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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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616TH MEETING

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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WEDNESDAY

JULY 9, 2014

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ROCKVILLE, MARYLAND

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The Advisory Committee met at the Nuclear
Regulatory Commission, Two White Flint North, Room
T2B1, 11545 Rockville Pike, at 8:30 a.m., John W.
Stetkar, Chairman, presiding.

COMMITTEE MEMBERS:

JOHN W. STETKAR, Chairman

HAROLD B. RAY, Vice Chairman

DENNIS C. BLEY, Member-at-Large

RONALD BALLINGER, Member

SANJOY BANERJEE, Member

CHARLES H. BROWN, JR., Member

MICHAEL L. CORRADINI, Member

DANA A. POWERS, Member

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JOY REMPE, Member
PETER RICCARDELLA, Member
MICHAEL T. RYAN, Member
STEPHEN P. SCHULTZ, Member
GORDON R. SKILLMAN, Member

DESIGNATED FEDERAL OFFICIALS:

CHRISTINA ANTONESCU
WEIDONG WANG

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P R O C E E D I N G S

8:32 a.m.

CHAIRMAN STETKAR: The meeting will now come to order. This is the first day of the 616th Meeting of the Advisory Committee on Reactor Safeguards.

During today's meeting, the Committee will consider the following: the proposed revision to 10 CFR 50.55a(h), endorsing IEEE 603-2009, criteria for safety systems for nuclear power generating stations, Peach Bottom extended power uprate, the draft final design-specific review standard for B&W mPower small modular reactor Chapter 7 on instrumentation and controls, and preparation of ACRS reports.

This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Ms. Christina Antonescu is the Designated Federal Official for the initial portion of the meeting.

Portions of the session on the Peach Bottom extended power uprate may be closed in order to discuss and protect information designated as proprietary. We have received written comments and a request to make oral statements from Eric Epstein, a member of the public, regarding the Peach Bottom

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1 extended power uprate session.

2 There will be a phone bridgeline. To
3 preclude interruption of the meeting, the phone will
4 be placed in a listen-in mode during the presentations
5 and Committee discussion. A transcript of portions of
6 the meeting is being kept, and it's requested that the
7 speakers use one of the microphones, identify
8 themselves, and speak with sufficient clarity and
9 volume so that they can be readily heard. And I'd ask
10 everyone in the room to please silence your, whatever
11 sort of electronic devices you have.

12 As an item of interest for today, we'd
13 like to announce and congratulate Dr. Michael
14 Corradini for being appointed to his third term on the
15 Committee. Please also congratulate Dr. Joy Rempe for
16 being appointed to her second term on the Committee.

17 (Appause.)

18 CHAIRMAN STETKAR: We will all appreciate
19 enduring both of you for another four years. And with
20 that, we'll come to the first item on the agenda,
21 which is proposed revision to 10 CFR 50.55a(h). And
22 I'll turn the proceedings over to Mr. Charles Brown.

23 MEMBER BROWN: Thank you, John. Just one
24 very quick comment is that, as most of you know, we
25 have been dealing with how to apply the existing

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1 regulations and rules to digital instrumentation
2 control systems in both new plants, as well as backfit
3 plants modification. And the staff, over the last few
4 years, has also been looking at the adequacies, or
5 inadequacies I should say, of the existing rule for
6 how it deals with the new technology.

7 So they have now prepared a revision, a
8 revised rule, to incorporate the latest version of
9 IEEE 603-2009. And they have also incorporated
10 conditions, I think is how you refer to it, conditions
11 into the rule to deal with those aspects of the
12 application of technology that aren't really covered
13 by the IEEE standard.

14 And so they are here to present that.
15 We've had a subcommittee meeting on it, which was very
16 thorough and detailed, back-and-forth interactions,
17 and I'm sure we will have some more today. So I'll
18 turn it over to, I think, Mr. John Thorp to do the
19 introductions and get moving.

20 MR. THORP: Thank you, Member Brown,
21 Chairman Stetkar, and other members of the ACRS.
22 Thank you for allowing us -- as well as Christina for
23 arranging our opportunity to be here for the first
24 thing on the agenda. I appreciate that assistance and
25 coordination with us.

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1 Our staff was requested to provide an
2 informational briefing to you, the ACRS, on several
3 topics related to the 10 CFR 50.55a rulemaking effort.
4 We had made a previous presentation on this topic to
5 the subcommittee, as Member Brown referred to, on May
6 20th. We have several presenters, not as many this
7 time. We have a much shorter time frame in which to
8 try to present to you the essence of this rulemaking.

9 Rich Stattel on my left will be presenter,
10 as well as Mike Waterman over here on my right on the
11 end, and Terry Jackson from the Office of New
12 Reactors. Mike represents the Office of Nuclear
13 Regulatory Research.

14 This staff will present the results of an
15 extensive effort by the working group over the last
16 four years to develop new regulations for safety-
17 related instrumentation and control systems. This
18 proposed rule is a preliminary draft proposed rule,
19 and, essentially, it's preliminary draft proposed rule
20 text because we're not presenting the entire rule
21 itself. It's undergoing concurrence reviews by the
22 various offices.

23 We're prepared to present the contents of
24 this proposed draft rule text and to discuss the
25 rationale used by the working group in its

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1 development. This preliminary proposed rule text
2 includes a discussion section, which includes many
3 statements of consideration. These statements provide
4 an explanation of matters considered during the
5 development of the preliminary proposed rule text.
6 They also provide clarification of what is intended
7 for each clause of this proposed draft rule.

8 Once the concurrence is completed within
9 the offices, the proposed rule will be made public and
10 will undergo a public comment period, after which the
11 working group will reconvene to address any of the
12 comments received and try to deal with those items.

13 Next slide. With respect to the agenda
14 you see before you here, this proposed rule would
15 incorporate a voluntary consensus standard, IEEE
16 Standard 603-2009, into the NRC regulations to
17 establish functional and design requirements for
18 power, instrumentation, and control systems for
19 nuclear power plants. The prior standard that is
20 currently incorporated by reference in our 10 CFR
21 50.55a is the standard from 1991. So it is time,
22 beyond time for us to have updated this.

