option, CVCS if
15 it's not injection above the -- in the riser.

16 Second, spray. And third, containment,
17 flood and drain system and intercept this before the
18 conditions come to a situation where your downcomer
19 dilution is greater than the critical boron
20 concentration for the core. And then --

21 MEMBER PETTI: So Walt --

22 MEMBER KIRCHNER: Let me finish.

23 MEMBER PETTI: Okay.

24 MEMBER KIRCHNER: I love calculational
25 space. I was an original member of the team that

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1 developed TRAC which is now TRACE. I'm very pleased
2 that almost 50 years later, it's still in use. I have
3 a lot of confidence in what can be done in
4 computational space.

5 But I would rather -- as Dave had
6 eloquently said or someone else, I don't want to be in
7 the red box. All I want to do is avoid getting to
8 this situation. I personally believe it can be done.
9 And so again, from my standpoint, an adequate safety
10 determination could be made. And that's the end of my
11 speech.

12 MEMBER PETTI: So Walt, to make sure I
13 understand what you're saying is think about a part of
14 the boron concentration in the downcomer after
15 actuation. It's decreasing. It's decreasing. It's
16 decreasing. There's a window where you need to get in
17 there and do the things you suggest so you don't get
18 into --

19 MEMBER KIRCHNER: Exactly.

20 MEMBER PETTI: -- below a critical level.

21 MEMBER KIRCHNER: I'm an engineer. I want
22 to prevent this situation. I don't want to try and
23 manage it.

24 MEMBER PETTI: I think we should capture
25 that.

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1 MEMBER KIRCHNER: There is a window. It
2 doesn't happen instantaneously. You don't have ECCS
3 actuation and then entire boron, as Jose was saying,
4 14 volumes of the core diluted. That takes time. You
5 have time to react. I have confidence that they can
6 do it.

7 I don't want to get into the detailed
8 procedures. But I do believe that in calculational
9 space with conservative assumptions, much like the
10 applicant and the staff used, one can make an estimate
11 of the time window that's available to intervene
12 before you come close to conditions that would
13 threaten the possibility of a reactive insertion
14 accident. And then we don't have to argue about
15 whether the wavefront is purely diluted, whether
16 there's mixing in the core, and all these other
17 aspects of the problem which are very complex
18 calculations.

19 MEMBER PETTI: So Walt, can you --

20 MEMBER KIRCHNER: But I don't want to do
21 that.

22 MEMBER PETTI: Can you dictate a sentence
23 to Sandra so we don't lose it?

24 MEMBER KIRCHNER: Go ahead, Dave.

25 MEMBER PETTI: Okay. I'll try. A window

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1 of time exists following ECCS actuation for operator
2 actions to assure boron dilution does not decrease
3 below critical core concentration.

4 MEMBER MARCH-LEUBA: It's called the
5 critical boron concentration.

6 MEMBER KIRCHNER: Yeah, critical boron
7 concentration is the vernacular.

8 MEMBER PETTI: Right.

9 MEMBER MARCH-LEUBA: Which I remind
10 everybody that it's just a few percent from nominal.
11 I cannot tell you the exact number, but it's not very
12 large. And for this window, it might be minutes. And
13 I would like to ask you guys what power I'm going to
14 use to fix this.

15 MEMBER PETTI: Let me just finish. It's
16 concentration, yeah. Conservative calculations need
17 to be performed. Conservative calculations need to be
18 performed to determine the time window for such
19 recovery actions.

20 MEMBER KIRCHNER: And then finally, as a
21 former operator as well, I would not want to have to
22 rely on the source instrumentation. If we get into a
23 situation where this is feasible, there's inertia and
24 fluid dynamic effects. You, as an operator, will not
25 react fast enough to -- and you don't have much to --

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1 actually, what are you going to do, stop a boron
2 injection? It's a nice theory, but I don't think it
3 will -- if you just examine it from a few different
4 perspectives, yeah, the source --

5 MEMBER MARCH-LEUBA: I agree. It is --

6 MEMBER KIRCHNER: -- centers will tell you
7 went critical. But you know what? It's too late. So
8 you don't want --

9 MEMBER MARCH-LEUBA: Yeah, it will take at
10 least a minute or two to stop the flow.

11 MEMBER KIRCHNER: Yeah, yeah. You've got
12 flow in the pumps. The pumps -- or you isolate --
13 there's still flow in the system. That's not -- you
14 can't sit there with a delicate balance and then just
15 say, I'm going to look at the source term measurements
16 and control this situation. Trust me. Look into it.
17 Think about it. You'll figure out why --

18 VICE CHAIR REMPE: I agree.

19 MEMBER KIRCHNER: -- it's not feasible.

20 VICE CHAIR REMPE: Absolutely, Walt, what
21 I was trying to get to earlier. You just can't rely
22 on it.

23 MEMBER MARCH-LEUBA: I mean, you can rely
24 if it's the only thing you got. Okay? But that will
25 require throttling the CFDS injection to ten percent

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1 or something. There will have to be an analysis and
2 the operator will have to be with the bottom at the
3 stop. I mean, plus, he have all the GDC-27 --

4 MEMBER KIRCHNER: They're not calibrated
5 for that. They're not -- it's just not a viable
6 option. Trust me.

7 VICE CHAIR REMPE: And they have voiding
8 to consider as well as boron concentration. So how do
9 you distinguish what's causing it?

10 MEMBER KIRCHNER: It's just not -- that's
11 not a credible option. I like what the applicant is
12 doing. I mean, prevention is the best cure for any of
13 these kind of events.

14 MEMBER PETTI: Stay out of the box.

15 MEMBER KIRCHNER: Stay out of the box. Do
16 not put yourself into a situation. Now I do not know
17 whether this is tech-spec space or EOP space. I would
18 like to see -- this is not a wish list thing. It may
19 exist. But I mean, what one can do clearly is
20 calculate very conservatively the deboration rate and
21 whether it's minutes as Jose suggested. It may depend
22 on the scenario that got you there and so on.

23 It may be hours. I think in most events,
24 it will be hours. But I haven't looked at the
25 spectrum of initiating events that you would consider.

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1 But it's like going through a spectrum of small-break
2 LOCAs to see what's the limiting --

3 MEMBER MARCH-LEUBA: Well, we're not
4 supposed to be deciding the reactor agenda.

5 MEMBER KIRCHNER: I'm trying to solve the
6 problem.

7 MEMBER MARCH-LEUBA: Okay. But the
8 critical boron concentration is just a few percent
9 below the nominal. It is minus, believe me.

