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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

+ + + + +

POWER UPRATES SUBCOMMITTEE

+ + + + +

OPEN SESSION

+ + + + +

WEDNESDAY

DECEMBER 2, 2015

+ + + + +

ROCKVILLE, MARYLAND

+ + + + +

The Subcommittee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B1, 11545 Rockville Pike, at 8:31 a.m., Joy Rempe, Chairman, presiding.

COMMITTEE MEMBERS:

JOY REMPE, Chairman

JOHN W. STETKAR, Member

RONALD G. BALLINGER, Member

DENNIS C. BLEY, Member

MICHAEL L. CORRADINI, Member

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DANA A. POWERS, Member

PETER C. RICCARDELLA, Member

STEPHEN P. SCHULTZ, Member

GORDON R. SKILLMAN, Member

ACRS CONSULTANT:

KORD SMITH*

DESIGNATED FEDERAL OFFICIAL:

WEIDONG WANG

ALSO PRESENT:

KEVIN BORTON, Exelon

DOUG BROADDUS, NRR

ANTHONY HIGHTOWER, Exelon

MOLLY KEEFE, NRR

JIM KOVALCHICK, Exelon

MARVIN LEWIS, Public Participant*

JOSE MARCH-LEUBA, ORNL

JOHN McCLINTOCK, Exelon

PAT NAVIN, Exelon

ANDREW OLSON, Exelon

ALEX PSAROS, Exelon

DIEGO SAENZ, NRR

*Present via telephone

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P R O C E E D I N G S

8:31 a.m.

CHAIRMAN REMPE: This meeting will now come to order. Thank you. This is a meeting of the Power Upgrades Subcommittee, a standing Subcommittee of the Advisory Committee on Reactor Safeguards.

I'm Joy Rempe, the Chairman of the Subcommittee. ACRS Members in attendance are Pete Riccardella, Ron Ballinger, John Stetkar, Dana Powers, Stephen Schultz and Gordan Skillman and Sanjoy Banerjee.

We also will be joined shortly, we hope by Mike Corradini and our consultant, Professor Kord Smith, who will come in through a phone line. Weidong Wang of the ACRS Staff is the designed Federal Official for this meeting.

In this meeting, the Subcommittee will review the Peach Bottom Atomic Power Station Units Two and Three Operating License Amendment Request or LAR, to allow plant operation in the expanded maximum extended load light limit analysis plus or MELLLA+ domain.

We're going to hear presentations from the NRC Staff and representatives from the licensee, Exelon Generation Company, LLC. We did not receive

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1 written comments and requests for time to make oral
2 statements from a member of the public regarding
3 today's meeting.

4 Part of the presentations by the
5 licensee and the NRC Staff will be closed in order
6 to discuss information that's proprietary to the
7 licensee and its contractors, pursuant to 5 USC
8 55(2) (b) (c) (4) .

9 Attendance at these portions of the
10 meeting that deals with such information will be
11 limited to the NRC Staff, the NRC consultants,
12 Exelon Generation Company, LLC, and those
13 individuals and organizations who have entered into
14 appropriate confidentiality agreements with them.

15 Consequently, we'll need to confirm that
16 we have only eligible observers and participants in
17 the room for the closed portions of this meeting.

18 This is the fourth LAR that our
19 Subcommittee has had the opportunity to review
20 related to the MELLLA+ applications. And today
21 we're going to gather information, analyze relevant
22 issues and facts, and formulate proposed positions
23 and actions as appropriate for this LAR.

24 As a heads up to my colleagues
25 participating in this Subcommittee meeting, I'm

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1 going to be requesting at the end of our meeting,
2 that each of you provide your opinion on whether
3 this fourth LAR warrants deliberation by the full
4 Committee at a future meeting.

5 The rules for participation in today's
6 meeting have been announced as part of the notice
7 that was previously published in the Federal
8 Register. A transcript of the meeting is being kept
9 and will be made available as stated in the Federal
10 Register Notice.

11 Therefore, we request that participants
12 in this meeting use the microphones located
13 throughout the meeting when addressing the
14 Subcommittee. The participants should first
15 identify themselves and speak with sufficient
16 clarity and volume so they may be readily heard and
17 recorded on this transcript.

18 And we'll now proceed with the meeting.
19 And I'd like to start by calling up the NRR Staff.
20 And Doug Broaddus will start us, right?

21 MR. BROADDUS: Thank you. And good
22 morning. I am Doug Broaddus. I am the Chief of the
23 Plant Licensing Branch 1-2, and the Division of
24 Operating Reactor Licensing in NRR.

25 The NRC staff appreciates the

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1 opportunity to brief the ACRS Subcommittee today on
2 the LAR for Peach Bottom Units Two and Three to
3 operate in the MELLLA+ domain.

4 The request would change the Peach
5 Bottom technical specifications from the currently
6 licensed MELLLA domain to allow operation in an
7 expanded MELLLA+ domain under the previously
8 approved extended power uprate, or EPU, conditions
9 of 3,951 megawatts thermal ready core power.

10 The expanded MELLLA+ operating domain is
11 intended to increase operating flexibility by
12 allowing control of reactivity at maximum power by
13 changing flow rather than by control rod insertion
14 and control.

15 The proposed amendment would allow
16 recirculation of core flow to operate within a wider
17 window than under the current MELLLA conditions to a
18 core flow as low as 83 percent under MELLLA+.

19 At this meeting, Exelon, who owns and
20 operates the Peach Bottom Boiling Water Reactor
21 Units, will provide a presentation on their
22 application. And the NRC Staff will present the
23 results of our review and assessment of the
24 application. Next slide.

25 I want to take this opportunity to

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1 recognize and thank the NRC Technical Staff, who are
2 here today. For their support and for performing a
3 thorough review of Exelon's application.

4 Which is, as you said, the fourth of
5 such reviews involving the implementation of
6 MELLLA+. Staff's previously reviewed and presented
7 to ACRS on MELLLA+, amendments from Monticello,
8 Grand Gulf and Nine Mile Point Unit 2.

9 Consistent with these previous
10 applications, Exelon defined the scope of the
11 evaluations required to support operation at Peach
12 Bottom in the MELLLA+ domain based upon the NRC
13 approved GE-Hitachi MELLLA+ topical report. Next
14 slide.

15 So the Peach Bottom application as well
16 as the results of the NRC Staff's review is similar
17 in many respects to the prior MELLLA+ applications.
18 The NRC Staff presentations today will provide
19 comparisons between Peach Bottom and these other
20 plants for some of the key parameters associated
21 with MELLLA+ implementation.

22 And we appreciate the Subcommittee
23 considering whether continued ACRS review of these
24 MELLLA+ applications is warranted. And we look
25 forward to your feedback on that.

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1 CHAIRMAN REMPE: Just to be clear, the
2 discussion will focus on whether we will want to
3 bring this one, not in general all MELLLA+
4 applications today. Okay?

5 MR. BROADDUS: Sorry. All right, yes.
6 The NRC Staff's safety evaluation that was
7 previously provided to ACRS documents are a re --
8 the documents are a review of the Peach Bottom
9 application. And contains no open items.

10 Based on a thorough technical review,
11 the NRC Staff has determined that operation of Peach
12 Bottom Units Two and Three in the MELLLA+ domain as
13 proposed in Exelon's application, maintains
14 compliant safety while providing additional
15 operational flexibility. And satisfies all
16 regulatory criteria.

17 This concludes my opening remarks.
18 Unless there are any questions, I would like to turn
19 it over to Rick Ennis, the NRC Senior Project
20 Manager for Peach Bottom Units Two and Three, who
21 will provide some additional details on the MELLLA+
22 LAR as well as the presentations you'll hear today.

23 MEMBER POWERS: I perhaps have, or ask a
24 question that may not be very clear, or may be for
25 Rick rather than you. But, I'll pose it to both.

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1 And you can sit -- both can answer it.
2 You can answer it perhaps when we meet with the full
3 Committee.

4 The depth is -- these MELLLA+ reviews
5 have taken some substantial amount of time to do.
6 And they've been done very well. I have -- I make
7 no fault on the work that the Staff or either the
8 work of the licensee.

9 But my question is, do you in the course
10 of this work identify tools or technology that would
11 substantially facilitate the review if you added
12 available? And I think that's a hard question to
13 ask because I'm asking you for, is there something
14 that doesn't exist that should exist.

15 But, I'm wondering if you could speak to
16 that issue of is the Staff -- could the Staff be
17 aided substantially by any technology improvements
18 available to it?

19 MR. ENNIS: My name is Rick Ennis. I'm
20 the Project Manager for Peach Bottom.

21 As far as the -- at the time of the
22 review, had this review not had to go through ACRS,
23 it would have been about a year review. Maybe a
24 little bit longer which is typical of some of the
25 normal license amendments we've had.

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1 So, it's not as extensive as like an
2 extended power uprates.

3 MEMBER POWERS: Yes.

4 MR. ENNIS: With that being said, in
5 putting together the safety evaluation, we've had
6 some discussions with NRR that it might be
7 advantageous to have some sort of review standards
8 similar to the extended power uprates. So, I'll
9 talk about a little bit of that during the -- my
10 opening remarks.

11 But, I think that would help facilitate
12 the review. And I think had the safety evaluation
13 been formatted so it was more consistent with the
14 GE-Hitachi topical report that it would have been
15 easier to get through and maybe done a little bit
16 quicker.

17 MEMBER POWERS: Yes, that is -- this is
18 worthwhile things to bring up in the full Committee
19 by the way. And I would be explicit in that when
20 you talk to the full Committee.

21 But I'm mostly interested in the
22 technologies, which include computer codes,
23 expertise, any range of things that would be of
24 assistance. And now that you've gone through four
25 and each had its own peculiarities and methodologies

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1 and whatnot, I would appreciate it if you'd give
2 that some thought.

3 MR. ENNIS: Okay.

4 MEMBER POWERS: And if you could comment
5 perhaps when you meet the full Committee, on are
6 there technological improvements? For the
7 technology available to the Agency and I interpret
8 that very broadly.

9 Computer codes, computational platforms,
10 expertise, whatever you think, that would facilitate
11 the review. Now I don't discount the things that
12 you bring up. Those are very important.

13 And I would bring those up explicitly.
14 But I would very much appreciate because it seems to
15 me that a year is bit long for this kind of thing.

16 If we could use technology to reduce
17 that down to a few months, we should leap at the
18 opportunity to do that. Now, maybe we can't. Maybe
19 you can't identify anything.

20 But I would appreciate your thoughts.

21 MR. ENNIS: I think we have a comment
22 from the Technical Staff.

23 MR. SAENZ: This is Diego Saenz from the
24 Reactor Systems Branch. So what the -- at the
25 September 21 Thermohydraulic Subcommittee meeting,

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1 we talked about some of the challenges we had.

2 And there some -- quite frankly, some of
3 it is understanding the phenomena.

4 MEMBER POWERS: Um-hum.

5 MR. SAENZ: So, we have a user need to
6 get testing data that would aid us in truly
7 understanding the phenomena. So, that's part of
8 what we're doing going forward.

9 And we think that will aid these
10 reviews. There's also an effort that we're
11 undertaking to develop the capability to do trace
12 confirmatory calculations as these reviews go
13 forward.

14 So, we think that those will aid these
15 reviews.

16 MEMBER POWERS: I would really like to
17 see you comment on that explicitly at some point. I
18 don't know whether it's this meeting, which is kind
19 of fixed in its end time, or the full Committee
20 meeting, or even privately.

21 Because I think it's important for us to
22 understand that.

23 MR. BROADDUS: Thank you, Dr. Powers.

24 MR. ENNIS: Good morning, my name is
25 Rick Ennis. And I'm the NRC Project Manager for

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1 Peach Bottom in the Office of NRR in the --

2 MEMBER BANERJEE: It's so difficult.
3 Are you thinking of presenting to either the full
4 Committee, or to one of the Subcommittees the
5 program that you envision going forward to deal with
6 some of the issues that have recently arisen with
7 regard to say FSI, things like that?