23 This action would be consistent with the
24 provisions of the National Technology Transfer and
25 Advancement Act of 1995. That encourages federal

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1 regulatory agencies to consider adopting voluntary
2 consensus standards as an alternative to de novo, or
3 from the beginning, agency development of standards.
4 This action is also consistent with the NRC policy of
5 evaluating the latest versions of consensus standards
6 in terms of their suitability for endorsement by
7 regulations or by regulatory guides.

8 So moving forward, Rich Stattel will now
9 begin to explain the reasons for changing the rule.

10 MR. STATTEL: Thank you, John. And good
11 morning, everyone. As John mentioned, one of the main
12 driving forces for this rulemaking activity was the
13 fact that the current incorporated by reference
14 standard has become outdated. The state of I&C
15 technology has changed a great deal since that
16 standard was issued in 1991. There are several design
17 concepts that are being incorporated into I&C systems,
18 particularly for balance of plant applications, such
19 as feedwater control.

20 The industry has matured and has gained a
21 great deal of experience of using digital I&C systems.
22 The NRC has also raised several concerns over the last
23 20 years concerning different failure modes of digital
24 systems, particularly for highly-integrated systems in
25 more recent years. The NRC has also raised concerns

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1 over the potential for software common-cause failures
2 or errors that could occur within these systems using
3 multiple instances of software across divisions,
4 safety divisions.

5 The fact of the matter is very few I&C
6 systems that are being proposed to the NRC today were
7 actually developed using the 1991 standards.
8 Additionally, the working group had identified the
9 need for clarification of applicability requirements
10 based on the experience that we've had with the
11 existing regulations.

12 The primary objective of the rulemaking
13 activity was to update this incorporate by reference
14 standard to the more recent IEEE Standard 603-2009
15 version. This standard establishes the minimum
16 functional and design requirements for power
17 instrumentation and control systems, as John
18 mentioned.

19 There was an intermediate 1998 version of
20 this standard. However, the NRC, at the time, chose
21 not to incorporate that version because the changes to
22 that standard were not considered substantial at that
23 time and the safety benefits of that new standard were
24 not considered significant to the effect of warranting
25 the resources that were required to incorporate it

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1 into regulation.

2 Additionally, the proposed rule defines
3 conditions which would allow existing licensees to
4 replace plant equipment while maintaining their
5 existing licensing basis. And it defines the
6 conditions for which existing permit, license and
7 certificate, and standard design and standard design
8 approvals would be required to address the new
9 standard.

10 And, finally, the rule imposes conditions
11 upon the use of IEEE 603-2009 in the areas of system
12 integrity, diversity, defense in depth, independence,
13 maintenance bypass, and maintenance of records.

14 Okay. So what changed in the new
15 standard? Here's a list, as you can see on this
16 slide. And I apologize in advance because I realized
17 after we printed them that the copies that you have
18 don't have the slide numbers on them. That wasn't
19 intentional because my note pages have the numbers on
20 them. So it's just a quirk of the system there.

21 MEMBER SKILLMAN: John? Excuse me. Rich,
22 may I please ask this question? On unnumbered slide
23 the reasons for rulemaking activity, it's back two,
24 please. My question is have there been any instances
25 where the licensees have used an older standard and,

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1 as a consequence of having used the older standard,
2 created an unworkable or an unsafe system or
3 configuration?

4 MR. STATTEL: There have been several
5 instances where an applicant used an older standard to
6 develop their system. And what they used is an
7 alternative process. So, basically, there is a
8 clause, which we will talk about at today's
9 presentation, there's an alternative clause that's
10 included in the old regulation and the new regulation
11 whereby an applicant can basically propose an
12 alternative standard through the 603-2009, and then we
13 have a means for reviewing that and approving that.

14 Now, your question is specific to did it
15 result in an unsafe condition or an unsafe or
16 unapprovable --

17 MEMBER SKILLMAN: Unworkable.

18 MR. STATTEL: -- design. I would say, no,
19 we haven't really seen that. The best example I can
20 think of is the Oconee reactor protection system.
21 They actually used the 1998 standard, which, as I
22 mentioned, we never incorporated. But they applied
23 for an alternative, and we were able to review that
24 and accept that system. And we consider that to be a
25 safe system that's operating today.

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1 MEMBER SKILLMAN: And were those changes
2 conducted under their 50.59 process? Is that what --

3 MR. STATTEL: No, they submitted a license
4 amendment.

5 MEMBER SKILLMAN: Oh, they did license
6 amendment. Okay.

7 MR. STATTEL: That's correct.

8 MEMBER SKILLMAN: Well, actually, they
9 must have done a 50.59 and concluded they needed an --

10 MR. STATTEL: That's correct. That's
11 exactly right.

12 MEMBER SKILLMAN: Okay. Hey, thank you.
13 Good, thanks.

14 MR. STATTEL: Certainly. Okay. So we're
15 now on the current slide that you see here, which is
16 --

17 CHAIRMAN STETKAR: Oh, Rich? I was
18 reading ahead in your slides --

19 MR. STATTEL: Okay.

20 CHAIRMAN STETKAR: -- and, just for the
21 benefit, because Dick raised this one question, could
22 you briefly -- we had some discussion at the
23 subcommittee meeting that the wording of the rule in
24 terms of its applicability, I want to make sure that
25 the members understand exactly to which reactor this

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1 rule will apply because, for example, it will not
2 apply to AP1000. It will not apply to AP600. It will
3 not apply to ESBWR.

4 MR. STATTEL: I don't think that's
5 entirely true. I think it actually does apply to
6 ESBWR --

7 CHAIRMAN STETKAR: I, I don't think so.
8 No, it --

9 MR. STATTEL: Well, I guess it depends, it
10 depends on when the rule is actually issued.

11 CHAIRMAN STETKAR: Right. But they
12 already have the certified design.

13 MR. STATTEL: I wasn't aware that --

14 CHAIRMAN STETKAR: Okay. ESBWR is
15 certified. It will apply -- well, it depends now on
16 when the rule is issued, but it may apply to EPR, US-
17 APWR, and any future designs to come.

18 MR. STATTEL: That are not yet certified.

19 CHAIRMAN STETKAR: That are not yet
20 certified. So, for example, plants, even though we
21 don't have an ESBWR on the horizon, and it has
22 substantial back in their digital I&C, they still only
23 have to comply with, I think, the 1991, if I remember
24 correctly, version of the rule.