10 If you use any conservative analysis, I
11 think you'll see --

12 MEMBER KIRCHNER: I don't know, Jose. Let
13 them analyze the problem. Let them tell us what the
14 distribution is in the lower --

15 MEMBER MARCH-LEUBA: That's what I've been
16 screaming at the top of my lungs. I don't know what
17 the answer is.

18 MEMBER KIRCHNER: Okay.

19 MEMBER MARCH-LEUBA: All I know is nobody
20 else does.

21 MEMBER KIRCHNER: But, well I don't know
22 that. I'm not going to say that.

23 MEMBER MARCH-LEUBA: I know that. Because
24 if they knew, it was an only --

25 MEMBER KIRCHNER: Yeah. Jose, let's not

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1 use the no, all never. That's an allegation, not a
2 fact.

3 All I can say is, there is a way to
4 determine a path out of this problem. And that's my
5 suggestion.

6 MEMBER MARCH-LEUBA: Let me put a request
7 to all the world that this is really distressing. If
8 you have a calculation that shows that this is not a
9 problem, please let me know.

10 Because I don't have it.

11 MEMBER KIRCHNER: No, no, no. No, Jose,
12 that's not -- that's not where I'm coming from. I
13 don't want to do the wave front going into the core
14 calculation and argue with you about void fraction
15 feedback and all the rest.

16 I want to avoid that. What I want to say
17 is, there is a pathway to determine when I don't have
18 sufficient boron in the downcomer. And I need to
19 intervene in the situation and take action.

20 And then I'm not going to bother about
21 analyzing the worst case scenarios.

22 MEMBER MARCH-LEUBA: Okay. The most
23 likely reason you have a LOCA is because you have an
24 earthquake, and you don't have power.

25 Okay. I will wait.

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1 MEMBER KIRCHNER: But let them, let them
2 do that in PRA space.

3 MEMBER DIMITRIJEVIC: Why in the PRA
4 space? You know, I just want to say you guys are now
5 discussing details that we don't even have a good big
6 picture.

7 We obviously have a difference in opinion.
8 We don't have all the calculations we need. Now,
9 where do we go from here?

10 That's the big picture.

11 MEMBER KIRCHNER: The big picture, if I
12 could summarize, Vesna, is the concern is post-ECCS
13 actuation for a variety of initiating events can lead
14 to boron dilution of the downcomer.

15 The boron -- the diluted downcomer
16 introduces the possibility of a reactivity insertion
17 event. Which could potentially lead to core damage.

18 So, the big picture is, how does one
19 prevent that from happening?

20 MEMBER DIMITRIJEVIC: Okay. So, --

21 MEMBER KIRCHNER: And demonstrate that you
22 can do it.

23 MEMBER DIMITRIJEVIC: All right. So, your
24 proposal is that they address this with the tech specs
25 or we're talking procedures.

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1 When should this happen? Now? Or how do
2 we make -- I mean, they're not going to write
3 procedures that -- they have some tech specs, you
4 know, section.

5 And we can --

6 MEMBER KIRCHNER: Earlier. We heard
7 earlier from the staff today and yesterday. They seem
8 to be in a position where they believe they can issue
9 an FSER.

10 And that the Applicant has met all the
11 requirements for the DCA. And we, in the course of
12 preparing this letter, can affirm that descent.

13 We can point out whatever deficiencies we
14 see possible. I don't think at this point we're going
15 to see any new design changes.

16 We're not likely to see any new analysis.
17 So, we have what we have. And we can then, as a
18 collegial body, come to a conclusion on this issue.

19 MEMBER DIMITRIJEVIC: But the whole, how
20 do they come to the conclusion, or all of us, how do
21 we come to a conclusion that this is not a risk
22 outlier?

23 MEMBER KIRCHNER: Well, you may convince
24 us that this is a risk outlier. And we put that in
25 the letter.

1 MEMBER DIMITRIJEVIC: Well, -- well, the
2 cla -- you know, that's what I was sort of on there
3 yesterday. What is our -- I mean, if you write a
4 letter that this we can, you know, we disagree with
5 ACR conclusions on Chapter 19 for example, or Chapter
6 15.

7 Then where do we go from there? I mean,
8 you know, if that --

9 MEMBER KIRCHNER: We document them. And
10 the COL Applicant will likely not ignore an ACRS
11 letter that has anything that has a negative or a
12 conclusion that suggests that further work isn't
13 necessary before the COL application is accepted by
14 the Commission.

15 MEMBER DIMITRIJEVIC: But whatever has to
16 point, when they point that there is a difference of
17 opinion, there is not just difference in opinion
18 between, you know, the staff and us.

19 There is a difference of opinion among the
20 staff. So, I mean, there is so many --

21 MEMBER KIRCHNER: But Vesna, Vesna stay
22 out of that. That is something that is dealt with
23 through a formal process.

24 And that's a staff issue. That's not an
25 ACRS issue.

1 MEMBER DIMITRIJEVIC: Well, it was
2 presented to us. So, I mean, we don't --

3 MEMBER KIRCHNER: It was. We -- that's
4 our role to hear all positions. And also ask for
5 public input.

6 MEMBER PETTI: But isn't it in fact, your
7 major point Walt, is that we've got to look at
8 prevention here. And think about that.

9 MEMBER KIRCHNER: Well, this is --

10 MEMBER PETTI: Which I think there's been
11 enough about that.

12 MEMBER KIRCHNER: I think, you know, if
13 you remember our meetings with the Applicant, I
14 stopped let's see, who was it?

15 It wasn't Paul. It was probably Matthew
16 Presson. Very early in the presentation, the first
17 time they presented after they had made design
18 changes.

19 And I -- he had, you know, I don't have
20 the view graph in front of me. He talked about
21 prevention and mitigation, I believe. And I may not
22 be quoting the view graph well.

23 But, it was clear that their design
24 changes, their first objective was prevention. And I
25 think to a large part, they succeeded.

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1 So, yeah. As Ron pointed out earlier, if
2 you're going to -- let me back up. Years and years
3 ago, I don't like to do this, but I'm going to do it.

4 Years and years ago, there was something
5 called the Clinch River Breeder Reactor. And this
6 sounds like I'm getting off topic.