8 We hear about it, but we don't sort of
9 have any -- anything on record, you know, like
10 explicitly what you're doing. I know for example
11 you're planning some tests in the Call Sign
12 facility, right?

13 What is the scope of those tests? And
14 then are we doing any fundamental work to try to
15 understand these very complicated phenomena and
16 simpler geometries and things?

17 How is this program all being put
18 together? It would be very helpful to know that.

19 MR. SAENZ: So, again, this is Diego
20 Saenz. At this time we have no plan to present
21 today here to ACRS.

22 But if requested, we've always been
23 happy to present information today here as ACRS
24 requested.

25 CHAIRMAN REMPE: I think actually that

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1 that's something that let's save until the end of
2 the day about what to do in moving forward. Because
3 I read through the transcript.

4 Unfortunately I missed the September
5 Subcommittee meeting where you did discuss those
6 tests.

7 MR. SAENZ: Um-hum.

8 CHAIRMAN REMPE: And I think that that
9 is a very good topic that should be brought. The
10 test program, some of the insights, there's
11 different vendor methodologies.

12 And so it's a thermohydraulic's type of
13 discussion. And I think that would be very good for
14 a full Committee meeting.

15 And maybe whether there needs to be a
16 Subcommittee meeting again before that or not, is
17 something that we can discuss later.

18 But, to make sure that we cover the
19 topics relevant to Peach Bottom, let's --

20 MEMBER BANERJEE: Yes, just let's table
21 it now and we'll bring it up.

22 CHAIRMAN REMPE: Right.

23 MR. SAENZ: Okay.

24 MEMBER BANERJEE: Because some of your
25 sensitivity studies here depend on the discussions

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1 we've had in the Thermohydraulics Subcommittee
2 meeting.

3 MR. SAENZ: Absolutely.

4 MR. ENNIS: Today you'll hear
5 presentations from the NRC Staff and Exelon
6 regarding proposed MELLLA+ for Peach Bottom Units
7 Two and Three. I'll present some background
8 information regarding the Staff's review and then
9 I'll discuss the agenda for today's meeting.

10 Throughout the meeting, you may hear
11 references to the SAR. The SAR is a Safety Analysis
12 Report which summarizes the results of the
13 evaluations performed by GE-Hitachi for Exelon to
14 justify the proposed MELLLA+.

15 A proprietary version of the SAR is
16 included as Attachment Four to the application dated
17 September 4, 2014. And a nonproprietary version is
18 included as Attachment Five to the application.

19 The format of the SAR closely follows
20 the format of the NRC approved GE-Hitachi MELLLA+
21 topic report. And the SAR provides the Peach Bottom
22 disposition of the MELLLA+ topical report technical
23 review areas either by confirming the applicability
24 of the generic assessments or providing plant
25 specific evaluations.

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1 With respect to the format of the NRC
2 Staff's draft Safety Evaluation, Section 3.2
3 provides a review of the technical review areas that
4 were generically dispositioned. And Section 3.3
5 provides the review of the areas that were
6 dispositioned on a plant specific basis.

7 As I had mentioned in the discussion
8 with Dr. Powers, we did use the Review Standard 001.
9 Which NRC uses for extended power uprates.

10 And although the MELLLA+ amendment is
11 not an EPU, we have found in the past that some
12 topics lend themselves to using that review
13 standard. And Section 3.4 of the SE provides our
14 review of various topics using the Review Standard.

15 There are also a number of NRC approved
16 topical reports that support the proposed MELLLA+.
17 And Section 3.5 of the Safety Evaluation provides
18 our evaluations against the limitations and
19 conditions in those topical reports.

20 Section 3.6 of the Safety Evaluation
21 talks about the NRC Staff's evaluation of guarding
22 the TRACG Code Models for ATWS instability events.
23 Section 4 talks about the license and tech spec
24 changes as part of the requested license amendment.

25 And in addition Appendix 8 to the Safety

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1 Evaluation, talks about the licensee's response to
2 Reactor Systems Branch request for additional
3 information questions. And the Staff's evaluation
4 of the licensee's response.

5 Some of the details of the Staff's
6 review are, well, after the application was
7 submitted in September 2014, consistent with what we
8 normally do for a licensed member request, we
9 perform an acceptance review.

10 And mid-October 2014, the Staff accepted
11 the application for review. Determining that it
12 provided sufficient detail to provide the technical
13 review.

14 The key technical areas during this
15 review consistent with some of the previous MELLLA+
16 license member requests were in the reactor systems
17 and human factors branches reviews. This particular
18 review was pretty straightforward.

19 We had 40 requests for additional
20 information, RAI questions that were asked. These
21 questions resulted in seven supplements to the
22 application being submitted.

23 To give you some perspective on the
24 request for information questions we asked, this
25 graphic -- what happened here? Okay, we lost

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1 something in the translation.

2 Okay. Anyway, about half the questions
3 were in the reactor systems part of the review. But
4 a third of the questions were in human factors. And
5 the rest were from the other branches that were
6 involved.

7 Consistent with the focus areas of our
8 review, the Staff performed two audits. The first
9 audit in May 2015 was at the Peach Bottom site.

10 And that focused on the time critical
11 operator actions. Details of the issues that were
12 discussed during the audit are contained in Section
13 3.310 of the Staff Safety Evaluation.

14 The second audit was August 31 to
15 September 2, 2015 at GE-Hitachi in Wilmington, North
16 Carolina. And that audit focused on sensitivity
17 calcs and methodologies for ATWS with instability
18 events using TRACG.

19 Those issues are discussed in Appendix A
20 under RAI, SRXB RAI-18. And our presentations today
21 will closely align with the technical focus areas
22 discussed by the RAIs and the audits.

23 MEMBER SCHULTZ: Rick, before you go
24 forward. Could you describe qualitatively if you
25 would, the -- some comparison of this review versus

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1 the other three that have been done?

2 You've gone through quickly. And you
3 did indicate that this was a straightforward review.

4 MR. ENNIS: Right.

5 MEMBER SCHULTZ: Some of the previous
6 ones were not so straightforward. So, could you
7 provide a qualitative comparison on that?

8 Thinking about the RAIs in particular.
9 And the Staff's interaction with the licensee?

10 MR. ENNIS: Okay. As I mentioned for
11 Peach Bottom, the RAIs resulted in seven
12 supplements. Nine Mile Point had nine supplements.
13 Monticello had 16. And Grand Gulf had 20.

14 So, I think we're learning from our
15 reviews as well as our discussions with ACRS. And
16 we're focusing areas on some of these technical
17 areas that we know that are a concern.

18 So, I think we're getting better at
19 these reviews. And when we do get into the
20 technical area in the closed session, we will have
21 some side by side comparisons on some of the
22 parameters for each of the reviews.

23 MEMBER SCHULTZ: Okay. Thanks.

24 MR. ENNIS: With respect to the agenda
25 for today, during the open session, Exelon is going

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1 to provide an overview of the MELLLA+. This
2 discussion will include an overview and history of
3 some of the key design issues pertaining to Peach
4 Bottom.

5 An overview of the MELLLA+, the design
6 and analysis supporting the proposed change. And a
7 discussion on operating reactor procedures and
8 operating training, including time critical operator
9 actions.

10 Following the break, we'll have to go
11 into a closed session due to the proprietary nature
12 of the information that will be discussed. During
13 the closed session, Exelon will start out with a
14 presentation regarding the MELLLA+ analysis.

15 And then the Staff and one of our
16 contractors will give a presentation that will focus
17 on the reactor systems and human factors reviews.
18 And unless there are any questions, I would like to
19 turn it over to Exelon.

20 MEMBER BANERJEE: Was the minimum set at
21 83 percent flow?

22 MR. ENNIS: I think we'll get into that
23 during the technical discussion.

24 MEMBER BANERJEE: Okay. It wasn't by
25 accident?

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1 MR. ENNIS: I think Exelon will discuss
2 that during their discussion.

3 MEMBER BANERJEE: Okay.

4 CHAIRMAN REMPE: While we're
5 transitioning, I want to check again. Kord, are you
6 able to speak on -- are you on the line? And it's
7 open so you can actually talk?

8 MR. SMITH: It's the same as the speaker
9 is actually they're not able to respond.

10 CHAIRMAN REMPE: Okay. Thank you.
11 Kord, Mike wants me to remind you that it works
12 better if you're on a land line versus a speaker
13 phone or other options, okay?

14 MR. SMITH: Other option.

15 CHAIRMAN REMPE: Okay. Thank you.

16 MR. SMITH: I'm on a land line. I just
17 have to take it off speaker. Is that better?

18 CHAIRMAN REMPE: Yes.

19 MR. SMITH: Okay.

20 MR. BORTON: Good morning. My name is
21 Kevin Borton. I'm the Licensing Manager for Power
22 Uprates.

23 What I'll do, is I'll do a quick
24 introduction of our team so we'll get that out of
25 the way. Here at the head table we have Pat Navin,

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1 which is our Plant Manager at Peach Bottom.

2 Andy Olson, who is from Corporate Fuels.
3 And Jim Kovalchick to my far right, which is our
4 Peach Bottom Operations Manager.

5 Moving to slide four, on the side table,
6 we have with us today John Rommel, the Engineering
7 Director for Exelon Power Uprates. Jim Armstrong,
8 Reg Assurance Manager from Peach Bottom.

9 James Tusar, Nuclear Fuels Manager at
10 corporate. Alex Psaros who is our Reactor
11 Engineering Manager at Peach Bottom.

12 And John McClintock from Operations
13 Training. We also had Tony Hightower, which is an
14 Operator that had worked on the project and has
15 since moved onto a new -- a job up at Limerick.

16 And from GE in our audience here, we
17 have Bruce Hagemer, a Project Manager for MELLLA+
18 from GE-Hitachi. Sean Lamb and Mike Cook, who are
19 the Technical Leads from GEH as well.

20 So, the next slide is our presentation
21 objectives. The objectives here to is to present
22 our need for MELLLA+. Provide the key aspects of
23 our submittal and demonstrate our readiness.

24 We've added the last bullet there. And
25 asking for support for that January 2016

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1 implementation which we spoke about at the beginning
2 of the meeting.

3 CHAIRMAN REMPE: Elaborate a little bit
4 about that. Because all I mentioned is what we -- I
5 didn't really elaborate on it.

6 I just mentioned that we need to decide
7 what we want to do to go forward.

8 MR. BORTON: Okay. So first of all, I
9 appreciate you making the accommodations for us to
10 present this week. I know it had to be shifted
11 around in order to do that.

12 Because you're considering a need for a
13 full Committee review based on the previous reviews,
14 what I found at our Peach Bottom review, I want to
15 expand a little bit on the impact specific to Peach
16 Bottom.

17 We asked for the approval from the NRC
18 to be --

19 MEMBER CORRADINI: Your things not on.
20 You need the little green light or else the recorder
21 is going to go crazy.

22 MR. BORTON: Got it. Okay. Much
23 better?

24 CHAIRMAN REMPE: I was going to tell you
25 I present the update to technology. I'm sorry.

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1 MEMBER CORRADINI: Well, we've changed
2 it. Let's not say update.

3 CHAIRMAN REMPE: Okay.

4 MR. BORTON: All right. So, is this
5 better?

6 CHAIRMAN REMPE: Yes.

7 MR. BORTON: Okay. What we did was we
8 asked for a September 2015 approval from the NRC
9 when we put our submittal in back in 2014. And as
10 such, our current Unit Two Core was designed for
11 MELLLA+.

12 And at this point, we're a little bit
13 more than halfway through our cycle. So, there are
14 some impacts in loss benefits that would impact us
15 if we would go beyond January with our
16 implementation.