25 MR. STATTEL: Right. Now, I will mention

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1 that the applicability of this rule was a major
2 challenge for the working group developing that
3 because we're applying this to operating reactors,
4 we're applying it to 30-year-old plants, we're
5 applying it to new reactors, we're applying it to
6 future reactors.

7 And particularly in the new reactor realm,
8 and Terry can chime in on this as well, but, you know,
9 the reviews that are in progress, this actually does
10 affect some of the reviews that are in progress. And
11 some of them have been in progress for a number of
12 years, so we're kind of changing the rules on them
13 midstream. But since those design certifications were
14 not issued, this rule, when it gets issued, would
15 apply to them, as well.

16 CHAIRMAN STETKAR: And it will apply to
17 any future upgrades for existing plants --

18 MR. STATTEL: Well, we have a slide to
19 talk about that.

20 CHAIRMAN STETKAR: Oh, okay, okay.

21 MR. STATTEL: So we have a way -- because
22 that was basically a lesson learned from the existing
23 regulation where we were constantly having debates
24 every time a license amendment would come in about
25 whether or not they had to use the 1991 version of the

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1 standard or whether they could use their existing
2 licensing basis.

3 CHAIRMAN STETKAR: Yes.

4 MR. STATTEL: And it wasn't really well
5 defined in the rule, so one of the things that we've
6 attempted to do in this update is provide some
7 definition to applicability. So we have certain
8 criteria we use to determine the applicability of this
9 standard. And that's mainly aimed at the operating
10 plants.

11 CHAIRMAN STETKAR: Okay.

12 MEMBER BROWN: I want to make one
13 observation for the members relative to your comment.
14 Now, when he says they looked at it, there is a multi-
15 page inclusion in the rule that goes through about
16 every if, then you can imagine, in terms of, even back
17 to 279, and who and who shot John and everything. No
18 pun intended there, John.

19 So, I mean, it is a very extensive
20 evaluation of all the old plants' potential
21 modifications, who should do what. It's very, very
22 thorough. At least in my opinion, it was. I'm not
23 good at some others, but it was a lot of writing. So,
24 anyway, it is well covered.

25 MR. STATTEL: Okay. So in the development

1 of this rule, the working group evaluated and compared
2 the new 2009 version of the standard with the 1991 and
3 the 1998 version, and this slide summarizes the
4 changes to that standard that the working group
5 identified.

6 Now, what I'm going to do next is I'm
7 going to explain each one of these seven items in a
8 little bit more detail. Okay. The first item, this
9 change was included to address the introduction of
10 digital components, such as field-programmable gate
11 arrays or computer-programmable logic controllers
12 technologies into I&C systems at nuclear power plants.
13 Back when computers were first being introduced to the
14 industry, the IEEE had decided to develop a separate
15 standard as a companion standard to provide guidance
16 for digital computer-based systems. Instead of
17 including -- they did that, instead of including the
18 technology-specific guidance, in the 603 standard
19 itself.

20 In 1991, that standard, which is IEEE
21 7432, at the time it was 1982 version, was generally
22 referenced. However, no specific topical references
23 were included in the old 603 standard. In 1998,
24 specific sectional references were added to the 603
25 standard, and that's basically the gist of that

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1 change.

2 Okay. The second change involved, in the
3 new version of the standard, it updated the entire
4 list of reference standards. This is basically a
5 standard practice by the IEEE working group. They do
6 that every time they update one of their standards.

7 Since the reference standards are not
8 considered by the NRC to be incorporated by reference
9 into regulation, these changes were not considered by
10 the working group to be technically relevant to the
11 IBR rulemaking process. Instead, the NRC does endorse
12 many of those standards that are referenced, but we do
13 it through our regulatory guidance.

14 Okay. The third change occurred during
15 the 1998 revision of the IEEE 603. A new informative
16 annex titled "Electromagnetic Compatibility" was added
17 to the standard. Now, the NRC does not endorse this
18 informative annex. Instead, electromagnetic
19 compatibility, or EMC, has been addressed by a
20 separate reg guide. That reg guide is Reg Guide
21 1.180, which is titled "Guidelines for Evaluating
22 Electromagnetic and Radio Frequency Interference in
23 Safety-Related Instrumentation and Control Systems."
24 And that endorses several other standards.

25 Okay. In 1998, a new section, 5.16, was

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1 added to IEEE 603 in attempt to address the criteria
2 for software common-cause failure. In actuality, the
3 added clause does not introduce any criteria at all.
4 Instead, it referred to IEEE 7432, the companion
5 standard, and it states that the reference standard
6 provides guidance criteria in this area.

7 Now, though the NRC does endorse 7432 via
8 Reg Guide 1.152, the NRC does not consider the
9 guidance within 7432 to be complete or adequate for
10 addressing common-cause failure. Instead, the NRC
11 refers back to the staff requirements memorandum that
12 was issued against SECY paper 93-087 via the standard
13 review plan guidance and Branch Technical Position 719
14 for its evaluations of software common-cause failure
15 susceptibility. Additionally, I'll discuss NRC
16 position on this particular topic in greater detail
17 when we get to the conditions that we included in the
18 rule.

19 Okay. Number five. So there are some
20 numbers on this slide that help keep us inline here.
21 This section of the standard was enhanced to provide
22 additional guidance for maintaining independence
23 between safety systems and support systems, and that
24 includes those which are classified as non-safety
25 related. The revised section expands on the concept

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1 of associated circuits, and it provides guidance
2 criteria for establishing necessary independence
3 between these systems.

4 Now, for the most part, the NRC doesn't
5 take exception to any of that enhancement language
6 that was added to the standard. However, we decided
7 to add some conditions for independence, and we'll
8 cover those separately.

9 Okay. Number six. The standard requires
10 system surveillance testing to be performed
11 periodically to ensure safety functionality during
12 plant operations, so it is necessary for licensees to
13 be able to bypass or prevent safety system actuation
14 during maintenance activity. The purpose of this
15 clause of the standard is to establish performance
16 criteria for situations requiring systems or portions
17 of systems to be in a bypass state. It requires the
18 safety system to retain its capability of performing
19 the safety functions while those surveillance or
20 maintenance activities are being conducted.