7 But --

8 VICE CHAIR REMPE: Really, it was just a
9 paper reactor. There never was a reactor, right?

10 MEMBER KIRCHNER: Well, no. There was a
11 pretty solid design actually. And it was derivative
12 of FFDF, which was built and operated.

13 So, we're talking about yes, paper, on
14 paper. But fairly mature design concepts and so on
15 and so forth.

16 And what happened with CRBR among other
17 things was that there were, what should I say, event
18 paths that could lead to and challenge core integrity,
19 probably, oh bad choice in words, likely, with a
20 higher frequency than we would ever see in an LWR in
21 the existing fleet.

22 And so the NRC actually funded Los Alamos
23 to develop a safety analysis code specifically for
24 fast reactors, for liquid metal fast reactors. It was
25 called poor choice of acronyms. Don't ever do this in

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1 the future. SIMMER, S-I-M-M-E-R.

2 A tremendous amount of effort went into
3 it. But what was realized was something that Ron was
4 alluding to earlier today.

5 It was going to be a calculational warfare
6 between you know, the applicant, the regulator and the
7 public about, you know whose estimates were better.
8 Much more difficult problems I would suggest.

9 It's like being -- it's like being in
10 MELCOR space. You don't want to be in MELCOR space
11 because now the uncertainties, the difficulty of the
12 physics, the chemistry, everything gets, you know, so
13 much more complicated.

14 So, my feeling is, Dave, well, pardon the
15 ramble, we don't want to get there. I think there are
16 ways to intervene so that getting into the red box is
17 yes, it's probably worth exploring.

18 But, what's the old maxim? There's
19 something about -- something about prevention is worth
20 a lot of cure. And I forget the measurement. I don't
21 want to do it in dollars of reactivity.

22 MEMBER BALLINGER: It's a pound of
23 convention is a, of prevention is worth an ounce of
24 cure.

25 MEMBER KIRCHNER: Or whatever it was.

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1 Yeah.

2 MEMBER BALLINGER: It's something like
3 that. The corollary is, cut the head off the snake.

4 MEMBER KIRCHNER: Yes. That's it. Thank
5 you, Ron. You just don't want to be there.

6 MEMBER RICCARDELLA: An ounce of
7 prevention is worth a pound of cure.

8 MEMBER BALLINGER: Ah, okay. I had it
9 backwards. Okay.

10 MEMBER KIRCHNER: I was tongue-tied.
11 Thank you, Pete. Mr. Chairman, I think I've done --
12 I've used too much of my platform as the subcommittee
13 chair.

14 I think where we go from here is we take
15 this. I've already talked to several members. First,
16 I want to say to all members, thank you.

17 And I want to say that please send any
18 further input you have to me and the rest of the
19 Committee. And my proposal is that myself, Member
20 March-Leuba, and Member Petti take it from here.

21 And try and provide the Committee a draft
22 next week. I don't want to pick a day next week, but
23 provide something next week, because we are on a tight
24 time schedule.

25 And our next full Committee meeting is

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1 just a short two weeks away. And this lastly, I want
2 to say once again, thank you to the Applicant.

3 And thank you to the staff. We know how
4 hard you've been working. And we appreciate your
5 presentations and your patients with us.

6 And with that, I am going to stop and turn
7 it over to you, Mr. Chairman.

8 CHAIR SUNSERI: Thanks Walt. And thanks
9 for leading that session. Looking ahead, I think we
10 still need to answer the question for the upcoming
11 full Committee week.

12 Do we need any additional presentations
13 from staff or Applicant on any topic to help us with
14 our deliberation?

15 MEMBER BLEY: Well, since I brought that
16 up earlier, I'll take a shot now. I don't see a need
17 for presentations.

18 But, I think each of us, as we go back and
19 review, this week, review the transcript. And for me,
20 especially review the Peter Yarsky paper.

21 There will be questions, and I don't think
22 open-ended discussions of questions is appropriate in
23 a letter writing session. So, I'd like to see us have
24 at least a two hour session which would allow us to
25 raise questions and discuss them in detail with the

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1 staff and with NuScale if they participate.

2 And I'd like to hear from others too on
3 that, because, you know, that might not be enough
4 done.

5 MEMBER KIRCHNER: Actually Dennis, maybe
6 four hours on the first day of our meeting for that
7 purpose.

8 MEMBER BLEY: And if we finish early,
9 that's great. But, I just can't see us not having
10 things we really want to pursue with the staff and the
11 Applicant.

12 MEMBER MARCH-LEUBA: Dennis, can we make
13 a commitment as members to think through everything we
14 still need to know, writing down, and send the
15 questions in advance to the staff so that they can
16 prepare a presentation to respond to our specific
17 questions.

18 Instead of go fill me up four hours of
19 entertainment, no. I still need an answer to this
20 particular question. Can you please prepare for it.

21 MEMBER KIRCHNER: Yeah. So, we don't --

22 MEMBER BLEY: I think the Board makes
23 that.

24 MEMBER KIRCHNER: Yeah, we don't send it
25 to the staff. We'll send it to Mike Snodderly.

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1 MEMBER MARCH-LEUBA: Sure.

2 MEMBER KIRCHNER: And he'll collate and
3 collect any input.

4 MEMBER MARCH-LEUBA: But do we have a buy
5 in for all the members that that's what we're going to
6 do?

7 MEMBER BLEY: Well, sure. With the
8 proviso that we may still be working on this the
9 weekend before, and then we have a full week.

10 So there -- we can't be assured that
11 everybody will get everything written down.

12 MEMBER MARCH-LEUBA: You can always ask
13 questions on the spot. But, any important question,
14 it would be really nice if we write it out in advance,
15 send it through Mike to the staff. And say hey, I
16 still have doubts on this. Prepare an answer.

17 That would be fantastic that. That would
18 be good.

19 MEMBER DIMITRIJEVIC: Mike, when did you
20 say we were going to get out into documentation?

21 MR. SNODDERLY: I'm sorry, Vesna. Could
22 you please repeat that? When are we going to what?

23 MEMBER DIMITRIJEVIC: You said that we
24 were going to get out the documentation late --

25 MEMBER KIRCHNER: July 17.

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1 MR. SNODDERLY: The audit summary July 17,
2 next Friday.