17 Those impacts are because of the low
18 core flows and high power, it makes testing
19 difficult due to the thermal margins at this point.
20 Anything past January.

21 Our small operations window increases
22 the rod pattern adjustments that are necessary.
23 Which also puts a reactivity management challenge
24 for our operators.

25 And operating without MELLLA+ in the

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1 higher core flows results in increased APRN noise as
2 well. And of course frequent low drops decreases
3 our capacity factor as well.

4 So, those are some of the things that
5 we've a little anxious about with the reviews. And
6 because of the type of reviews and some of the other
7 audits that we had to perform, has pushed us up
8 against this window.

9 So, we'll have to also consider, at this
10 point, whether or not we would pursue implementing
11 Unit Two in 2015 or early 2016. Rather, we may feel
12 it necessary to delay this until 2016, after our
13 refueling outage in the fall.

14 So, there are some loss benefits here
15 and some impacts to our operators. And I just
16 wanted to let the Committee also weigh that in with
17 the other factors.

18 The fact that we put our application in.
19 We met the limits and conditions of the topical
20 report.

21 And we feel that the previous reviews do
22 bound the review necessary for Peach Bottom as well.
23 Okay. We can move onto the next slide.

24 As Rick stated earlier, our agenda today
25 is to give a history of the plant that brings us up

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1 to MELLLA+ with a project overview. We'll touch on
2 that design and analysis that we've heard from the
3 previous submittals that we think that you're
4 interested in, including the operator reactions and
5 training.

6 So, we'll start with Pat Navin, with the
7 station overview.

8 MR. NAVIN: Good morning. My name is
9 Pat Navin. I am the Plant Manager at Peach Bottom.

10 I started my career at Peach Bottom 31
11 years ago after receiving an Engineering Degree from
12 Drexel University. And had various aspects of the
13 operation at Peach Bottom in the course of my career
14 in engineering.

15 Extensive time in operations and work
16 management, including operations experience as a --
17 four years on shift as a Shift Technical Advisor.
18 Ten years on shift as a Senior Reactor Operator, and
19 three years as the Site Operations Director.

20 And then also had a place and one year
21 assignment as the Corporate Operations Director for
22 the Exelon Fleet. And following that, became the
23 Peach Bottom Plant Manager just over three years
24 ago.

25 So, seen a -- been again, seen a lot of

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1 changes over the course of my time at Peach Bottom.
2 And very proud of a lot -- the number of
3 accomplishments we've accomplished at Peach Bottom.

4 We'll talk a little bit about that
5 around extended power uprate, which we recently
6 completed. First of all, I want to say thank you
7 for the opportunity to per -- for our team to
8 present and answer any questions you may have
9 regarding the Peach Bottom MELLLA+ LAR.

10 Kevin will discuss during his portion of
11 the presentation how important this change is to us.
12 Especially the flexibility and procession it will
13 provide for the Operators.

14 Especially, we're talking about the
15 timing here, as we move into the second half of the
16 operating cycle for Unit Two. Which just completed
17 its first year of operation after our completion of
18 the power uprate project for the Units.

19 In order to provide the foundation for
20 the rest of the presentation and your questions, I'd
21 like to provide a brief overview of the plant's
22 history leading up to this change. So, the station
23 overview, it's a duel unit, the General Electric
24 BWR-4, Mark I containment.

25 The containment design pressure is 56

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1 psig. Did begin commercial operation in 1974. The
2 original licensed thermal power radial was three
3 times -- I'm sorry? Excuse me?

4 CHAIRMAN REMPE: Just a second. The
5 noise from the phone lines is a bit loud. Could
6 everyone please put their phones on mute?

7 I apologize, but I think it will make
8 your life better. Thank you.

9 MR. NAVIN: Okay. Okay, very good.
10 Okay. Again commercial operation in 1974. Again,
11 original license thermal power was 3,293 megawatts
12 thermal.

13 With the extended power uprate --

14 MEMBER STETKAR: Excuse me, sir?

15 MR. NAVIN: Yes?

16 MEMBER STETKAR: If you're out there on
17 the line, put your phone on mute. It's star six.
18 Just please do it.

19 We're hearing background talk coming in.
20 And it's really disrupting our meeting here.

21 So, if you're out there, put your phone
22 on mute please.

23 MR. NAVIN: Okay. All right. Thank
24 you. Okay. So, we did just complete, we had the
25 license amendment approval for extended power

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1 operation that has raised our licensed thermal power
2 to 3,951 megawatts thermal. That was approved in
3 2014.

4 Unit Two, we completed the modifications
5 on Unit Two in the fall of last year. Actually a
6 year ago today, Unit Two came online following the
7 completion of those modifications.

8 And it's been running safely and
9 reliably for 365 days since we've completed those
10 activities on Unit Two. Unit Three, those
11 modifications also are complete.

12 We currently are in power ascension.
13 The testing associated with the extended power
14 uprate modifications at 96 percent power currently.

15 So, we are going through the final
16 reviews and approvals to continue to operate. To
17 move up to 100 percent power on Unit Three. And we
18 expect to achieve that most likely in the next two
19 weeks.

20 MEMBER CORRADINI: So, just a question
21 about kind of performance statistics. So, I was
22 reading, I want to make sure I understand.

23 It's only at the end of life can you
24 achieve that high flow rate because of change in
25 flux shape and pressure drop? And an early -- or a

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1 beginning of cycle, you can't get to 110. What can
2 you get to?

3 MR. NAVIN: For a core flow?

4 MEMBER CORRADINI: Yes.

5 MR. OLSON: Actually, I'll be discussion
6 that shortly.

7 MEMBER CORRADINI: Okay fine. All
8 right, fine. Thank you, thank you.

9 MR. NAVIN: Okay. With the extended
10 power uprate, there were significant upgrades to the
11 plant. Which I believe this Committee had an
12 opportunity to go through some of that previously.

13 It includes an improved steam dryer
14 design, significant modifications to the generation
15 balance of plant equipment. And also of note for
16 this discussion today, enriched boron.

17 That significantly has improved our
18 standby liquid control system response for an ATWS
19 condition. And the ability to more promptly
20 suppress power and mitigate the potential
21 implications of an ATWS event.

22 Additionally, we put significant effort
23 into the elimination of the containment over
24 pressure credit. This was a very significant
25 modification for the station to undertake.

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1 And it has improved notable margin
2 improvement in our ability to remove heat from the
3 containment. It also provides and allows an
4 additional flexibility for the Operators with the
5 changes reimplemented associated with that.

6 Both Units are on a 24-month operating
7 cycle. Both Units are now 100 percent GNF2 fuel in
8 the cores.

9 We have three steam-drive reactor feed
10 pumps on each Unit. And we are licensed for an
11 increased core flow up to 110 percent.

12 MEMBER STETKAR: Well, just out of
13 curiosity. I unfortunately have to plead ignorance
14 because I didn't read all of the material.

15 What did you do to eliminate the cap
16 credit?

17 MR. NAVIN: Well, we put in a -- say a
18 very extensive -- Peach Bottom design has four RHR
19 residual heat removal pumps per Unit. Each one has
20 a dedicated heat exchanger associated with it.

21 We put in cross side pipes to allow us
22 to cross connect. One RHR pump can go into
23 essentially two heat exchangers.

24 MEMBER STETKAR: Okay. Good.

25 MR. NAVIN: To improve heat removal

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1 capability without impacting diesel generator
2 loading.

3 MEMBER STETKAR: So it's hardware
4 modifications, --

5 MR. NAVIN: That's correct.

6 MEMBER STETKAR: Not just pencil
7 sharpening.

8 MR. NAVIN: Yes.

9 MEMBER STETKAR: Thank you.

10 MR. NAVIN: That's right.

11 MEMBER BANERJEE: And this was done
12 during your EPU, right?

13 MR. NAVIN: That's correct. Right.

14 MEMBER BANERJEE: I remember that.

15 MR. NAVIN: And it was a very extensive
16 amount of work. We put in single failure criteria
17 and a lot of the different things that we had to do
18 with redundant power supplies and et cetera.

19 So, it was a very extensive amount of
20 work. Okay, next slide.

21 Peach Bottom history. Again, the
22 original license power as I mentioned, 3,293. There
23 were two previous uprates.

24 A stretch power uprate, which was a 5
25 percent uprate in the 1994/1995. And then also an

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1 MUR uprate, was a 1.6 percent increase in 2002 on
2 each Unit.

3 We did get the licensing amendment for
4 MELLLA operating domain, operations in MELLLA
5 operating domain back in 1995. That was associated
6 with our stretch power uprate project.

7 And also received a renewed operating
8 license back in 2003. And we did enter into the
9 extended operation on both units. And currently
10 licensed to operate through 2034.

11 We did implement the Option Three
12 Stability Solution. Which is the auto suppression
13 trip back in 2005. As I mentioned, GNF2 first
14 introduced in 2010.

15 And now all -- both all cores -- both
16 cores are fully implemented with GNF2. And the
17 extended power uprate project again, license
18 amendment approvals and, you know, currently in
19 power ascension as I discussed on Unit Three.

20 And I will say, additional history, you
21 know, at Peach Bottom, very focused on operating the
22 power plant safely, precisely. INPO ratings we have
23 four consecutive INPO One ratings.

24 We have not had an automatic scram at
25 Peach Bottom either Unit in over ten years. So,

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1 we've taken a lot of efforts to make sure the plant
2 is running reliably, safely and an extensive amount
3 of work put into this extended power uprate to
4 ensure that we'll maintain that.

5 Before I turn it over to Kevin and the
6 rest of the team, I just want to leave you with our
7 goal today. Which is to make sure all your
8 questions are answered regarding the MELLLA+
9 application.

10 And ensure that you have the sense of
11 confidence that we will implement this change very
12 safely, very precisely. And I'll point to our
13 extended power uprate project that we just
14 completed.

15 It was done with a very strong
16 engineering design basis. A very strong alliance
17 with operations and our training departments to make
18 sure that that project was done very well, very high
19 quality, and implemented with absolute safety.

20 And we're seeing results of that today
21 at Peach Bottom.

22 MEMBER SKILLMAN: Pat, let me ask this.
23 You mentioned the benefit of the enriched boron for
24 the power uprate. In making that comment, were you
25 referring to the analytical benefit?

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1 Or were you referring to actually
2 testing and demonstrating the benefit?

3 MR. NAVIN: Well, it's tested on our
4 simulator. I mean, we did not inject it into the
5 reactor. I mean, it's analytical.

6 But the Operators can attest to the
7 simulator -- changes on the simulator, ATWS
8 response, and how that affects their response in an
9 ATWS event.

10 MEMBER SKILLMAN: Simulator and
11 analytical?

12 MR. NAVIN: Correct. Yes, sir.

13 MEMBER SKILLMAN: Okay. Thank you.

14 MR. NAVIN: Okay.

15 CHAIRMAN REMPE: Because we weren't
16 given the slides in advance, I may be asking this
17 out of order. But at some point will you discuss
18 when you did the EPU's and what happened with the
19 measurements on the steam dryer? And how things
20 compared to what was predicted?

21 MR. BORTON: We could probably touch on
22 that at the end.

23 CHAIRMAN REMPE: Okay. Thank you.

24 MR. BORTON: Yes. Okay, Kevin Borton
25 again here. I want to go over the benefits starting

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1 on slide 10, gained from this change.

2 And the major benefit is to provide the
3 Peach Bottom Operators with the ability to control
4 power using core flow versus moving rods. This is -
5 - reduces the number of times that are required to
6 maneuver the reactor, especially during end of
7 cycle.

8 And the DSS-CD also provides for earlier
9 detection in instability due to its sensitivity
10 speed and the alarms that we're installing. And
11 finally, the station capacity factor will increase
12 due to the reduced number of down powers that we
13 anticipate with this as well. Next slide.