21 In the 1991 version of the standard, this
22 requirement was stated and it was immediately followed
23 by an exception clause. The exception clause
24 identified conditions where certain portions of the
25 safety system could be tested or placed in maintenance

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1 bypass without satisfying the criteria of the
2 preceding clause.

3 The next two slides show the exact text of
4 this exception clause. And so what it is is the first
5 slide shows what the 1991 version says, and if you
6 flip to the next slide -- I'll kind of go back and
7 forth -- you can see what words change. So they
8 changed a "shall" to a "should." You can see that.
9 And they changed the exception to a note, okay?

10 So when IEEE revised the standard, this
11 exception was determined to be contrary to IEEE
12 policy. So, basically, their policy, the IEEE policy
13 is that a requirement isn't really a requirement if
14 there can be allowable exceptions to it.

15 To address the policy, the standard
16 working group changed the "shall" to a "should," which
17 effectively changed the requirement into a
18 recommendation. This exception clause was also re-
19 worded and re-titled as a note, as indicated on these
20 slides.

21 MEMBER SKILLMAN: Rich, back one, please,
22 to the next to the last line on that slide, "to ensure
23 there is no significant detrimental effect on overall
24 sense and command." To go into bypass, maintenance
25 bypass, that's normally an I&C function. There's no

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1 procedure. It's conducted through work control. But
2 I can imagine a shift manager saying, "I give you
3 permission to go into maintenance bypass because I
4 don't think that there's any significant detrimental
5 effect." How is significant detrimental effect
6 interpreted?

7 MR. STATTEL: I think you need to take the
8 entire clause into account. There was a slight re-
9 wording on that.

10 MEMBER SKILLMAN: Yes, I did. And I've
11 seen words like this before that become, in all
12 candor, the name of the game. A smart operator is not
13 going to take the plant at risk. But someone who's
14 clever and trying to get done before the shift ends
15 just might go down and say, "Hey, you know what? I
16 don't think there's any significant detrimental
17 effect. Let's do it."

18 MR. THORP: So the logic of the phrase
19 that I'm seeing is that the removal from service for
20 maintenance bypass, the time period allowed for that
21 is sufficiently short to ensure there's no significant
22 detrimental effect on overall sense and command
23 feature availability. And, oftentimes, there's also
24 guided by the presence of technical specification
25 limiting conditions for operation that provide a time

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1 limit for how long you can be in maintenance bypass.
2 The plant that I worked at, it allowed a 48-hour time
3 frame for troubleshooting and maintenance bypass; is
4 that correct?

5 MR. STATTEL: That's correct.

6 MR. THORP: Yes. So this, in systems that
7 we're talking about here, like reactor protection
8 system, engineer safety features, we're talking about
9 pretty carefully controlled procedures and technical
10 specification controls. So I think, in theory, your
11 position is clear and well taken, but I don't think
12 that's a big vulnerability post here.

13 MR. STATTEL: Also, this clause is really
14 not a normative clause. It's really just providing an
15 example. But, yes, it would be our expectation when
16 we're evaluating these systems and how they're
17 operated that they wouldn't use this kind of rationale
18 for, for instance, bypassing a safety injection
19 function in anticipation of an event that could
20 challenge that function.

21 MR. THORP: Or to do so for some lengthy
22 period of time.

23 MR. STATTEL: Right.

24 CHAIRMAN STETKAR: I mean, in principle,
25 the tech spec should cover you. This specifically

1 applies to one out of two, so it could be either one
2 out of two, you know, if you only have a two-train
3 output --

4 MR. STATTEL: That's right.

5 CHAIRMAN STETKAR: -- or it could be one
6 out of two input signals to reactor trip, like source
7 range or intermediate range flux, you know, which are
8 typically one out of two instead of two out of four.
9 The tech specs should have you covered on the output
10 because it shouldn't allow you to take both trains of
11 your safeguards actuation or reactor --

12 MR. STATTEL: Well, most of the functions
13 of reactor protection systems and SFAS systems are
14 basically performed by the four divisions or four
15 channels of instrumentation. And, therefore, taking
16 one of those channels out and going to a two out of
17 three, I mean, that's what the main --

18 CHAIRMAN STETKAR: That's what the main
19 clause is.

20 MR. STATTEL: -- but really just, as a
21 result of just having, basically, those functions
22 filter down after the voting when you get down into
23 the voting and the actuation of components, you know
24 -- for instance, most plants only have two trains of
25 safety injection.

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1 CHAIRMAN STETKAR: Right.

2 MR. STATTEL: So you get down to two --

3 CHAIRMAN STETKAR: That's right.

4 MR. STATTEL: You get down to two
5 components sooner or later, and really what this
6 exception is intended to address is how do you make
7 sure you maintain the operability of those, you know,
8 that limited set of electronics that is actuating
9 those components on the two-channel system and still
10 maintain your safety.

11 MEMBER SKILLMAN: Yes, I was really
12 thinking about a pre-GEC plant that's, at least on the
13 surface, very central. But it turns out, in its
14 simplicity, the fact that they only had one last man
15 standing becomes the most important thing that they
16 have in the plant, and if they defeat it then they are
17 probably where they're not supposed to be. And I
18 agree with John. Tech specs probably --

19 CHAIRMAN STETKAR: Tech specs --

20 MEMBER SKILLMAN: This allows them to go
21 into that status. I got it. But this wording can be,
22 can be gamed. That's the point I'm making.

23 CHAIRMAN STETKAR: Or if it does -- I've
24 seen plants that do but they give you a specific, you
25 know, one hour, or they specify. Whether that's

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1 sufficiently short to have no significant detrimental
2 effect is a different issue, but the tech specs, if
3 they do allow you to get into a severely degraded
4 state, typically do specify a time frame.

5 MR. STATTEL: Yes. And I want to make
6 clear that the clause does not allow them to defeat
7 the safety function for any amount of time at all.
8 What it allows is for them to take one of those two
9 trains out of service. The other one is still
10 performing, capable of performing that safety
11 function, but there's no, it doesn't meet single
12 failure criteria, for example. So if a failure were
13 to occur that disabled that one train, then you
14 wouldn't --

15 MR. THORP: Suffer that loss.

16 MR. STATTEL: Right. So in other words,
17 you know, we don't want them not to test those two-
18 channel portions of the system. We want them to test
19 them, and we recognize that there are cases where, you
20 know, you just have a limited amount of redundancy, so
21 there's really no other alternative other than to be
22 able to bypass one, test it, and then put it back in
23 and bypass the other one. So it just allows for that
24 reality.