3 MEMBER KIRCHNER: July 17.

4 MEMBER DIMITRIJEVIC: That will be just a
5 couple of days before the meeting.

6 MR. SNODDERLY: Yes. But as I said, I
7 don't think you're going to -- well, I just -- yes.
8 That's what they've proposed.

9 MEMBER DIMITRIJEVIC: But somebody said
10 there is a four hundred or five hundred pages in that
11 document.

12 MR. SNODDERLY: No. That's -- if someone
13 from the staff could give us an estimate. But, I
14 think that -- I don't know where -- where did you hear
15 that, Vesna?

16 MEMBER DIMITRIJEVIC: Well, it was in our
17 discussion somebody say on the -- I think maybe Dennis
18 estimate that. I'm not sure. Somebody said it and
19 we're not that far.

20 (Simultaneous speaking)

21 MEMBER KIRCHNER: I don't think there was
22 the estimate of the page length to anyone. Let's
23 just, let's just do that.

24 MR. SNODDERLY: Yeah. Maybe they reviewed
25 that many pages. They probably reviewed that many.

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1 But, I don't think that that report is anywhere near
2 that.

3 Again, it's a summary. But, I'll follow
4 up on that. But, one thing I would like from the
5 Chairman, so what was the deadline for providing
6 questions for me to then pass onto the staff?

7 Because remember, they need time to
8 prepare.

9 MEMBER KIRCHNER: That's right. Let's
10 see, I have not a calendar in front of me. But I know
11 that we have a two week window.

12 So, I would ask my colleagues, could you
13 do it by the end of next week? The close of business
14 next Friday?

15 Because -- or even Thursday would be
16 better. Thursday would be better, then Mike and I
17 perhaps on Friday could go over them and consolidate
18 the things that might overlap.

19 And then for that -- to the staff.

20 MEMBER MARCH-LEUBA: Walt, you keep saying
21 two weeks. It's one week. Okay, we have one free
22 week to work. The next week we'll be in meetings.

23 MEMBER KIRCHNER: Oh, I'm sorry. My
24 mistake. You're right. Okay, hold on. I'll get a
25 calendar.

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1 MEMBER DIMITRIJEVIC: Walt, this is why I
2 was bringing this out. Is because we can even have
3 more questions after we look at this outed document.

4 MEMBER KIRCHNER: Well, here's the
5 problem. The problem is now, with the calendar in
6 front of me, we've been told that we'll get the audit
7 document on July 17.

8 That's a week from today. And then we
9 reconvene the following week. Thank you, Jose, for
10 pointing out my oversight.

11 If you have questions, I -- probably we
12 would have to say Wednesday. And that does not give
13 staff a lot of time.

14 MEMBER BLEY: Anything after that we just
15 bring up in the meeting.

16 MEMBER KIRCHNER: Yeah. Just bring up in
17 the meeting. I mean, I'm assuming now we're talking
18 about a really, you know, substantive issue, not a --
19 not just clar -- issues of clarification.

20 Because I think we can bring those up in
21 the meeting.

22 MR. SNODDERLY: I would request Wednesday
23 at lunchtime. That way then Walt, you and I have --

24 MEMBER KIRCHNER: Okay. Okay, Mike.
25 Yeah.

1 MR. SNODDERLY: Yes. Can we get it out by
2 Wednesday by close of business to the staff.

3 MEMBER KIRCHNER: Okay. Good point. And
4 that's lunchtime is 12:00 Eastern daylight time.

5 MR. SNODDERLY: So, I just heard from the
6 staff. They estimate the audit report will be about
7 20 pages.

8 So, as I said before, I really think the
9 Committee should stay focused on resolving from this,
10 these interactions between the staff and NuScale.
11 Which was the May 20 submittal, the June 19 submittal,
12 and the May 28 8930 supplement.

13 So, that's the bulk of the documentation.
14 And of course the Yarsky white paper.

15 MEMBER KIRCHNER: Yes. Another
16 housekeeping matter here. Alexandra, would you send
17 what you have on the screen to the members and staff
18 only? ACRS staff only.

19 And I just remind the public, since you
20 have the opportunity to participate, these are not
21 positions of the Committee. These are just topics
22 that we will consider in our letter report.

23 The Committee can only speak through its
24 final letter report. So, we have not made any effort
25 here to edit these in any way to reflect a position of

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1 the Committee.

2 Mr. Chairman?

3 CHAIR SUNSERI: Thank you, Walt. So, any
4 other final input from the Committee?

5 MEMBER BLEY: Yes. This Dennis. And I
6 apologize for missing Anna Bradford's opening remarks.

7 I have searched through Part 52, and to
8 some extent searched through the SRM guidance -- or
9 the SRP guidance on reviewing applications.

10 And I haven't found the guidance or
11 regulation that says, don't consider anything after
12 the initial point of stability.

13 If anybody can point me to something like
14 that, I'd like to, you know, be familiar with it
15 before our next meeting. I'm going to keep looking.

16 CHAIR SUNSERI: Can you state that again?
17 You were a little muffled on my microphone. What are
18 you looking for again?

19 MEMBER BLEY: I am looking for regulation
20 or the guidance that tells the staff anything dealing
21 with recovery, no matter how unstable the position, is
22 not an issue for the design cert.

23 I can't find it. I have -- I shouldn't
24 say that. I have not yet found it. I'm still
25 looking.

1 CHAIR SUNSERI: Okay. I understand.

2 MEMBER MARCH-LEUBA: Yeah. I support
3 Dennis' statement. Is it possible to add an
4 additional paragraph to Sandra's letter?

5 Because a couple of members mentioned that
6 using source range flex monitors to recover from a
7 critical event, is certainly not recommended.

8 (Simultaneous speaking)

9 MEMBER KIRCHNER: If we could capture
10 Dennis' thoughts, because that was the part that I had
11 missed on this morning when I was taking notes.

12 VICE CHAIR REMPE: So, actually, that's
13 already captured. If you'll go to the lower numbers.

14 MEMBER KIRCHNER: Is it? Okay.

15 VICE CHAIR REMPE: And also, the thing
16 about the instrumentation. Please show lower numbers.
17 I'd defy it, but flip on it. Lower numbers, please.

18 MEMBER MARCH-LEUBA: We don't have to talk
19 --

20 VICE CHAIR REMPE: Okay, there. Guidance
21 is number nine. And that's the thought. And then the
22 exist -- it should be with unvalidated analysis code
23 and existing plan instrumentation.