14 And just to expand on this a little bit
15 more, slide 11 is our proposed power to flow map.
16 As you can see, the blue dotted line at 3,514
17 megawatt thermal, was our pre-EPU operating window
18 at 100 percent.

19 You could also see that the window was
20 reduced at EPU represented five points D to F at
21 3,951 megawatt thermal. So the new MELLILA boundary
22 is showing in the highlighted green lines where the
23 100 percent window now is expanded once again from J
24 to F right above it.

25 MEMBER CORRADINI: So, just for my

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1 understanding, when you were at your EPU condition,
2 but not using MELLLA+, what would be the path you
3 trace on this power flow map to make a maneuver?

4 I think I know. But I'm not really
5 sure. So, I'm curious. You come down at Point D to
6 a lower power and then come over? Or do you
7 actually follow the old MELLLA line down?

8 MR. BORTON: For rod pattern adjustment?
9 Do you want --

10 MEMBER CORRADINI: Well, on this plot,
11 how does power and flow change with rod
12 manipulations?

13 MR. BORTON: Okay. We'll call on our
14 Reactor Engineer.

15 MEMBER CORRADINI: I'm not enough of a
16 BWR person to appreciate this.

17 MR. PSAROS: I'm Alex Psaros, Reactor
18 Engineering Manager. Is this on?

19 MEMBER CORRADINI: Okay, you have to be
20 closer. Get closer. Have a seat.

21 CHAIRMAN REMPE: And say your name
22 again, please.

23 MR. PSAROS: Alex Psaros, Reactor
24 Engineering Manager. For maneuver from 100 percent,
25 we'd insert rods first and come straight down.

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1 MEMBER CORRADINI: Okay.

2 MR. PSAROS: And then maneuver.

3 MEMBER CORRADINI: And then you'd come
4 down to lower flow or do whatever you have to do?

5 MR. PSAROS: That's correct. That's
6 correct, lower flow. By inserting rods, we're
7 giving ourselves margin to the MELLLA boundary.

8 MEMBER CORRADINI: You don't ever --
9 we'll take it whatever time of life you can do. You
10 don't ever go to increase flow and come down that
11 way?

12 MR. PSAROS: Within the cycle we would
13 run up core flow.

14 MEMBER CORRADINI: Okay. So you would
15 have that extra margin at end of cycle to maneuver
16 through?

17 MR. PSAROS: That's correct.

18 MEMBER CORRADINI: Okay. Thank you.

19 MR. NAVIN: But for full power, we would
20 not be able to raise core flow. Because we'd
21 already be in a situation where by raising core
22 flow, it would raise power.

23 So, you would have to insert core rods -
24 -

25 MEMBER CORRADINI: You would have to

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1 come down and then come over to create mar -- or
2 create flexibility on both sides. Okay.

3 MR. NAVIN: That's correct.

4 MR. PSAROS: That's right. You have to
5 insert rods and come straight down.

6 MEMBER CORRADINI: Got it. Okay, thank
7 you.

8 CHAIRMAN REMPE: So this slide is a good
9 place, I think answer Sanjoy's question about why
10 you picked your particular MELLLA+ region, because
11 we do see differences in what comes before us. And
12 if you -- why'd you pick 83 percent?

13 MR. BORTON: So, we're actually going to
14 have Tony Hightower discuss that.

15 CHAIRMAN REMPE: Oh, later? All right.

16 MR. BORTON: No, right now.

17 MR. HIGHTOWER: So, this is Tony
18 Hightower, Peach Bottom Operations. The 83 percent
19 as the lower limit of our envelope restores the
20 envelope that we have prior to the changes for EPU.

21 If -- this graphic shows it pretty
22 clearly. If you look at the point labeled J and
23 take a line straight down to where that blue dotted
24 line intersects, that's -- that is essentially the
25 same point. So, 83 percent.

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1 MEMBER CORRADINI: So, can I say it to
2 you differently? There wasn't a technical reason on
3 fun multi-phase flow stuff. It was just that from a
4 procedural standpoint, if you stayed graphically the
5 same way, a lot of your procedures would just
6 naturally translate up.

7 MR. HIGHTOWER: Correct.

8 MEMBER CORRADINI: Or actually both.

9 MR. HIGHTOWER: Yes.

10 MEMBER CORRADINI: Both.

11 MR. BORTON: That won't go to into our
12 fuel's person, it's on the other side.

13 MEMBER CORRADINI: Okay. Fine.

14 MR. HIGHTOWER: So, yes, from an
15 operations perspective, it was similar.

16 MEMBER CORRADINI: Okay.

17 MR. OLSON: Andy Olson, Nuclear Fuel
18 Safety Analysis. So, the selection of the point is
19 a balance between operational considerations and
20 analytical considerations.

21 The MELLLA+ LTR genetically allows the
22 values as low as 80 percent flow. Our vendor
23 initially proposed a value of 85 percent flow to us.

24 To take into consideration the impact of
25 the lower flow rates on the rod line and the

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1 implications to ATWS results. There is a balance.

2 The lower you come in flow, the higher
3 rod line that you're on. And it's more challenging
4 with respect to ATWS response and ATWS results.

5 When they proposed 85 percent to us, it
6 was based on that consideration. We evaluated the
7 preliminary analysis that they had performed for us
8 and concluded that we believed there was some
9 additional margin available.

10 And we kind of proposed the 83 percent
11 value in part because it did coincide with where we
12 were previously. And would make operations
13 basically take them back to where they were prior to
14 EPU.

15 And --

16 MEMBER BANERJEE: Why were you there
17 previously?

18 MR. OLSON: The --

19 MEMBER BANERJEE: Pre EPU.

20 Mr. Olson: Pre EPU. So, MELLLA
21 implemented prior to power uprate provided for a
22 lower flow value of 75 percent. The stretch uprate
23 and the MUR uprate is performed preserving the
24 MELLLA line.

25 And so, in order to increase power, you

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1 are forced to slide up the line. And as you slide
2 up the line, you come further to the right higher in
3 core flow.

4 So, as you increase licensed power under
5 MELLLA operation, you slowly constrain your flow
6 window because the lower end of the window becomes
7 higher in flow rate.

8 So, we started at 75 percent. We did
9 stretch uprate that took us to 81 percent. We then
10 did the MUR and that took us to essentially 83
11 percent.

12 And that's where we were prior to EPU.

13 MEMBER BANERJEE: I understand.

14 MR. OLSON: Does that answer your
15 questions?

16 CHAIRMAN REMPE: Yes. Thank you.

17 MR. BORTON: All right, we're on slide
18 12. Peach Bottom is based on the GE approved
19 topicals as were the previous industry applications.
20 So, therefore pressure, max thermal power, max core
21 flow and feed water rates and temperatures do not
22 change with MELLLA+.

23 Also, balance of plant equipment is not
24 required to be modified is per --

25 MEMBER BANERJEE: So, just going back to

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1 the point you were making. If you did take it to 80
2 percent, would that have substantially impacted the
3 operator action time for at risk?

4 MR. OLSON: We just --

5 MEMBER BANERJEE: Did you do a
6 sensitivity analysis of that?

7 MR. OLSON: No. We took a very critical
8 look at the core flow rate we wanted to use for the
9 analysis. We knew 80 percent was available.

10 Upon the recommendation of the vendor,
11 we did not pursue that because it was felt that we
12 would not meet the ATWS criteria. Not just ATWS-I,
13 but ATWS itself in terms of pressure response and
14 other characteristics.

15 And so, we chose to go with 83. And we
16 didn't investigate any further beyond that.

17 MEMBER BANERJEE: Did they give you any
18 evidence to that effect? Or to that concept?

19 MR. OLSON: We had some basic
20 sensitivity studies that they had performed. We had
21 calculations at 85 percent flow that showed
22 sufficient margin available to allow us to go down
23 in flow and achieve a higher rod line.

24 And but based on their past experience,
25 they recommended no lower than that. So, we worked

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1 back and forth with the vendor to conclude that 83
2 was supportable and provided assurance that we
3 wouldn't have to redo the work and reconsider a
4 different value.

5 MEMBER BANERJEE: Okay. So it was a
6 judgment call?

7 MR. OLSON: Yes.

8 MR. BORTON: So, moving from slide 13
9 onto slide 14. This talks about what changes are
10 required for MELLLA+. It does require some physical
11 changes at set point changes.

12 However, the majority of changes listed
13 here are related to operator aids, tech spec changes
14 and reporting. So, this is something I think is
15 familiar to the Committee.

16 Moving onto the next slide,
17 implementation. The installation of DSS-CD firmware
18 and testing is now completed on both Units. At both
19 Unit Two and Three at Peach Bottom.

20 After NRC approval, tech specs will be
21 implemented and the DSS-CD will be enabled and
22 tested at that point. Procedures and updating the
23 3D Monicore Databank and COLR will also be performed
24 during implementation.

25 So this really ends our quick overview

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1 of the scope of our implementation. So, if there's
2 no questions, I'd like to turn this over to Andy.

3 MEMBER BANERJEE: You have no plans to
4 change to type of fuel?

5 MR. BORTON: I'm sorry?

6 MEMBER BANERJEE: You have no plans to -
7 -

8 MR. BORTON: Not at this time. No.
9 We're going to stay with the fuel that we have in
10 both Units.

11 So, I'd like to turn it over to Andy.

12 CHAIRMAN REMPE: Actually, I do have a
13 question. And again, I didn't -- I don't know if
14 I'm doing this out of order because I didn't see the
15 slides until this morning.

16 But, in the last couple of these, we've
17 had an issue of -- or a discussion about the safety
18 relief valves and their propensity for drifting.
19 The statement that's in the actual document that you
20 have is almost identical to one we've seen before.

21 But it doesn't actually cite what the
22 tolerances are when you test the relief valves. And
23 do you have that information?

24 The statement is something about a
25 propensity to drift more than 3 percent. But it

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1 doesn't state that they don't have a propensity to
2 draft more than 3 percent.

3 MR. BORTON: Yes, it's 3 percent is what
4 we have.

5 CHAIRMAN REMPE: But what is the actual
6 test data? Is what I want to know. And is this the
7 good place to -- if there's another place where
8 you're planning to talk about that?

9 MR. NAVIN: Well, Peach Bottom used to
10 have a tighter tech spec requirement, it was plus or
11 minus 1 percent.

12 CHAIRMAN REMPE: Um-hum.

13 MR. NAVIN: We recently implemented the
14 change. We did our challenges maintaining the 1
15 percent criteria.

16 CHAIRMAN REMPE: Okay.

17 MR. NAVIN: We did a tech spec change to
18 support the plus or minus 3 percent, which is the
19 industry standard.

20 CHAIRMAN REMPE: Okay.

21 MR. NAVIN: And with that 3 percent
22 change, we have not had historically problems
23 maintaining that 3 percent margin to set point. Is
24 what you're referring to?

25 CHAIRMAN REMPE: Right.

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1 MR. NAVIN: Yes. That has not been a
2 problem at Peach Bottom.

3 CHAIRMAN REMPE: And what is the actual
4 data? I guess it says here, as found SRV left set
5 point tests do not show a propensity for set point
6 drift higher than the 3 percent drift tolerance.

7 So, what is the value? Is it around 1
8 percent? Two percent? Less than 2 percent?

9 MR. BORTON: We could call that up from
10 the station and have that to you before we close.

11 CHAIRMAN REMPE: That's fine. It's
12 something I would like to check if you don't mind.

13 MR. BORTON: Yes.

14 MR. NAVIN: Based on our previous tech
15 spec requirement of 1 percent, normally they were in
16 with 1 percent. But we did have, it was not usual
17 to have one or two SRVs test outside the 1 percent,
18 but within 3.