25 MEMBER BROWN: Rich, my memory is failing

1 me right now. This is the IEEE 1991 version.

2 MR. STATTEL: That's correct.

3 MEMBER BROWN: The words and the exception
4 that's in 1991.

5 MR. STATTEL: That's correct, yes.

6 MEMBER BROWN: In 2009, the standard was
7 changed, not by you all but by the IEEE, to the
8 "should" and the changed exception.

9 MR. STATTEL: Should and note.

10 MEMBER BROWN: And the note. Well, but
11 the note was there -- yes, as a note, as opposed to an
12 exception. Now, my memory is failing me in that I
13 thought you all took issue with that relative to a
14 condition.

15 MR. STATTEL: Well, it was not -- we did
16 not address that as a condition. What we did -- we
17 don't agree with the softening of the requirement.

18 MEMBER BROWN: Yes, but that's, you said
19 that in the new rule.

20 MR. STATTEL: Right. So the new rule
21 states --

22 MEMBER BROWN: I didn't hear you say that
23 --

24 MR. STATTEL: That's my next sentence.

25 MEMBER BROWN: Oh, I'm sorry. I

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1 apologize. I didn't see it on these pages, and I just
2 wanted to make sure -- so go ahead.

3 MR. STATTEL: So the new proposed rule
4 states that the criteria for the 1991 standard, the
5 old standard, should be used in lieu of the new clause
6 6.7. And that's to clarify the requirements for the
7 use of maintenance bypass. So, essentially, if the
8 rule gets issued as proposed, the 1991 version of this
9 clause becomes the operative clause.

10 MEMBER BROWN: You got that, Dick?

11 MEMBER SKILLMAN: Yes.

12 MEMBER BROWN: You had a big question. I
13 just want to make sure to get that across. They
14 wanted to retain the rigor of the old rule.

15 MEMBER SKILLMAN: What I'm taking away is
16 the revised standard retains the requirement for
17 defense in depth.

18 MEMBER BROWN: The rule, yes, brings that
19 back.

20 MEMBER SKILLMAN: And when going into
21 maintenance bypass, the final safety function has not
22 been defeated. The redundancy has been reduced, but
23 the function has not been. So I understand.

24 MR. STATTEL: That's correct.

25 MEMBER SKILLMAN: Thank you.

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1 MR. WATERMAN: This is Mike Waterman.
2 Just one clarification. Rich, if you could go back to
3 the note.

4 MR. STATTEL: Which version do you want?

5 MR. WATERMAN: This one right here.

6 MR. STATTEL: Okay.

7 MR. WATERMAN: In IEEE standard space,
8 notes are not normative. In other words, if somebody
9 claims compliance to IEEE Standard 603-2009, they
10 don't have to be in compliance with that note because
11 that note is not a normative requirement. So even
12 though there's a "shall" down in that note that makes
13 it look really strong, it's not strong at all because
14 the note is not what we call normative. Just to
15 comment -- claiming compliance for 2009 does not mean
16 compliance for that note.

17 MEMBER SKILLMAN: Thank you.

18 MR. STATTEL: Okay. And the last change,
19 number five. This clause was added to the standard
20 and to introduce technology-specific guidance for
21 communication independence. It was a departure from
22 the IEEE's earlier position to place such guidance in
23 the companion standard, and we'll have a more detailed
24 discussion later in the presentation about this. But
25 you can see the sections affected and the change

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1 that's being made on this slide.

2 Okay. Now, the next part of the
3 presentation I'm going to discuss how the rule is
4 addressing those seven changes that were made to the
5 standard. I'll also discuss several conditions,
6 several of the conditions that are being proposed in
7 the new rule.

8 Okay. For the context of this rule, there
9 are several terms that are defined in the Federal
10 Register notice, the statements of consideration.
11 This was done to provide a common understanding for
12 each of the terms as they are being applied to the
13 different standards being referenced by the CFR. It
14 is intended that these definitions be applied by the
15 NRC for the underlying basis of 50.55a(h). Some of
16 these terms are being introduced by the rule. These
17 terms are, those terms are bolded in your handout.

18 The rest of the terms are used within the
19 reference standards. However, the working group, as
20 we were reviewing the documentation, we recognized
21 that the definitions in the standards are not always
22 consistent. So we decided to provide a common
23 definition within the rule package to avoid ambiguity.

24 MEMBER BROWN: Are the non-bolded ones
25 included in the rule, or are those just in the RG

1 1.153, the associated reg guide?

2 MR. STATTEL: They are included, they're
3 not, they were not defined prior to this rulemaking.

4 MEMBER BROWN: No, I understand that. I
5 understand that.

6 MR. STATTEL: They are included in the
7 statements of consideration --

8 MEMBER BROWN: But that's in the FRN.

9 MR. STATTEL: In the FRN, yes. They're
10 not going to show up in the Code of Federal
11 Regulations.

12 MEMBER BROWN: So how does the FRN apply
13 relative -- so you want people to use those as common
14 terms. If they're just in the FRN, how does that get
15 translated to the future? I didn't ask that question
16 in the subcommittee meeting.

17 MR. STATTEL: Correct me if I'm wrong,
18 Mike, but I think those definitions will be
19 transferred to the reg guide.

20 MEMBER BROWN: I thought they were.

21 MR. WATERMAN: I think all of those terms
22 that are defined in the FRN are used in the rule
23 language.

24 MEMBER BROWN: Yes, but the definition is
25 what I'm interested in.

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1 MR. WATERMAN: Because those terms are
2 used in the rule language, we felt it necessary to let
3 the stakeholders know this is what the Commission
4 intended to mean when they --

5 MEMBER BROWN: That's FRN. That's the
6 FRN.

7 MR. WATERMAN: That's the FRN.

8 MEMBER BROWN: Are all of these included
9 in your RG 1.153 associated explanation of the new
10 rule?

11 MR. WATERMAN: As far as I know they are.

12 MEMBER BROWN: I thought they were.

13 MR. STATTEL: I'm pretty sure they are
14 because they're --

15 MEMBER BROWN: I looked at it. You had a
16 list of definitions, but I didn't go count every one.

17 MR. WATERMAN: If they're in the FRN, yes.

18 MEMBER BROWN: Okay.

19 MR. STATTEL: They're in the glossary
20 portion of the draft reg guide.

21 MEMBER BROWN: Okay, okay. The FRN will
22 get lost in a few years. It's not in the Code of
23 Federal Regulations. I'm happy. Just go on.