24 And that's what I'm trying to get to here.
25 Okay, Jose?

1 MEMBER MARCH-LEUBA: Sorry, what was --
2 what was the line number?

3 VICE CHAIR REMPE: On number three --
4 four.

5 MEMBER MARCH-LEUBA: I couldn't see.

6 VICE CHAIR REMPE: Look at line four. It
7 says existing plant instrumentation.

8 MEMBER MARCH-LEUBA: But, I think we can
9 be, you know, a little stronger than this. Saying
10 that it has been proposed to use a criticality alarm
11 to control boron addition to the core. And we don't
12 think that's wise.

13 VICE CHAIR REMPE: We don't need to write
14 it out. But just put under existing plan
15 instrumentation, put criticality alarm.

16 Right, Jose? We're just trying to put a
17 note to jog your memory as you write this thing,
18 right?

19 MEMBER MARCH-LEUBA: Right. Yeah. I just
20 think that using a criticality alarm to control your
21 boron presentation, it is not advisable.

22 MEMBER KIRCHNER: We discussed that.

23 VICE CHAIR REMPE: Right. And then on the
24 documents and regulations they need to be modified.

25 If Anna is still here, I mean, she made a

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1 statement saying that they met the existing
2 regulation. It clarified, I mean, she even said, you
3 guys can think of a way to do this.

4 I mean, with her point about the fact that
5 you can't do a pull out because of the fact that this
6 is so linked integral to the reactor. But, is Anna
7 still on the line?

8 I can't see the whole group.

9 (Simultaneous speaking)

10 MEMBER KIRCHNER: No, Joy. Let's not
11 debate -- let's not debate our letter writing with the
12 staff.

13 VICE CHAIR REMPE: No. I'm not trying to
14 do that. I want her clarification. Dennis asked a
15 question.

16 If she's here, she knows, I think, the
17 answer to Dennis' question, Walt. Right?

18 MEMBER KIRCHNER: All right.

19 VICE CHAIR REMPE: And I -- if Anna is on
20 the line, then she is --

21 MEMBER MARCH-LEUBA: Why don't we wait,
22 Joy. Sandra needs to know that what she did is okay.
23 And I think it's sufficient.

24 She put criticality along with line four.
25 And that reminds us that what we need. So, that --

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1 for Sandra, you don't need to do anything for my
2 account.

3 VICE CHAIR REMPE: Okay. If you're going
4 to -- I thought you were taking care of your stuff.

5 MEMBER KIRCHNER: So, let me just be
6 clear, I wasn't talking about --

7 VICE CHAIR REMPE: And after moving the --
8 thing, then we're there. But, is Anna still on the
9 line?

10 MEMBER KIRCHNER: No, Joy. Wait a minute.
11 Wait a minute. Let's observe the process. What
12 precisely is the question that you want to pose?

13 VICE CHAIR REMPE: Dennis question that he
14 asked. Is there some guidance that led the staff to
15 believe you don't -- could not ask for recovery.

16 MEMBER KIRCHNER: Let's do the following.
17 Let's do the following, let's not put the staff in a
18 position of having to respond on the spot.

19 Let's pass that request through Mike
20 Snodderly.

21 VICE CHAIR REMPE: It would be nice if we
22 could hear a little sooner than next week. But, I
23 think -- yes, if you could point to a section, you
24 know, she had that.

25 But we were told that earlier today. And

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1 I wanted to ask at the time. But I didn't it in.

2 MEMBER KIRCHNER: I defer to you, Mr.
3 Chairman.

4 CHAIR SUNSERI: Yes. I agree with letting
5 Snodderly ask the question and let them reflect on it.
6 Because we're talking two different things.

7 They're talking procedures. And Dennis
8 framed it a little differently then procedures. So,
9 let's not put them in a spot by giving a reaction
10 without reflecting on the request.

11 VICE CHAIR REMPE: Okay.

12 CHAIR SUNSERI: And let me just be clear
13 on what I was saying a little earlier. Because people
14 like to take what I say and then change it.

15 But, I'm not talking about using a
16 criticality alarm to approach critical. And I know
17 the accident situation is different and there needs to
18 be some compensation.

19 I get that. I understand. I'm a nuclear
20 engineer. I'm just suggesting that, I've been on
21 several power reactors where we have diluted the
22 criticality using source range instrumentation,
23 plotting count rate, and in doing a very controlled
24 approach to criticality.

25 That's my simple comment. You could

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1 probably turn that around, if you wanted to. And
2 think about an approach to avoiding criticality using
3 those kind of instruments and that approach.

4 And I will also say, there's not that much
5 momentum, fluid momentum. When you turn off that CFDS
6 system, it's going to stop. It's only 100 gallons per
7 minute.

8 MEMBER MARCH-LEUBA: All I want Matt, is
9 a calculation and an estimate from a risk analysis and
10 HRA specialist of how long it would take for the
11 operator to recognize the problem. Which will be not
12 much, because there's a criticality alarm.

13 And then push the button to stop it. And
14 what is the probability that he will push the wrong
15 button when it's at --

16 CHAIR SUNSERI: I'm not arguing all that.
17 I mean, that's the probability and all that stuff. I
18 mean, what -- so, what's the probability of success is
19 not the question.

20 The question is, is there a success path?
21 Can we contemplate one that would be successful?

22 MEMBER MARCH-LEUBA: Well --

23 CHAIR SUNSERI: I'm just saying
24 everybody's imposing their extreme positions. I'm in,
25 you know, I get the right to impose mine as well,

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1 don't I?

2 MEMBER MARCH-LEUBA: Yes, you are. Yes,
3 you are, Matt. And as an engineer, as a guy that has
4 worked on a plant, you are fully right.

5 But, if risk analysis people need to
6 consider what kind of probability field that something
7 will go wrong. And put that on their PRA.

8 And tell me that it probably something
9 will go wrong is less than 10 to the minus 11.
10 Because if it's more than 10 to minus 11, which is a
11 ridiculously low number, it becomes the critical path
12 for this one.

13 CHAIR SUNSERI: Yes. So, I mean, I don't
14 want to --

15 MEMBER DIMITRIJEVIC: It's a nine. It's
16 a nine. You're repeating the minus 11. But there's
17 nothing minus 11. I mean, therefore we have to be
18 even below the 10 to minus nine not to be the, you
19 know, the significant consequences.