19 CHAIRMAN REMPE: Okay.

20 MR. NAVIN: So I think 2 would normally
21 be probably a boundary number for where we normally
22 sit.

23 CHAIRMAN REMPE: Less than 2 percent
24 would be nice to hear. Thank you.

25 MEMBER BALLINGER: Are these two or

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1 three staged target rocks?

2 MR. NAVIN: These are I believe two
3 staged. Three? Ours are three? Thanks.

4 MEMBER BALLINGER: Three staged? Okay.

5 MR. OLSON: Good morning. My name is
6 Andy Olson. I am a Safety Analysis Engineer in the
7 Nuclear Fields Department at Exelon.

8 I have been supporting Peach Bottom
9 station as a Safety Analysis Engineer for over 30
10 years now. I'm going to provide some general
11 information about our MELLLA+ application.

12 Including our experience with increased
13 core flow. Which was a question raised a little
14 earlier.

15 Peach Bottom is licensed for a maximum
16 core flow of 110 percent. We actually licensed to
17 110 percent core flow back in 1995 in conjunction
18 with the stretch up rate. And at the time we were
19 able to achieve 110 percent core flow.

20 With the various uprates and over time,
21 our ability to achieve 110 percent core flow has
22 become somewhat constrained. We can achieve
23 approximately 109.5 percent core flow at end of
24 cycle conditions.

25 However, earlier in the operating cycle,

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1 particularly near the beginning of cycle when axial
2 power shape is strongly bottom peaked and core flow
3 resistance is high, we can achieve about 104
4 percent.

5 As we proceed through the cycle, for the
6 majority of the cycle, that core flow capability
7 increases slightly. And we see roughly 105.5
8 percent maximum core flow capability through most of
9 the operating cycle.

10 And then as we proceed towards the end
11 of the operating cycle and the power shape begins to
12 move towards the top of the reactor core, core
13 pressure drop is reduced and flow capability
14 increases naturally.

15 And we can achieve higher core flows as
16 we implement end of cycle extension strategies like
17 feed water temperature reduction and coast down.
18 The core flow capability increases. And we can
19 again, achieve roughly 109.5 percent.

20 In practical operation, that results in
21 a flow operating window at Peach Bottom of
22 approximately 101 percent to 105.5 percent. The 101
23 percent limitation is driven by our requirement to
24 maintain operational margin to the MELLLA boundary.

25 Which under EPU conditions begins at 99

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1 percent core flow. And of course, we do use higher
2 core flows as we approach the end of cycle.

3 So, you can see the practical flow
4 window currently without MELLLA+ on the order of 4
5 to 5 percent. It's fairly tight.

6 MEMBER SKILLMAN: Andy is that one half
7 percent between 109.5 to 110 an issue or a problem?

8 MR. OLSON: I'm sorry, repeat the
9 question please?

10 MEMBER SKILLMAN: Is that half a
11 percent, EPU allows 110, you can achieve 109.5 at
12 end of cycle. Is that half a percent important?

13 MR. OLSON: A problem? No. It has a
14 very modest impact on overall fuel cycle economy.
15 But operationally it's not a problem or a concern,
16 no.

17 MEMBER SKILLMAN: Thank you.

18 MR. OLSON: Okay. So, for Peach Bottom
19 we have produced MELLLA+ supplemental licensing
20 report. And that has been previously submitted to
21 the NRC as supplemental information to the license
22 amendment request.

23 The current core design for Unit Two and
24 Unit Three as well, is based on the presumption that
25 we will utilize MELLLA+ during the cycle. MELLLA+

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1 does introduce some modest thermal limit increases.

2 In particular SLMCPR for operation.
3 That's as a result of the increase in the safety
4 limit MCPR that occurs with MELLLA+ due to
5 limitations and conditions.

6 There's a safety limit adder that we
7 have to consider as well as the implementation of a
8 larger uncertainties for core flow conditions. And
9 we'll discuss that in a little more detail during
10 the closed session.

11 There is no impact on the linear heat
12 generation rate limits. Nor the --

13 MEMBER BANERJEE: Isn't that just based
14 on the conditions that took place on the LTR, right?

15 MR. OLSON: That's correct.

16 MEMBER BANERJEE: Yes.

17 MR. OLSON: It's based on the conditions
18 placed on the LTR. Otherwise, there would be very
19 little change--

20 MEMBER BANERJEE: Right.

21 MR. OLSON: or none. And yes, that --
22 and no change in our map or hydro limits as well.

23 The new supplemental relo licensing
24 report also reflects the transition to the new DSS-
25 CD stability solution. That section of the SLAR

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1 previously addressed the utilization of the option
2 three detect and suppress solution.

3 It now provides generic confirmation of
4 our DSS-CD set points. As well as provides the
5 manual backup stability protection and automated
6 backup stability protection limits and information.

7 The SLAR also includes Appendix F, which
8 provides and address the limitations and conditions
9 from the interim methods licensing topical report
10 that apply to the core. And a new Appendix G has
11 been added that does the same for the applicable
12 limitations and conditions from the MELLLA+ LTR.

13 So, that's the changes that we see in
14 the SLAR as a result of the implementation of
15 MELLLA+. And that's the end of my presentation if
16 there's any questions.

17 MR. KOVALCHICK: Yes, good morning, I'm
18 Jim Kovalchick. To discuss my background, I started
19 at Peach Bottom, like Pat, 31 years ago.

20 And most of my time has been in
21 Operations. And 15 years of that time as a Senior
22 Reactor Operator.

23 And my latest assignment as a Senior
24 Manager in Operations has been to focus on our power
25 uprate. And also a subset of that, the MELLLA+, in

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1 particular operations and training.

2 And that's what I'll be discussing this
3 morning. Starting with slide 21, I can discuss
4 license conditions.

5 So, operations in the MELLLA+ domain
6 will be prohibited when we have either of the
7 following plant conditions occur. One is that when
8 we're in single loop operation, we'll not be in
9 MELLLA+.

10 And the other is when we have a feed
11 water heater out of service. Now, I'll define feed
12 water heater out of service a little bit.

13 Because we wanted to make sure that we
14 didn't have minor equipment malfunctions limit us
15 unnecessarily. But also, we wanted to make sure
16 that that is a term that the operators would be able
17 to easily recognize and understand.

18 And so we determined that a 10-degree
19 reduction in feed water temperature below our design
20 would be appropriate. So, that's something that we
21 know that we'll be able to see both in power and in
22 feed water temperature.

23 And then we'll be able to implement
24 operations appropriate for that out of our already
25 existing positive reactivity insertion procedure.

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1 Next slide please.

2 For our tech specs, to accommodate
3 changes for our OPRM upscale function, we'll revise
4 the required operability threshold and set points
5 for the enabled region to make them a larger region.

6 We'll have new conditions, required
7 actions and completion times do to the addition of
8 the automated backup stability protection for when
9 the OPRM upscale function is inoperable.

10 And we'll eliminate a surveillance
11 requirement that's no longer necessary because the
12 DSS-CD implementation specifically on that, DSS-CD
13 automatically arms. And so we no longer need to
14 verify that the OPRM is not bypassed.

15 We'll change the allowable value of the
16 APRM simulated thermal power and high trip function
17 to preserve the margin to trip. And then we'll
18 revise our single loop operations at LCO to make
19 sure that we're exiting the MELLLA+ region
20 immediately if that occurs.

21 And then finally, our tech spec
22 administration section will include changes that
23 will specify what kind of items are required each
24 time that we make our quota operating limit report.
25 Next slide please.

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1 Okay. Now I'd like to discuss the time
2 critical operator actions. I've already mentioned
3 these a couple of different times.

4 And an important part of our
5 implementation, three time critical operator actions
6 for ATWS and stability. One, that we initiate
7 reactor water level reduction in 120 seconds.

8 We'll initiate poison injection in 120
9 seconds. And initiate suppression pool cooling in
10 660 seconds. The new one in that trio is the
11 reactor water level reduction.

12 So, examining implementation of that,
13 the coincidence of that new one, with the existing
14 one for standby liquid control injection, we wanted
15 to make sure that number one, we would maintain our
16 existing EOP strategy. But also make sure that each
17 time we have an ATWS, that the steps will be
18 executed in that timely way.

19 So, we implemented new rapid response
20 cards for ATWSs. We already have rapid response
21 cards to help the operators and other transient and
22 emergency operation situations.

23 But we've added new ones for the ATWS.
24 And what --

25 MEMBER STETKAR: Jim, before we get too

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1 much in details there. You had feed water run back
2 under just plain MELLLA before or not?

3 You never had feed water run back? So
4 this is a brand -- you say it's changed for MELLLA+.
5 You mean that's a new action? You never had feed --

6 MR. KOVALCHICK: The new time critical
7 action. So, for ATWSs, it was not -- it wasn't a
8 required in 120 seconds for previous ATWS analysis.

9 MEMBER STETKAR: Okay. Was it --

10 MR. KOVALCHICK: It was already an
11 action inside of our EOPs if that's your question.

12 MEMBER STETKAR: Yes. But it was
13 expected to be taken some time -- some time.

14 MR. KOVALCHICK: We never put a
15 timeliness on it within the generic aspects. So,
16 remember, we have symptom days procedures.

17 MEMBER STETKAR: Yes.

18 MR. KOVALCHICK: So, the supervisor is
19 going to make decisions on how he goes through it
20 each time. And you know, we wanted to make sure
21 that we expeditiously got to that set of
22 instructions each time we do an ATWS anytime moving
23 forward.

24 That's the only difference. The actual
25 EOP strategy of if we have a power ATWS, we are

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1 taking the mode switch to shut down. We are
2 injecting poison.

3 And we are going to go reduce level to
4 limit the possibility of cold water injection.

5 MEMBER STETKAR: That's -- that's --
6 but, what you were just getting to, is what I wanted
7 to hear from you. The operators until this point in
8 time thought, were trained in that sequence.

9 Mode switch to shut down. Shoot the
10 boron and then -- and then run back feed water.

11 MR. KOVALCHICK: Yes. And some other
12 little things in there.

13 MEMBER STETKAR: Yes, yes.

14 MR. KOVALCHICK: For example, we're
15 going to do ARI --

16 MEMBER STETKAR: Sure, sure. But I'm
17 taking big picture steps here. That's right. Okay.

18 MR. KOVALCHICK: Big picture. That's
19 what we're going to do.

20 MEMBER STETKAR: Okay. Okay.

21 MR. KOVALCHICK: And that's not going to
22 change. But what's going --

23 MEMBER STETKAR: It's only going to
24 change in the sense that now you have made the feed
25 water run back equally critical with injection --

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1 with water injection.

2 MR. KOVALCHICK: We have developed a
3 pattern in our rapid response cards that it's going
4 to happen the same way every time to make sure that
5 the timeliness is there.

6 MEMBER STETKAR: Okay. I'll let you
7 consider on -- continue now on the rapid response
8 card.

9 MR. KOVALCHICK: Okay. Okay, thanks.

10 MEMBER STETKAR: Thank you.

11 MR. KOVALCHICK: Okay. All right.
12 Moving on, I think we can go to, let's see, we're up
13 to slide 24.

14 The talk a little bit more about the
15 rapid response cards. I did mention the content of
16 them. One thing I want to do, reinforce that with
17 respect to the supervisor command and control.

18 One of the things that we've done is to
19 make sure that the supervisor does not lose command
20 and control by just issuing a set of instructions
21 and isn't in the decision making process during
22 certain critical times.

23 So, even within the implementation of
24 the rapid response cards, we have built in at
25 decision points where their communications must

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1 happen. For example, immediately prior to injection
2 of poison, the reactor operator will report that I'm
3 ready to inject.

4 And then he will get a final -- he or
5 she will get a final command from the shift
6 supervisor, inject poison or not to do so. The same
7 with a reduction of reactor level.

8 So, within the packaging of instructions
9 that we have, we've made sure that we aren't taking
10 command and control away from the senior reactor
11 operator.