24 MR. STATTEL: Okay. I know this slide is
25 a little busy, but it's really just a copy of a page

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1 from the statements of consideration. The backfit
2 analysis that was performed for this rulemaking
3 activity determined that the application of this new
4 criteria was not mandatory for current license
5 holders. Instead, the new criteria will be applied to
6 new applications and selectively to license
7 amendments, depending on several factors such as the
8 introduction of digital technology into I&C safety
9 systems.

10 We created this table, and there's
11 corresponding language that goes with this that's
12 included in the statements of consideration, to better
13 define and clarify the applicability of the standard.
14 The previous date-based applicability clauses were
15 left in place, and that was in order to maintain the
16 existing design basis for current licensed operating
17 plants. These conditions are based on the issue date
18 of the plant's construction permit, standard design
19 certification, or manufacturing license.

20 A new set of criteria was then added to
21 define the applicability of the 2009 standard
22 criteria, including the conditions that are
23 implemented by this rule. The rule also allows
24 voluntary application of the new standard for
25 previously-licensed facilities.

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1 So someone can always choose to use the
2 newest standard instead of the license basis standard
3 for the associated plant, okay?

4 MEMBER POWERS: I mean, they can't make
5 exotic decisions to switch standards.

6 MR. THORP: You mean one week to use the
7 new standard and then the next week to harken back to
8 the old one.

9 MR. STATTEL: No, that's not the intent.
10 So, basically, it's forward-looking. We consider the
11 new standard to be perfectly adequate and appropriate
12 to apply to an analog system, for example. So if
13 someone chooses to upgrade their analog system and
14 they want to use, they voluntarily want to commit and
15 use the current-day standard to develop that system,
16 they're able to do that. They're not required to
17 because we're not applying this as a backfit to them,
18 so we're not making it mandatory for them to use the
19 new standard for an older plant, for example. But
20 they can voluntarily use the newer version of the
21 standard.

22 Now, what this table identifies is certain
23 conditions, depending on the nature of the change that
24 they're making to their design, there are conditions
25 that would basically -- if you're changing from analog

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1 technology to digital technology and you're adding new
2 safety functions that were not part of the original
3 licensing basis for the plant, well, then we would
4 expect them to use the new standard for the
5 development of that system.

6 I think the next table also goes into a
7 little bit better detail about that. Okay, yes. So
8 this table, it kind of works with the previous table.
9 This is also in the FRN document. It basically
10 provides several examples of I&C system modifications,
11 and this is intended to aid in the determination of
12 the applicability for the new standard.

13 So as you can see on the table, if all
14 they're changing in their system is updating their
15 power supplies in one division, then really there
16 would not, the expectation is they would use their
17 initial licensing basis as a minimum and that they
18 would not be required to use the 2009 standard.
19 However, if they're modifying the protection system
20 with components based on, they're changing their
21 technology, then we would expect that they would use
22 the 2009 version of the standard.

23 Any questions on that? Okay.

24 Now, these listed clauses --

25 MEMBER BROWN: Let me ask you a question.

1 I might be way off base, and this is just based on a
2 recent experience that -- talk about the first item,
3 the power supply. There are power supplies that
4 incorporate computer software-based components to
5 monitor their functionality, as well as to be smart.

6 MR. STATTEL: Yes.

7 MEMBER BROWN: So that's not exactly an
8 analog type situation.

9 MR. STATTEL: That's correct. And that's
10 an issue we've kind of coined the term "embedded
11 digital technology." And it's something the IEEE is
12 actually working on, developing a new standard to
13 address those types of issues to basically identify
14 what criteria would need to apply for that.

15 Our intention here would be, yes, that's
16 a change of technology. If you're adding computer
17 control function into a power supply, it's no longer
18 using the analog technology. So our intention here,
19 my interpretation of that and certainly the working
20 group's intention would be that they would have to use
21 the new version of the standard.

22 MEMBER BROWN: Okay. I just wanted to
23 provide that just to make sure I understood a little
24 bit of your thought process. That's fine.

25 MR. STATTEL: Okay.

1 MEMBER BROWN: Thank you.

2 MR. STATTEL: Okay. So the next part of
3 the presentation is talking about what's actually
4 changing in the regulation, okay? This slide lists
5 the clauses, and these clauses would add conditions.
6 So, basically, we're endorsing or incorporating by
7 reference the new version of the standard with all the
8 changes that I just went over. In addition to that,
9 these listed clauses would add conditions and several
10 new requirements for the use of the 2009 version of
11 the standard.

12 So we'll now discuss each of those clauses
13 individually. Okay. The first one is to amplify
14 system integrity requirement of IEEE 603. This new
15 clause would require that, in order to ensure the
16 integrity and reliable operation of a safety system,
17 the safety functions shall be designed to operate in
18 a predictable and repeatable manner. And we also
19 added definitions for those terms, okay?

20 Predictable and repeatable operation of
21 the system requires that the results of translating
22 input signals to output signals are determined through
23 known relationships among the control system states
24 and the required responses to those states. It also
25 requires that a given set of input signals produces

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1 the same output signals for the full range of
2 applicable conditions defined in the design basis.

3 Predictable and repeatable systems do not
4 provide the capability for unscheduled event-based
5 interrupts or operator system interrupts to meet
6 system safety requirements. Systems that operate in
7 a predictable and repeatable manner should not be
8 designed with a capability for unscheduled event-based
9 disruptions or operator-based system functions that
10 would inhibit or prevent the safety system from
11 meeting its safety requirements.

12 Any analysis used to demonstrate
13 predictability and repeatability should be based on
14 analysis of system characteristics, such as definitive
15 design and performance criteria as opposed to a
16 probabilistic analysis.

17 Okay. The next section of conditions is
18 for independence, and I will --

19 MEMBER BROWN: Can I ask you a question on
20 this? Those words will be, that's the H4 words that
21 will be in the rule? All the other words you read are
22 in the reg guide?