20 So, I wouldn't -- the minus 11, it's never
21 mind.

22 MEMBER MARCH-LEUBA: Nine and 11 among
23 friends. There is a 10 to the minus in front of it is
24 the same thing.

25 CHAIR SUNSERI: So, okay. Any other

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1 comments and input? This is good.

2 (No response)

3 CHAIR SUNSERI: Since this has been a
4 little bit of a modified session then our normal
5 report preparation session, and since this is a public
6 line, I would like to kind of close this session with
7 an opportunity for the public listening in to make any
8 statements or comments.

9 So, Thomas, if we could open the public
10 line, please.

11 THOMAS: The public line is open for
12 comment.

13 CHAIR SUNSERI: Thank you. So, any
14 members of the public that are listening in, if you
15 care to make a statement or a comment, now is the
16 opportunity to state your name and provide your
17 comment, please.

18 MS. FIELDS: Yes. This is Sarah Fields.
19 I didn't expect there's an opportunity to make a
20 comment.

21 I think you are in a very serious and
22 critical situation. I've been following this process
23 with the NRC and with the ACRS for quite a while.

24 I have little or no technical background.
25 But I have had long experience with the Nuclear

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1 Regulatory Commission.

2 I was in a town with a one billion dollar

3 --

4 (Simultaneous speaking)

5 CHAIR SUNSERI: Could you hold on please?

6 Would everybody that's not speaking, mute their
7 microphone?

8 (Simultaneous speaking)

9 MS. FIELDS: Okay. I'm sorry.

10 CHAIR SUNSERI: No, no. Hold on please.
11 Somebody has got their microphone open and disrupting
12 the flow.

13 Could we please mute our microphones and
14 let the public have their chance to talk. Sarah,
15 please go on.

16 MS. FIELDS: I live in a community with a
17 one billion dollar uranium tailings removal project.
18 I live in an area where there are a number of
19 abandoned uranium mines, permitted mines.

20 And the only operating convention is the
21 uranium mill. I have seen many errors by the Nuclear
22 Regulatory Commission over the years.

23 Most of you have worked in the industry.
24 But probably none of you have lived within 50 miles of
25 a proposed nuclear reactor and attended the emergency

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1 planning meetings. Or you probably not lived within
2 10 miles of a reactor that was under construction.

3 So, I -- because I've experienced many
4 things and been involved in many NRC proceedings and
5 meetings, and what not, I have a different
6 perspective.

7 And I really hope that you will lay out to
8 the NRC staff and to NuScale, and for the benefit of
9 the public, all of your concerns about this design.

10 I am sure if there is any problem in the
11 future that people will look back and say, well, you
12 know, how did this happen?

13 How did we miss this? What did NuScale
14 say? What did the NRC say? What did the ACRS say?

15 So, it's important that you fully express
16 all your concerns about this design. I know, you
17 don't address the PR aspect of this whole thing.

18 You don't make a decision about whether
19 this NuScale design is a carbon free power project.
20 Which, if course, is ridiculous industry in Department
21 of Energy public installations.

22 So, I see many different views from many
23 different aspects. I see the local concern about the
24 cost of this.

25 I see the NuScale and the industry trying

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1 to save money and reduce the cost by limiting the
2 emergency planning zone. By reducing the number of
3 operators to one in the control room.

4 When you're talking about control room
5 operator action, that maybe just one operator and two
6 senior operators. That's what NuScale would like to
7 have.

8 So, there are a lot of different
9 perspectives that you don't hear about, that you don't
10 know about. But, you need to completely consider and
11 document all the issues. Thank you.

12 CHAIR SUNSERI: Thank you for those
13 remarks. Any other members of the public care to make
14 a comment?

15 MR. DAVIS: This is Ed Davis with the
16 Pegasus Group. I've just got a very simple question.

17 Is the NRC White Paper, 30 page White
18 Paper going to be made available? And if so, where
19 would we find it?

20 CHAIR SUNSERI: I'm going to ask you to
21 contact our Federal Agent, Mike Snodderly for a
22 response to the question.

23 Mr. Snodderly would you make a statement?

24 MR. SNODDERLY: Yes. So, Dr. Yarsky's
25 paper does have a -- does have an ML number. But I

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1 don't know if they have a -- it is a proprietary
2 report.

3 I don't know if they're going to is -- I
4 would imagine they're going to issue a redacted
5 version.

6 Is there someone from the staff that can
7 verify what I'm saying is correct?

8 MS. BRADFORD: This is Anna Bradford from
9 the Office of Nuclear Reactor Relation. Yes. Our
10 plan was to, as you said, Mike, it's a prop version
11 that you have.

12 But we do plan to make a non proprietary
13 version publically available.

14 MR. SNODDERLY: So Ed, if you contact --
15 Mr. Ferguson, if you -- yeah, -- my email is
16 Michael.Snodderly@NRC.gov. And I can get you that ML
17 number when the public version is available.

18 But it doesn't exist at this time.

19 MS. DAVIS: Well, thank you very much.
20 Thank you.

21 MR. SNODDERLY: You're welcome.

22 CHAIR SUNSERI: Okay. Any other members
23 of the public care to make a comment?

24 (No response)

25 CHAIR SUNSERI: All right. Thank you.

1 Thomas, please close the public line.

2 THOMAS: The public line is closed.

3 CHAIR SUNSERI: Members, any additional
4 business to cover before we close this meeting?

5 (No response)

6 CHAIR SUNSERI: Okay. Well, I just want
7 to extend the appreciation of the ACRS to the NRC
8 staff, and the Applicant who supported us this
9 weekend. And everybody's engaged and active
10 participation.

11 So, I thank you all. And at this point,
12 we are adjourned. Thank you.

13 (Whereupon, the above-entitled matter went
14 off the record at 4:35 p.m.)