12 MEMBER SKILLMAN: Jim, how formally is
13 the instruction that you just described, codified?
14 And how often are the crews trained to do this?

15 MR. KOVALCHICK: The formality is as
16 formal as instructions you will see in the control
17 room. They're all three-parted. And the step
18 itself is listed for that communication in the rapid
19 response card.

20 Now, as far as ATWS training, John
21 McClintock, one of our training leads can discuss
22 how often we train on ATWSs. It's a good question.
23 And I think he can speak to it.

24 MR. McCLINTOCK: Hi, my name is John
25 McClintock. I am the License Operator Requal

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1 Training Lead at Peach Bottom. I'm also a former
2 Licensed Senior Reactor Operator for many years at
3 Peach Bottom and Shift Manager.

4 As far as the training goes, the
5 operators receive routine rigorous training
6 obviously on all aspects of, you know, power plant
7 operation. Which includes all of the normal
8 accident and transient sequences.

9 Of which failure scram is, you know, one
10 of the more significant. So, they receive training
11 on a routine basis every five weeks they're over in
12 training.

13 And a training week typically always
14 includes some training in failure to scram. I don't
15 know if that answered your question. It's --

16 MEMBER SKILLMAN: Every five weeks you
17 run an at risk?

18 MR. McCLINTOCK: No.

19 MEMBER SKILLMAN: No?

20 MR. McCLINTOCK: No. They are in
21 training every five weeks.

22 MEMBER SKILLMAN: Okay.

23 MR. McCLINTOCK: The training, you know,
24 is done through the systematic approach to training.
25 ATWS, you know, encompasses --

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1 MEMBER SKILLMAN: Once a year? Once
2 every couple of years?

3 MR. McCLINTOCK: No. It would be more
4 like several times a year.

5 MEMBER SKILLMAN: Okay. Thank you.

6 MR. KOVALCHICK: Does that answer your
7 question?

8 MEMBER SKILLMAN: Answered my question.
9 Thank you.

10 MR. KOVALCHICK: Okay. So, Mr. Ennis
11 mentioned that they got a chance to look at the
12 implementation of that in the audit of May 2015.
13 So, all of our operating crews have been trained on
14 the MELLLA+ ATWS instability time critical actions.

15 We did our latest initial license
16 training class in March 2015. And our license
17 operator requal training all of the crews have
18 received that now as of August 2015.

19 And all of the operating crews
20 demonstrated satisfactory completion within the time
21 critical actions that we have. Next slide please.

22 So, in discussing the time critical
23 actions, you know, I can present some data. And I
24 think there's some interest here.

25 For the audit crew, I want to make sure

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1 we understand that the audit crew's purpose was to
2 demonstrate our ability to do it. So this is in the
3 initial generation of our rapid response cards.

4 We had incentive to demonstrate to
5 ourselves. But also to the audit team that this was
6 something that could be accomplished.

7 So, we had hand-picked reactor operators
8 and supervisors that had some level of training and
9 proficiency at the time that it was demonstrated.
10 And very clearly, we demonstrated that it was a
11 feasible strategy.

12 Now getting into the operating crews --

13 MEMBER SKILLMAN: Well, just before you
14 go ahead.

15 MR. KOVALCHICK: Sure.

16 MEMBER SKILLMAN: Hand-picked
17 individuals is what you just said.

18 MR. KOVALCHICK: Yes, sir.

19 MEMBER SKILLMAN: Does that mean you
20 chose the best of the best? The sharpest knives in
21 the box?

22 MR. KOVALCHICK: Not necessarily. They
23 were picked specifically because of their
24 availability within -- outside of crews. They were
25 working with me.

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1 And one of them was on the shift that we
2 managed to use. But the other two were working with
3 me on the uprate stuff.

4 They were very good operators.

5 MEMBER SKILLMAN: Let me ask the
6 question a little bit differently. Why should we
7 believe that an audit crew is representative of an
8 operating crew?

9 MR. KOVALCHICK: And that's why I'm
10 going to present to you the operating crew data. So
11 remember, the first part was to go show that the
12 strategy works.

13 So, you know, the 120 second time is a
14 viable time. So, it's not wiped out with respect to
15 the analysis. So, it can be accomplished.

16 So -- but, your question with the
17 operating crews is very relevant. And that's why
18 we're presenting both sets of data.

19 So, the operating crews, the data is
20 there. It also shows that they meet the time.

21 Now, each of those crews received what
22 is more -- what I would call more traditional
23 training with respect to an introduction to the
24 rapid response cards in a cycle. And in the next
25 cycle after that, we had them demonstrate the times.

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1 Each of the crews was able to
2 demonstrate the times. The difference between the
3 audit and the operating crew, you know, is
4 important.

5 And I agree with you, that why, you
6 know, I need to be able to go demonstrate that.

7 MEMBER SKILLMAN: Um-hum.

8 MR. KOVALCHICK: So, that's why the
9 operating crew is there.

10 MEMBER SKILLMAN: I understand what you
11 did with the audit crew. The operating crews on
12 this graphic, did they know they were going to have
13 an ATWS event?

14 MR. KOVALCHICK: They do -- they did.

15 MEMBER SKILLMAN: So this was not 3:00
16 in the morning on a Monday morning?

17 MR. KOVALCHICK: It was not.

18 MEMBER SKILLMAN: After how many years
19 have you operated without an automatic scram?

20 MR. NAVIN: Ten years.

21 MEMBER SKILLMAN: Ten years on each
22 Unit.

23 MR. KOVALCHICK: Yes, and that's --

24 MEMBER SKILLMAN: Okay.

25 MR. KOVALCHICK: That's a -- I'll take

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1 the fact that we don't have ten year, you know, we
2 have ten years without a scram. I'll take that any
3 day.

4 But it does present a challenge in
5 making sure that your operating crews are not
6 complacent. And actually can, you know, implement
7 the training in the field.

8 For example, we did have a recert pump
9 trip this year. In early was it, Pat? It was like
10 in?

11 MR. NAVIN: Yes, earlier this year, yes.

12 MR. KOVALCHICK: Yes. Earlier this
13 year. The crews -- the crew, you know, implemented
14 that perfectly in the field.

15 So, we have evidence that shows that our
16 training is effective in doing that. I expect that
17 in a -- I can go ahead and if you go back to the
18 slide.

19 MEMBER SCHULTZ: Jim, before you go
20 forward.

21 MR. KOVALCHICK: Sure.

22 MEMBER SCHULTZ: Either for you or for
23 John. What is the average deviation represented
24 here? That you're showing for the crew response?

25 MR. KOVALCHICK: You mean what is it

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1 probably telling us?

2 MEMBER SCHULTZ: How is it evaluated?
3 What's it -- how is it determined?

4 MR. KOVALCHICK: The deviation was
5 determined simply by time, you know, from one crew
6 to the next, the deviation.

7 MEMBER SCHULTZ: How many -- the average
8 of how many crews? You mentioned that --

9 MR. KOVALCHICK: There's five crews.

10 MEMBER SCHULTZ: Five crews.

11 MR. KOVALCHICK: Five crews.

12 MEMBER SCHULTZ: For the operating crews
13 and for the audit crew the same?

14 MR. KOVALCHICK: The audit crew was just
15 one.

16 MEMBER SCHULTZ: That was just one.

17 MR. KOVALCHICK: And their deviation was
18 on multiple occasions to do it during the audit. We
19 tested --

20 MEMBER SCHULTZ: Several opportunities.

21 MR. KOVALCHICK: Yes. We did several
22 scenarios for the audit demonstration.

23 MEMBER SCHULTZ: Okay. And the other
24 was the average of five crews?

25 MR. KOVALCHICK: That's right.

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1 MEMBER SCHULTZ: Thank you.

2 MR. KOVALCHICK: Yes.

3 CHAIRMAN REMPE: Somewhere I thought I
4 read in some of the information that we were given
5 that the maximum time that they took was 105
6 seconds. Am I misreading something?

7 There was no place that they ever came
8 out to 120 or anything like that. Is that true?

9 MR. KOVALCHICK: That's correct.

10 CHAIRMAN REMPE: Okay.

11 MR. KOVALCHICK: Correct. I also expect
12 that the times will improve. As John mentioned,
13 ATWSs are something that we do with frequency in the
14 simulator.

15 And I expect that these times will start
16 to come closer to what you saw the audit crew do.
17 You know, with the familiarity of it.

18 The operators are -- actually like these
19 rapid response cards very much. They have in the
20 past always executed ATWS strategies the way we
21 expect.

22 And they've developed a very good
23 understanding of what they wanted to do. This
24 actually gives them a more expeditious path to where
25 they wanted to go in the first place.

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1 So, they're responding to it very well.
2 And they're actually, you know, they like this
3 change.

4 MEMBER STETKAR: Jim, who does each of
5 these actions? Initiates standby local control and
6 runs back feed water?

7 MR. KOVALCHICK: The supervisor will
8 direct the reactor operator to inject poison.

9 MEMBER STETKAR: Um-hum.

10 MR. KOVALCHICK: So that's all at the
11 controls right there. I call it the five panel.
12 So, all your attitude is controlled there.

13 Reactor operator is mostly stationed
14 there anyway. He'll do it. The second reactor
15 operator, the plant reactor operator we call him,
16 will be assigned to level reduction.

17 MEMBER STETKAR: Remedy that. Thank
18 you.

19 MR. KOVALCHICK: You're welcome.

20 MEMBER SKILLMAN: Jim, let me ask this.
21 For the average completion time for reactor water
22 level reduction is a minute and a half.

23 MR. KOVALCHICK: Um-hum.

24 MEMBER SKILLMAN: Is there data from
25 crew debriefs of why that isn't faster? For

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1 example, is it because there is a lack of
2 recognition?

3 Is it because there isn't sufficient
4 instrumentation to tell them what to do? Or is it
5 because they chose to have another two or three sips
6 of coffee and finish their sea story before they
7 take action?

8 MR. KOVALCHICK: I don't think it's any
9 of those. And what I'd like to do is turn this over
10 to some of the folks that watched a lot of that.

11 Tony or John, do you guys have any
12 thoughts on that?

13 MR. HIGHTOWER: Jim, this is Tony
14 Hightower, Peach Bottom Operations. I have some
15 insights.

16 One of the factors in the time are the
17 other actions, the other ATWS actions that need to
18 be performed. The plant reactor operator has an
19 action to inhibit ADS prior to initiating the water
20 level reduction.

21 So that does take a finite amount of
22 time. There's also the shear mechanics of the
23 communications. So, a few seconds are used in
24 recognizing the ATWSs.

25 And few seconds are used in the

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1 supervisor providing the direction to the team to
2 enter the appropriate procedures. And to perform
3 the rapid response cards.

4 So, that time is there. That will
5 improve with proficiency as we use these rapid
6 response cards more. There will still be a finite
7 amount of time required to get there.

8 The use of the rapid response cards
9 eliminates a substantial amount of the
10 communication. It allows us to perform ATWS
11 required steps without the same number of three-part
12 communications prior to initiating that level
13 reduction.

14 That's where we've gained an advantage.

15 MR. KOVALCHICK: And I think the
16 variance that you asked about, I think is somewhat
17 related to individual skill level to the new
18 communications that came in.

19 In part, which I would just point out
20 that there is -- initiating standby liquid is a
21 single switch the operators operate to make that
22 happen. Terminating the level injection or it takes
23 multiple actions.

24 There are three steam driven feed pump
25 turbines. Each need to be secured individually.

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1 The high pressure injection cooling system also
2 needs to be secured.

3 So there are more actions that the
4 operator needs to take that will inherently take
5 more time. Then if you look at the times for the
6 audit team to the operating crews on that, that's
7 actually a fairly small delta from 79 seconds to 84
8 seconds.

9 MEMBER SKILLMAN: Okay. Thank you.

10 MEMBER STETKAR: The first -- I'll call
11 them the person on the standby liquid control, the
12 first operator -- the first operator is the person
13 that throws the mode switch also?