23 MR. STATTEL: Verbatim. Word-for-word,
24 what you said is correct.

25 MEMBER BROWN: I want to make sure that

1 you understood. Those are the words that will be
2 here. What they intend is now in this new reg guide,
3 which goes through every item in the standard, in the
4 rule -- excuse me -- and explains what they mean by
5 the condition. We didn't have that before, did we?

6 MR. STATTEL: No. Yes, this clause did
7 not exist.

8 MEMBER BROWN: No, no, no, I mean the
9 companion explanation of the reg guide.

10 MR. STATTEL: Well --

11 MEMBER BROWN: But there wasn't, there
12 weren't any of these conditions in --

13 MR. STATTEL: It technically existed, but
14 it was kind of buried in the statements of
15 consideration for the old rule --

16 MEMBER BROWN: Okay.

17 MR. STATTEL: -- which is very difficult
18 to find and it's not, it's not really an operative
19 guide. So practically speaking, a reviewer, an NRC
20 reviewer would have, there was nothing in the standard
21 review plan that would tell him to go look at that.
22 Now, he could, but there's nothing that obligates him
23 to go look at that, what was intended --

24 MEMBER BROWN: But now you've covered that
25 omission. Well, not omission but that lack of

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1 information.

2 MR. STATTEL: And that's our idea. So our
3 idea here, as a practical matter, so the future
4 reviewer, as he's reviewing a design, he will be
5 pointed to the reg guide because the standard review
6 plan will point directly to the reg guide, and it will
7 have -- all the words that I just read will be right
8 in there. So there should be really very little left
9 to interpretation at that point. So the rule language
10 is here and how that's interpreted, how that was
11 intended to be interpreted will be contained within
12 the guidance --

13 MEMBER BROWN: I just wanted to make sure
14 of that because you went through that whole litany,
15 and I wanted to make sure people understood that that
16 explanation was not there. It's just in this part.

17 MR. THORP: So this process and this
18 concept includes a contemporaneous development of the
19 reg guide and issuance of the reg guide in parallel
20 with the rule. So that will be available.

21 MEMBER BLEY: A question about that kind
22 of structure. I'm asking it for response from you
23 guys as member of staff but also some of you have
24 worked for power plants, as well, and from them. In
25 trying to delve into issues in other areas like this,

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1 if I talk to lawyers here, they go to the statements
2 of consideration immediately and they know what those
3 are, and they do provide much depth behind the things
4 we have.

5 Does staff refer to them as -- are they as
6 conversant with them as I seem to see with the
7 lawyers? And are the folks out at the power plants at
8 all conversant with statements of consideration?

9 MR. STATTEL: Well, I'll be honest with
10 you, you know. I was at the power plant for 20 years.
11 I didn't know they existed.

12 MEMBER BLEY: That's kind of what I --

13 MR. STATTEL: Until I came to the NRC, I
14 did not know they existed.

15 MEMBER BLEY: So this is a really good
16 idea, and not just here. Maybe some other areas --

17 MR. STATTEL: Now, the reg guides, I knew
18 they were there. So I knew, when I submitted an
19 application, I knew that the NRC reviewer was going to
20 be using the criteria in that reg guide to evaluate my
21 system. So, of course, I'm very cognizant of what's
22 in the reg guide, but statements of consideration I
23 had no clue. I learned of their existence the first
24 year I was at the NRC.

25 MEMBER BLEY: So at least on staff you're

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1 aware of them.

2 MR. STATTEL: Oh, I am aware of them now.
3 The lawyers made sure of that.

4 MR. JACKSON: For the inspection staff,
5 they're aware of the statements of consideration.
6 They'll refer to them, but it's not very often that
7 you would need to refer to the statements of
8 consideration.

9 MR. THORP: When there's a question or a
10 controversy of some kind, you know, that has to be
11 examined in further detail, that's when they'll dig
12 into things like this.

13 MEMBER BROWN: One other -- this reg
14 guide, it was a very good idea to do this. I think
15 it's very extensive, very thorough, and it really does
16 explain the intent behind what the staff is trying to
17 do and it really delves into the application of the
18 new technologies. So I think it's a personal opinion.
19 I used it extensively during my, during my review.

20 MR. STATTEL: But it's a very unique reg
21 guide because our normal practice is the reg guide
22 would endorse a standard as a guidance, as a measure
23 of guidance. When the working group convened, one of
24 the first questions that came up is why do we even
25 need a reg guide because this is regulation. You

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1 know, what's in this standard is regulation. It's
2 incorporated into the CFR. But after reviewing that,
3 we felt it was necessary to have the reg guide clarify
4 that.

5 MEMBER BROWN: Okay. Let's go on.

6 MR. STATTEL: Okay, certainly. So for the
7 independence part of this presentation, I will turn
8 over to -- Terry Jackson will be presenting these
9 criteria.

10 MR. JACKSON: Okay. So I'm going to talk
11 about the criteria that's in the proposed rule, 10 CFR
12 50.55a(h)(5). So if you're following along in the
13 Federal Register Notice, it's about page 71.

14 CHAIRMAN STETKAR: Yes, we're all doing
15 that, Terry. Don't worry.

16 MR. JACKSON: So this section here on the
17 independence, there's three subparagraphs that provide
18 additional criteria on independence. This slide here
19 is going to talk about the two general requirements
20 that apply overall, and then there's some detailed
21 criteria which I'll talk about on the next slide.

22 Clause 561 of IEEE Standard 603 states
23 that redundant portions of a safety system provided
24 for a safety function shall be independent of and
25 physically separated from each other to the degree

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1 necessary to retain the capability of accomplishing
2 the safety function during and following any design
3 basis event requiring that safety function.

4 So the first subparagraph there, 5(I)
5 amplifies clause 561 by requiring that applicants
6 address independence between redundant portions of the
7 safety system and, further, that hazards introduced
8 into the safety system by information sharing must be
9 analyzed. And the second subparagraph there also
10 amplifies clause 563 by requiring that applicants
11 address independence between safety systems and other
12 systems and that the independence must be analyzed for
13 hazards by such information sharing.