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17

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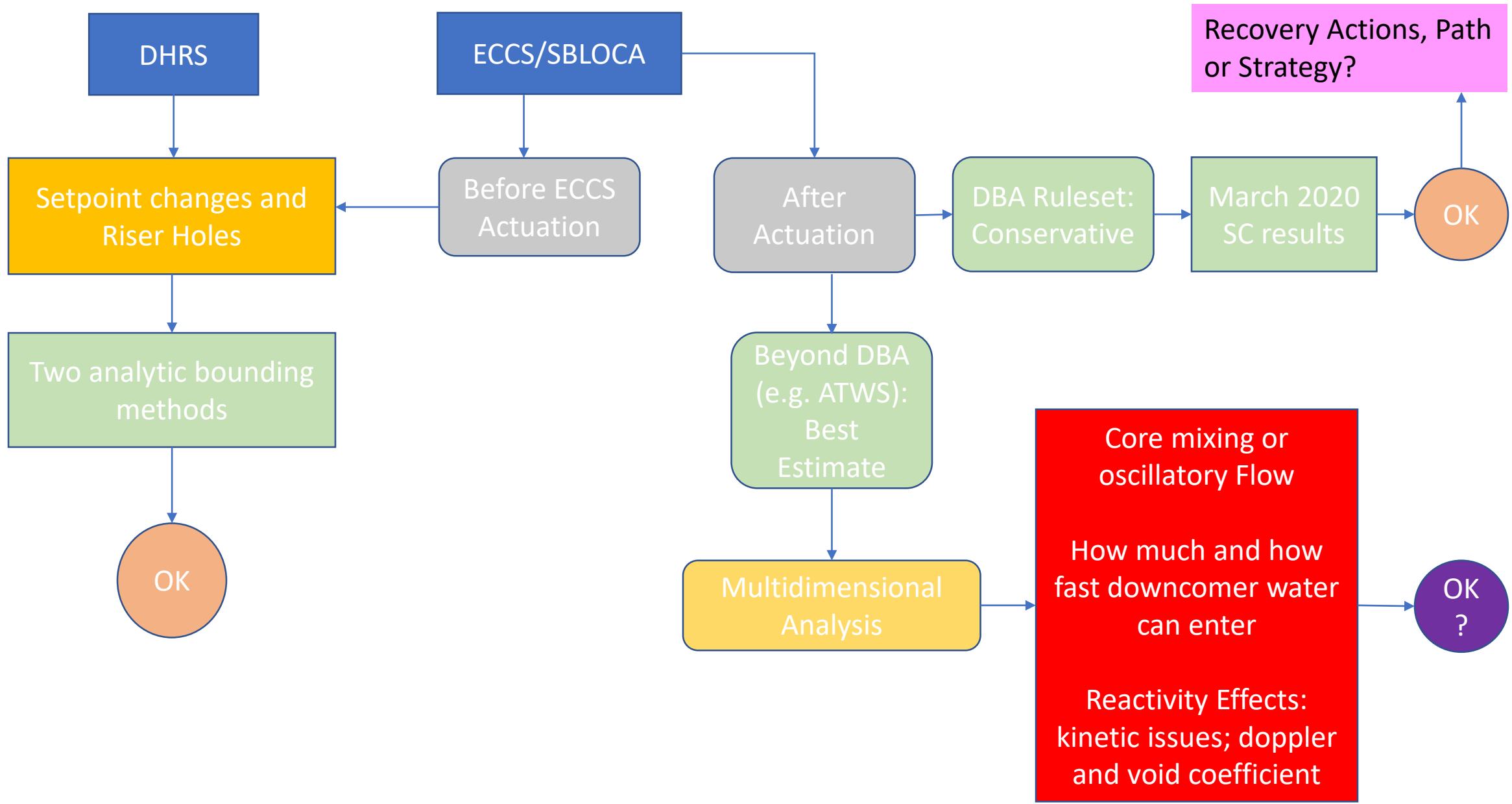
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Conversation (82 Participants)

82 Participants

Request Control Actual Size

5:11:02

PARTICIPANTS
Presenters (11)

- Compton, Makeeka
- Dashiell, Thomas
- Kirchner, Walter
- Lui, Christiana
- Nguyen, Quynh
- Rempe, Joy
- Snodderly, Michael
- Sunseri, Matthew
- Walker, Sandra
- Wang, Weidong
- Widmayer, Derek

Attendees (71)

- Abdullahi, Zena
- Antonescu, Christina
- Ashcraft, Joseph
- Bavol, Bruce
- BEN BRISTOL Guest
- Borromeo, Joshua
- Bradford, Anna
- Burkhart, Larry
- Caldwell, Bob
- Cell Phone VA Guest
- Charles Morrison Guest
- Cowdrey, Christian

1:17 PM
Friday
7/10/2020

Invide More People Participant Actions

Conversation (82 Participants)

82 Participants

Request Control Actual Size

5:11:26

PARTICIPANTS

- Cranston, Greg
- Dennis Bley Guest
- Donoghue Joseph Guest
- Dorn, Paula
- Dudek, Michael
- Etienne Mullin Guest
- Fields John Guest
- Franovich, Mike
- GROSS KARL Guest
- Hoxie, Chris
- HULL VERNON Guest
- Infanger Paul E Guest
- JAMES CURRY Guest
- Jcurry (NuScale) Guest
- John Fields Guest
- Karl Gross (NuScale) Guest
- Kristopher Cummings... Guest
- Lehning, John
- Lu, Shanlai
- March-Leuba, Jose
- Mark Chitty (NuScale) Guest
- Marby Bryan Guest
- Meghan McCloskey Guest
- Michael Co... - External Network
- MICHAEL MELTON Guest

1:18 PM
Friday
7/10/2020

Invide More People Participant Actions

Conversation (82 Participants)

82 Participants

Request Control Actual Size

5:11:50

PARTICIPANTS

- mike melton NuScale Guest
- Montgomery, Shandeth
- Moore, Scott
- Morris Byram Guest
- Nakanishi, Tony
- Nolan, Ryan
- Nourbakhsh, Hossein
- Paul Infanger Guest
- Petti, David
- Rebecca Norris (NuSc... Guest
- Riccardell... - Structural Integri...
- RNT G Guest
- Robert Gamble Guest
- Ron Ballinger Guest
- Rosenberg, Stacey
- Ross-Lee, MJ
- Sarah Bristol Guest
- Scheetz, Maurin
- Schultz, Stephen
- Sivy, Alexandra
- Skov, Tammy
- Stephanie Terwilliger ... Guest
- Taylor Coddington Guest
- Thompson, Jason
- Thurston, Carl

Invide More People Participant Actions

Recovery Actions, Path or Strategy?

Core mixing or oscillatory flow

How much and how fast downcomer water can enter

Reactivity Effects: kinetic issues; doppler and void coefficient

OK?