14 MR. KOVALCHICK: That's correct.

15 MEMBER STETKAR: Because they're sitting
16 at the --

17 MR. KOVALCHICK: That's correct.

18 MEMBER STETKAR: Okay. And all they do
19 basically in an ATWS is mode switch to shut down.
20 And wait for a command --

21 MR. KOVALCHICK: They'll load for
22 standby.

23 MEMBER STETKAR: For standby control?
24 They have other --

25 MR. KOVALCHICK: They'll attempt a

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1 manual scram.

2 MEMBER STETKAR: Yes. Okay. They're
3 going to do all of that stuff.

4 MR. KOVALCHICK: They'll also be, you
5 know, reporting out on power pressure level. And
6 also initiating our ARI system, the alternate rod
7 insertion system.

8 MEMBER STETKAR: Okay. And then the
9 second operator, as you said, they've got to inhibit
10 ADS and then do everything to run back feed -- do
11 they have -- does that person have any other things
12 that they need to do?

13 MR. KOVALCHICK: Depending on what power
14 is doing, they maybe responsible to go and make sure
15 the electrical plant is being taken care of.

16 MEMBER STETKAR: Oh. That's
17 interesting.

18 MR. KOVALCHICK: In other words, do we
19 need to trip the main turbine yet?

20 MEMBER STETKAR: So, do you run these
21 guys through a loss of offsite ATWS?

22 MR. KOVALCHICK: No. I don't know that
23 we've done that then.

24 MEMBER STETKAR: Okey dokey then.

25 MR. KOVALCHICK: With the rapid -- did

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1 we do it with the rapid response cards yet?

2 MR. HIGHTOWER: So, we didn't do a loss
3 of offsite power ATWS. But if it -- with the loss
4 of offsite power ATWS, the actions to stabilize the
5 plant would take priority over dealing with the loss
6 of offsite power.

7 I think what Jim's speaking to is
8 actions to transfer house loads --

9 MR. KOVALCHICK: Yes.

10 MR. HIGHTOWER: With the electric
11 plants.

12 MEMBER STETKAR: That's still -- I mean,
13 I only have so many hands that I --

14 MR. KOVALCHICK: There -- it is --

15 MEMBER STETKAR: An electrical board is
16 typically over there somewhere.

17 MR. KOVALCHICK: You're right. And --
18 you're right. So, you know, that will inherently
19 add a -- there's like a finite time that --

20 MEMBER STETKAR: And don't -- I know you
21 have turbine driven feed water pumps. So, don't get
22 me into the full loss of offsite power. Because
23 I'll walk you into the partial loss up front.

24 MR. HIGHTOWER: But I do have another
25 piece of information to go to the transfer of house

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1 loads that Jim's speaking of.

2 Initially, we had captured those actions
3 in the rapid response cards --

4 MEMBER STETKAR: Um-hum.

5 MR. HIGHTOWER: As plant rapid -- plant
6 reactor operator actions. Because that's part of
7 their normal process for mitigating a scram event.

8 But we recognize the amount of time that
9 that takes. Transferring house loads during an ATWS
10 is not essential.

11 MEMBER STETKAR: Right.

12 MR. HIGHTOWER: And that's been removed
13 from the procedures for the plant reactor operator
14 to deal with an ATWS. Because it's recognized if
15 the turbine is --

16 MEMBER STETKAR: Once you recognize
17 you're in an ATWS. Once you recognize -- but their
18 normal instinct if they had a, I'll call it the
19 plain vanillapower failure would be to head for the
20 electrical pump.

21 MR. KOVALCHICK: Yes. And this is one
22 of the benefits of the rapid response cards.

23 MEMBER STETKAR: Yes. Yes.

24 MR. KOVALCHICK: Is it goes to
25 streamline those activities to go make sure that

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1 you're minimizing those other distractions and
2 making sure you're setting the priorities.

3 MEMBER STETKAR: Okay. Thank you.

4 MR. KOVALCHICK: Okay. The next slide
5 please?

6 So, this kind of sums up a little bit
7 about some of what we've been talking about. About
8 the -- we do have some margin demonstrated by even
9 in the introductory phase, we know that we've done
10 with the new, you know, procedures and rapid
11 response cards.

12 It accounts for possible variation
13 between training and actual ATWS events. In other
14 words, you know if I -- I can accomplish this as you
15 guys noted in about a minute and a half.

16 That's not the 30 seconds that I'm
17 willing to go give to the analysis folks to go use.
18 I want to maintain that margin. And we're pretty
19 comfortable with that.

20 Comparing the audit and training crew
21 results was useful with respecting -- with respect
22 to some of that same uncertainty. You know, the --
23 what's the difference between a crew that, you know,
24 knows everything about what's coming. Lots of
25 practice versus maybe some crews that have a little

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1 bit of extra to accomplish.

2 And we also discuss that this is going
3 to be part of recurring training. And it will
4 always be part of our ATWS strategy.

5 And then finally just summing this up.
6 This couples together with the conservatisms that
7 realistic inputs give us within the analysis piece.
8 For example, what we know, and I think Andy will --
9 can talk to this later.

10 Things like realist inputs for feed
11 water temperature reduction, et cetera. That all
12 build together to what I know is a conservatism with
13 respect to the critical time, critical actions.

14 Are there any questions before I turn it
15 back over to Kevin? Okay, thanks. Go ahead Kevin.

16 MR. BORTON: Okay. And just a
17 conclusion of our open session here. Just to touch
18 on what we talked about is the significant benefits
19 for the operators for flexibility and the finite
20 adjustments that they have with core flow.

21 Increasing the station capacity factor
22 during operating cycles. And of course are we
23 gaining that margin that we lost with the EPU?

24 We're ready to implement MELLLA+, the
25 license amendment. The installations in the firm

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1 are in testing or completed.

2 Our training is completed. And our tech
3 specs and procedure and the implementation testing
4 is what's needed for us to go to that as well.

5 And just again, to touch on, thank you
6 for the consideration for an early January 2016
7 implementation as well.

8 CHAIRMAN REMPE: Thank you. And I'm
9 glad that you did complete the training on the
10 operators. Thank you for reporting the results to
11 us.

12 At this point, we're going to have
13 public comments and going -- before we go into
14 closed session and have a break.

15 So, if I could ask you to open up the
16 public line, we'll first look around the room and
17 see if anyone wants to come up to the mic and
18 provide any comments? And then we'll just wait
19 until the line is there.

20 The folks that are out on the licencing
21 line like you Kord. Do you have any comments that
22 you wanted to make at this time too? While we're
23 waiting for the public line?

24 (No response)

25 CHAIRMAN REMPE: I guess it's a no. It

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1 sounds like the public line is open. But the only
2 way we can confirm it is to ask the --

3 MR. LEWIS: Marvin Lewis. Member of the
4 public.

5 CHAIRMAN REMPE: Thank you, Marvin, for
6 confirming the line is open. Do you or does anyone
7 else on that line have any comments?

8 MR. LEWIS: Yes, I do. In fact some of
9 my comments are positive.

10 CHAIRMAN REMPE: Okay. Actually we're
11 getting a lot of noise. It sounds like heavy
12 breathing.

13 I don't know if it's from you Marvin or
14 someone else on the public line. But, could whoever
15 it is step back away from your phone, okay?

16 And then go ahead and provide your
17 comments Marvin.

18 MR. LEWIS: Okay. I hope that's better.

19 CHAIRMAN REMPE: That's much better.

20 MR. LEWIS: Okay. Well look, I am glad
21 to hear that ATWS is back in the realm of interest
22 in participated changing without scram.

23 I haven't heard that term I swear since
24 the '60s. But, it also bothers me. Because I also
25 heard the term WASH 1400 yesterday on another

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1 meeting -- on another ACRS meeting.

2 And what I'm worried is, are you now
3 taking the same positions that you took back 40
4 years ago that led us to Three Mile Island? I'm not
5 liking that idea.

6 So, although I'm fairly pleased with
7 what you're looking at. And fairly pleased at the
8 things that you're bringing out, I'm a little
9 worried that you're taking those old stances back
10 that really kept a lot of people out of it. And a
11 lot of say technology out of it.

12 My second point is this. I'm glad
13 you're bringing the operators in. The reactor
14 operators are the guys that actually will have to
15 flip the switch.

16 I am worried that you're bringing them
17 in in such a way that they cannot tell their full
18 feelings about what the heck's going on. In other
19 words, are -- is everything going to be
20 traditionally blamed on the operator if something
21 goes wrong?

22 And you know, look at the information,
23 yes. In the past everything has been blamed on the
24 operator rightly or wrongly.

25 So, maybe we ought to bring in Union

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1 reps to explain some stuff that might have been
2 given to them in confidence. Just an idea. Thank
3 you.

4 CHAIRMAN REMPE: Thank you for your
5 comment. Is there anyone else on the public line
6 that would like to make their comment?

7 (No response)

8 CHAIRMAN REMPE: So, not hearing any
9 other comments, let's close the public line. And
10 we're going to take a break and go into closed
11 session.

12 And let's come back at 10 after 10:00
13 with the closed session. Does that sound good?
14 Thank you.

15 (Whereupon, the above-entitled matter
16 went off the record at 9:53 a.m. and
17 resumed at 10:18 a.m.)

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**Peach Bottom Atomic Power Station
Units 2 and 3**

**MELLLA+
Maximum Extended Load Line Limit Analysis Plus**

**Advisory Committee on Reactor Safeguards
Power Uprate Subcommittee Meeting
December 2, 2015**



Exelon Generation®

Introductions

Kevin Borton
Licensing Manager, Power Uprates



Exelon Generation.®

Licensee Presenters

- Pat Navin Plant Manager Exelon/PBAPS
- Kevin Borton Licensing Manager Exelon/PUR
- Andy Olson Sr. Staff Engineer, Fuels Exelon /Corp
- Jim Kovalchick Operations Manager Exelon/PBAPS

Licensee Support

- | | | |
|-------------------|-------------------------|--------------|
| • John Rommel | Engr. Director | Exelon/PUR |
| • Jim Armstrong | Reg. Assurance Mgr. | Exelon/PBAPS |
| • James Tusar | Nuclear Fuels Mgr. | Exelon /Corp |
| • Alex Psaros | Reactor Eng. Mgr. | Exelon/PBAPS |
| • John McClintock | Operations Training | Exelon/PBAPS |
| | | |
| • Bruce Hagemeyer | MELLLA+ Project Manager | GEH |
| • Shawn Lamb | GEH Technical Leader | GEH |
| • Mike Cook | GEH Technical Leader | GEH |

Presentation Objectives

- Show the Need for MELLLA+
- Describe Key Aspects and Answer Questions
- Demonstrate Exelon Readiness
- Ask for Schedule that will Support Early January 2016 Implementation

Agenda

- PBAPS Station History / Overview Pat Navin
- MELLRA+ Project Overview Kevin Borton
- MELLRA+ Design and Analyses Andy Olson
- Operator Actions, and Training Jim Kovalchick

PBAPS Station Overview

Pat Navin
PBAPS Plant Manager



Station Overview

- General Electric BWR-4, Mark I Containment
- Containment design pressure 56 psig
- Began commercial operation in 1974, OLTP 3293 MWt
- EPU 3951 MWt implemented U2 2014, in progress for U3
 - Enriched Boron – improves Standby Liquid Control system margin for ATWS
 - Elimination of CAP Credit
- 24 month operating cycle
- GNF2 full core
- Steam-driven feedwater pumps
- Licensed for Increased Core Flow (ICF) (110%)