Conversation (81 Participants)

81 Participants

Request Control Actual Size

5:12:03

PARTICIPANTS

- Rebecca Norris (NuSc... Guest
- Riccardell... - Structural Integri...
- RNT G Guest
- Robert Gamble Guest
- Ron Ballinger Guest
- Rosenberg, Stacey
- Ross-Lee, MJ
- Sarah Bristol Guest
- Scheetz, Maurin
- Schultz, Stephen
- Sivy, Alexandra
- Skov, Tammy
- Stephanie Terwilliger ... Guest
- Taylor Coddington Guest
- Thompson, Jason
- Thurston, Carl
- TOM BERGMAN Guest
- Vernon Hull (NuScale) Guest
- Vesna Diml Guest
- wamassie Guest
- WASHINGTON, DC Guest
- Weaver, Kathy
- WIRELESS CALLER Guest
- Wong, Yuken
- Yarsky, Peter

Invide More People Participant Actions

Recovery Actions, Path or Strategy?

Core mixing or oscillatory flow

How much and how fast downcomer water can enter

Reactivity Effects: kinetic issues; doppler and void coefficient

OK?

Conversation (88 Participants) 7:41:09

88 Participants Request Control Actual Size

PARTICIPANTS

Presenters (12)

- Compton, Makeeka
- Dashiell, Thomas
- Kirchner, Walter
- Lui, Christiana
- Moore, Scott
- Nguyen, Quynh
- Rempe, Joy
- Snodderly, Michael
- Sunseri, Matthew
- Walker, Sandra
- Wang, Weidong
- Widmayer, Derek

Attendees (76)

- Abdullahi, Zena
- Anne-Marie Grady Guest
- Antonescu, Christina
- Ashcraft, Joseph
- Bavol, Bruce
- Bellinger, Alesha
- BEN BRISTOL Guest
- Ben Bristol Guest
- Borromeo, Joshua
- Bradford, Anna

3:48 PM Friday 7/10/2020

Insite More People Participant Actions

Microsoft Word Document Content:

12 Chapter 19 of the SER states that CPDS operation is not a risk concern. No calculation has been provided to support it.

13 if we can not

14

15 The boron dilution topic is not captured in the PRA

16

17 The design modifications solve the issue of uncontrol passive cooling and late ECCS activation

18

19 The design modifications do not completely prevent DC deboration

20

21 The applicant and the staff argue that no mechanism exist to drive the sufficient deborated water into the core to cause damage. No calculation support this statement

22

23

24 No effective instrumentation exist to measure boron redistribution. The existing instrumentation may not be operable under ECCS conditions.

25

26

27 The void reactivity coefficient has not been calculated. This condition are an unusual geometry and the possibility of a positive coefficient (30,30) be discarded without a calculation.

28

29

30 Chapter 19 of the SER states that CPDS operation is not a risk concern. No calculation has been provided to support it.

31

32

33 The statements are overly negative relative to the staff's reasonable assurance findings and the engineering assessment.

34

35

36 No calculation but a well-documented engineering judgement

37

38 Address a balance between reasonable assurance vs absolute assurance

39

40 In the context of 10 CFR 52 this is essentially a complete design. It has large margins compared to the existing fleet. Design change and support changes have addressed long-term cooling under DVHS conditions.

41

Conversation (88 Participants) 7:41:34

88 Participants Request Control Actual Size

PARTICIPANTS

- Burja, Alexandra Guest
- Burkhart, Larry
- Cell Phone VA Guest
- Charles Morrison Guest
- Cowdrey, Christian
- Cranton, Greg
- Dennis Bley Guest
- Donoghue, Joseph
- Dorm, Paula
- Etienne Mullin Guest
- Fields John Guest
- Franovich, Mike
- GROSS KARL Guest
- Hoxie, Chris
- HULL VERNON Guest
- Infanger Paul E Guest
- Ireland, Andrew
- J Curry (NuScale) Guest
- JAMES CURRY Guest
- John Fields Guest
- Karl Gross (NuScale) Guest
- Kristopher Cummings... Guest
- Lehning, John
- Lu, Shanlai
- March-Leuba, Jose

3:48 PM Friday 7/10/2020

Insite More People Participant Actions

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Conversation (88 Participants) 7:41:50

88 Participants Request Control Actual Size

PARTICIPANTS

- Mark Chitty (NuScale) Guest
- Marty Bryan Guest
- Meghan McCloskey Guest
- Michael Co... - External Network
- MICHAEL MELTON Guest
- mike melton NuScale Guest
- Montgomery, Shandeth
- Morris Byram Guest
- Nakanishi, Tony
- Nolan, Ryan
- Nourbakhsh, Hossein
- Palton, Rebecca
- Paul Infanger Guest
- Paul Infanger Guest
- Petti, David
- Rebecca Norris (NuSc... Guest
- Riccardell... - Structural Integri...
- RNT G Guest
- Robert Gamble Guest
- Ron Ballinger Guest
- Rosenberg, Stacy
- Ross-Lee, MJ
- Sarah Bristol Guest
- SCARBROUGH G T Guest
- Scheetz, Maurin

Inyte More People Participant Actions

3:48 PM Friday 7/10/2020

88 Participants

Request Control Actual Size

7:41:50

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41

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3:48 PM Friday 7/10/2020

Conversation (88 Participants) 7:42:00

88 Participants Request Control Actual Size

PARTICIPANTS

- Riccardell... - Structural Integri...
- RNT G Guest
- Robert Gamble Guest
- Ron Ballinger Guest
- Rosenberg, Stacy
- Ross-Lee, MJ
- Sarah Bristol Guest
- SCARBROUGH G T Guest
- Scheetz, Maurin
- Schultz, Stephen
- Siwy, Alexandra
- Skov, Tammy
- Taylor Coddington Guest
- Thomas Scarbrough Guest
- Thompson, Jason
- Thurston, Carl
- TOM BERGMAN Guest
- Vernon Hull (NuScale) Guest
- Vesna Diml Guest
- wamassie Guest
- WASHINGTON, DC Guest
- Weaver, Kathy
- WIRELESS CALLER Guest
- Wong, Yuken
- Yarsky, Peter

Inyte More People Participant Actions

3:48 PM Friday 7/10/2020

88 Participants

Request Control Actual Size

7:42:00

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3:48 PM Friday 7/10/2020