PBAPS History

Key Milestones	Year	MWth
➤ Full Power Operating License (Original Licensed Thermal Power - OLTP)	1973 (U2) 1974 (U3)	3293 3293
➤ Stretch Power Uprate (105% OLTP)	1994 (U2) 1995 (U3)	3458 3458
➤ MUR Uprate (1.62% increase)	2002 (U2) 2002 (U3)	3514 3514
➤ MELLLA Operating Domain	1995	N/A
➤ Renewed Operating License	2003	N/A
➤ Option III Stability Solution	2005	N/A
➤ GNF2 Fuel Introduction	2010	N/A
➤ Extended Power Uprate (120% OLTP) (* Currently performing EPU Power Ascension)	2014 (U2) 2015 (U3)*	3951 3951

MELLLA+ Project Overview

Kevin Borton

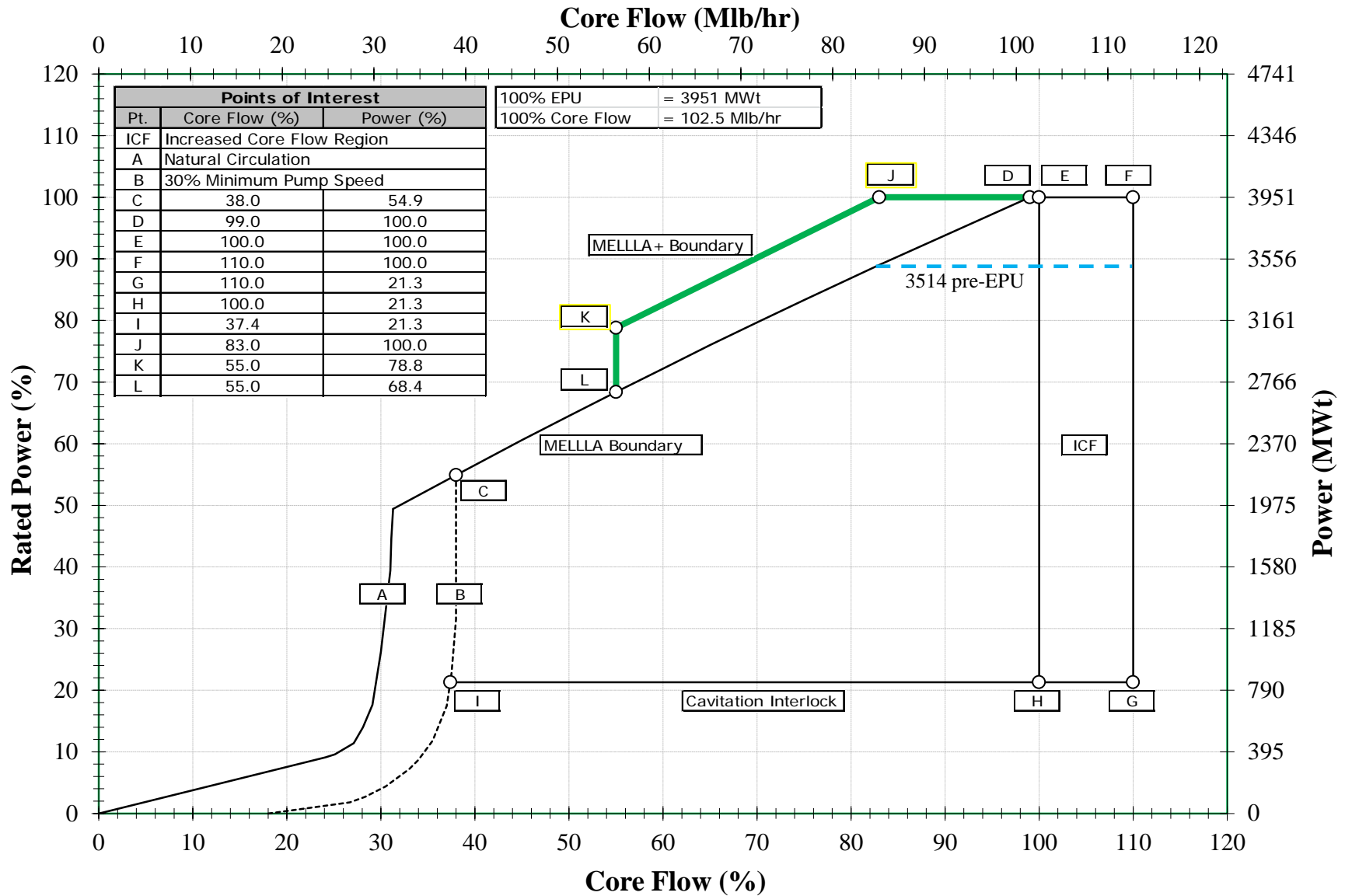


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MELLA+ Benefits

- Expands nominal core flow window at 100% EPU power by 16% of rated flow
 - Fewer control rod manipulations
 - Reduction in End-of-Cycle down-powers
- Detect and Suppress Solution - Confirmation Density (DSS-CD) provides improved core instability detection algorithm
- Will increase the station capacity factor during the operating cycle

MELLLA+ Power-to-Flow Map



MELLLA+ Project Scope

- MELLLA+ does not change:
 - Operating Pressure
 - Maximum Licensed Thermal Power
 - Maximum Licensed Core Flow
 - Feedwater Flow Rate or Temperature
- MELLLA+ does not require modifications to balance of plant equipment

MELLLA+ Project Scope

- MELLLA+ requires changes to:
 - Operating Power/Flow Map
 - Stability Solution and associated Oscillation Power Range Monitor (OPRM) settings
 - Average Power Range Monitor - Simulated Thermal Power Flow Biased Set-points
 - Power Range Neutron Monitor (PRNM) Control Room Human-System interfaces
 - Core Operating Limits Report (COLR)
 - Technical Specifications

MELLLA+ Implementation Plan

- **Phase 1 – Outage Related Plant Modifications (Prior to MELLLA+ Approval)**
 - DSS-CD Installation (Complete)
 - Units 2 and 3 have operated with Option III since 2005
 - DSS-CD Firmware Installed and Functionally Tested on Unit 2 and Unit 3
 - Unit 2 and Unit 3 CDA RPS Trip Bypassed until MELLLA+ Approval / Implementation
- **Phase 2 – On-line Installation / Testing (After MELLLA+ Approval)**
 - MELLLA+ Technical Specifications Implementation
 - MELLLA+ Modification Implementation
 - Enable DSS-CD APRM/OPRM Settings
 - Remove Bypasses and Test
 - MELLLA+ Reload Analysis Updated
 - 3D Monicore Databank
 - COLR
 - Procedure Revisions
 - Perform MELLLA+ Operational Testing

MELLLA+ Design and Analyses

Andy Olson



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EPU Operating Experience

- For EPU power the maximum licensed core flow is 110 %
 - 105.5% core flow achievable during normal conditions (not EOC or BOC)
 - 109.5% core flow achievable at End-of-Cycle (EOC) conditions
 - 104% core flow achievable during Beginning-of-Cycle (BOC) conditions
- The practical core flow operating window at EPU rated conditions is from 101.0% to 105.5%.
 - Operational margin to the MELLLA boundary at 99.0% flow
 - Higher core flows used at EOC conditions.

MELLLA+ SRLR

- MELLLA+ Supplemental Reload Licensing Report (SRLR) submitted to NRC as supplemental information to MELLLA+ License Amendment Request
 - Reload analysis based on currently operating core design
 - Minor thermal limit increase reflects SLMCPR adder and additional uncertainty for Two Loop Operation (TLO) and small changes to limiting transients for MELLLA+
 - No impact on Linear Heat Generation Rate (LHGR), Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) limits

MELLLA+ SRLR (Continued)

- **Stability section reflects move to DSS-CD solution**
 - Manual Backup Stability Protection (BSP) and Automated Backup Stability Protection (ABSP) tables, information provided
- **Appendix F addresses/updates applicable Limitations and Conditions (L&C) from NEDC-33173P- A Rev. 4 (Interim Methods Licensing Topical Report (LTR))**
- **New Appendix G addresses applicable L&C from NEDC-33006P-A Rev 3 (MELLLA + LTR)**

MELLLA+ Operator Procedures and Training

Jim Kovalchick



Exelon Generation®

License Conditions

Operation in the MELLLA+ domain is prohibited when operating with one of the following plant configurations:

- Reactor Recirculation System Single Loop Operation
- Feedwater Heater Out of Service - A feedwater heater out of service resulting in more than a 10°F reduction in feedwater temperature below the design feedwater temperature
 - 10°F feedwater temperature reduction results in a recognizable change in reactor power
 - Allows operators to promptly recognize feedwater temperature change and reduce power to exit the MELLLA+ region
 - Uses existing “Positive Reactivity Insertion” abnormal operating procedure

Tech Spec Changes

- **OPRM Upscale Function**
 - Revise required operability threshold and set-points for OPRM enabled region (larger region)
 - New Conditions/Required Actions/Completion Times due to addition of Automated Backup Stability Protection (OPRM Upscale Function Inoperable)
 - Eliminate surveillance requirement that is no longer required due to DSS-CD implementation
- **Change the Allowable Value for APRM Simulated Thermal Power – High trip function**
- **Revise Single Loop Operation LCO – Exit M+ Region Immediately**
- **Changes to TS Administrative Section**

ATWS-I Time Critical Operator Actions

TCOA	MELLLA+
Initiate Reactor Water Level Reduction	120 seconds (change for MELLLA+)
Initiate Standby Liquid Control System (SLCS) Injection	120 seconds (unchanged for MELLLA+)
Initiate Suppression Pool Cooling	660 seconds (unchanged for MELLLA+)

- Existing EOP strategy retained
- Use of new ATWS Rapid Response Cards (RRC) to streamline communications
- Control Room Supervisor (CRS) retains Command and Control for EOP strategy

ATWS-I Time Critical Actions

- **ATWS Rapid Response Cards - RRC directs:**
 - SLCS injection
 - Reactor water level reduction
- **NRC Audit observed use of RRC and time critical action in May 2015**
- **All operating crews have been trained on MELLRA+ ATWS-I time critical actions**
 - Initial License Training Class completed in March 2015
 - Licensed Operator Requalification Training completed in August 2015
- **All operating crews have demonstrated satisfactory completion of the ATWS-I time critical actions**

ATWS-I Time Critical Actions

- Audit Crew

Action	Required Time (sec)	Average Completion Time (sec)	Average Deviation (sec)
SBLC Injection	120	54	2
Reactor Water Level Reduction	120	79	5

- Operating Crews

Action	Required Time (sec)	Average Completion Time (sec)	Average Deviation (sec)
SBLC Injection	120	73	12.9
Reactor Water Level Reduction	120	84	11.3

- The Audit crew and all operating crews have demonstrated ability to complete SBLC injection and water level reduction within required times
- 120 sec TCA Licensing Bases is practical and conservative

Conservatism of ATWS-I Time Critical Actions

- Ample Operator Action and Analytical Margin Exists

Actions

- Average training performance demonstrates 30% margin to action times assumed in licensing bases
 - Accounts for possible variation between training and during an actual ATWS event
 - Comparing the audit and training crew results useful when assessing uncertainty
 - Operator actions are similar for every ATWS
 - 5 week training cycle reinforces familiarity
- Systematic approach to ATWS-I is very well suited to repeatability

Analysis

- Analytical sensitivity runs indicate that assuming 120 seconds for SBLC injection and RPV water level reduction meet regulatory criteria.
- Realistic inputs demonstrates further conservatisms

Conclusions

- **Implementation of MELLLA+ will provide significant benefits:**
 - PBAPS operators will have greater flexibility in using core flow adjustments to control reactivity
 - Increasing the station capacity factor during the operating cycle
 - MELLLA+ will regain margin to the Load Line boundary
- **PBAPS is ready to implement the MELLLA+ License Amendment**
 - Completed installation of the DSS-CD, firmware and testing
 - Completed training on required operator actions
 - Technical Specification, procedure, and implementation testing ready
- **Ask for early January 2016 implementation**