14 So, basically, what these two
15 subparagraphs are doing is, one, they're requiring,
16 they're making more explicit that there should be
17 analysis when you're doing communication between
18 redundant safety divisions or between safety systems
19 and non-safety systems. And that analysis should
20 cover, as a minimum, the safety system
21 internal/external hazards, the extent of
22 interconnectivity that is in the design, as well as
23 what the impact of failures of degradation are.

24 And then one of the other things that,
25 particularly 52 covers, is that digital communication

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1 independence is extended to include other signal
2 technology. So in the 2009 version, they put in there
3 digital communication independence, and we expanded it
4 to be any kind of communication independence
5 independent of technology.

6 Okay. So on this next slide here, we're
7 going to try to illustrate the detail of the criteria,
8 which is in 5.3. And first of all, what we'll be
9 talking about is the --

10 MEMBER BROWN: 5.3 or 5.63?

11 MR. JACKSON: Actually, it's in the draft
12 rule. It's paragraph 5 --

13 MEMBER BROWN: Oh, a little after it.

14 MR. JACKSON: A little after it.

15 MEMBER BROWN: Okay, all right. I'm
16 sorry. I was thinking of the standard.

17 MR. JACKSON: So we're talking about
18 independence between safety division or safety systems
19 and also between safety and non-safety systems. And,
20 first, there is criteria which is in big letter A
21 there in that subparagraph which describes criteria
22 that applies to all reactors. And what this does is
23 paragraph 5IIIA allows communications between the
24 safety division or safety system and other safety
25 divisions and safety systems and from non-safety

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1 systems into the safety division or safety system,
2 provided safety is not impaired.

3 MEMBER BROWN: And that's what the arrows
4 mean?

5 MR. JACKSON: Yes. So, basically, what
6 it's describing there is new communication direction.
7 So you could have communication basically between
8 redundant safety divisions, you could have
9 communication from a non-safety system in this clause
10 here particular. But you kind of have to take all the
11 clauses together and for what particular reactor,
12 which I'll describe the other ones coming up, as well.

13 Now, big letter B requires features in the
14 safety division or safety system for detecting and
15 mitigating faulted signals from another safety
16 division or system and faults from non-safety systems.
17 So, basically, this is having some kind of diagnostic
18 feature on communication system that can alert you to
19 communication failures.

20 Okay. So big letter C within that same
21 subparagraph allows signals from other safety
22 divisions or safety systems and from non-safety
23 systems if those signals support safety or benefit
24 safety, in addition to paragraphs A and B. So right
25 here, this is not just only including if you need it

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1 to perform a safety function, but if it would provide
2 safety in terms of enhancing reliability and
3 availability, then it could be allowed.

4 CHAIRMAN STETKAR: Terry, we had a little
5 bit of discussion on this one at the subcommittee
6 meeting. And, in fact, I can't recall the design; it
7 doesn't make any difference. It's come up in some of
8 our discussions with reviews of -- as I said, I can't
9 remember whether it was a new reactor or an upgrade
10 and it doesn't make any difference -- where there's a
11 danger that reviewers may interpret that requirement
12 very, very literally, to the extent of prohibiting
13 communications that might enhance operator reliability
14 but cannot be demonstrated in a deterministic
15 licensing basis as an improvement to safety because
16 they don't enhance any of the safety-related
17 functions. And that's a bit of a concern if the staff
18 is going to interpret that support or I think the
19 words are provide a safety benefit very, very
20 literally.

21 We did have some discussion during a
22 subcommittee meeting, but I guess I'd like you to
23 address it. In particular, the example that I seem to
24 recall, and I couldn't find it very quickly searching
25 through my notes here, was something where an

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1 applicant or a licensee said we would like to have
2 these non-safety related signals available to
3 operators on a safety-related display because they
4 told the operators an integrated picture of the status
5 of safety and non-safety systems, and the staff
6 disallowed that because they said that is not a
7 distinct safety benefit.

8 MR. JACKSON: Okay. That one there, I'm
9 not familiar with that --

10 CHAIRMAN STETKAR: And I can't find it.
11 I recall it because I remember during our
12 deliberations we had some discussion about it.

13 MR. STATTEL: Well, our experience, and,
14 you know, we've been working with NRO pretty closely
15 as we develop this, our experience with the reviews
16 has been very different for the operating plants
17 versus the new reactor designs. It's actually a lot
18 easier for the operating plants to make safety cases
19 because they have like a baseline. So, relatively
20 speaking, it's pretty, it's pretty easy or there's a
21 success path for showing that a new design with new
22 features actually provides a safety enhancement, and
23 that's pretty quantifiable.

24 For the new reactor designs, they're
25 pretty much establishing that baseline safety case,

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1 and they have nothing to compare it against. So it's
2 a lot more challenging for the new reactor designs,
3 and that's part of the reason why we separated the
4 requirements applicability for new and operating
5 reactors.

6 Now, we did attempt to define what a
7 benefit for safety was. The concern there was we
8 didn't want to have disagreements, so an applicant
9 could think it's a safety benefit and then the NRC
10 reviewer would say, no, I don't think that's a benefit
11 at all.

12 CHAIRMAN STETKAR: Yes. That's the type
13 of discussion I recall.

14 MR. STATTEL: The type of benefits that
15 we've seen in the operating plants for Oconee and for
16 Diablo Canyon have been basically reducing reliance on
17 operator actions, right, is one of them. We also see
18 benefits, we've credited benefits for diagnostic
19 features that basically identify faults in a system
20 immediately, instantaneously when they occur, as
21 opposed to the traditional way in operating plants, in
22 the old analog technology from the 70s and 80s, it's
23 very typical we have a surveillance test that we
24 perform once a month or once a quarter. And,
25 realistically, a fault can occur any time during that

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1 quarter, and you don't have a means of identifying
2 that until the end of the quarter. So having the
3 ability to immediately identify a fault in the system
4 really does provide a safety benefit there, and we've
5 basically credited applications for those types of
6 benefits, as well.

7 But we do review them, and they really
8 have to be case by case. You know, we definitely have
9 discussions with all the applicants with regard to is
10 this a feature of the system, is it a benefit or is it
11 just something you'd like to have, and we do evaluate
12 them on a case-by-case basis.

13 MR. JACKSON: I think, overall, this was
14 a challenging area in drafting rule language, and the
15 challenge is is that digital technology brings a lot
16 of benefits. There's a lot of functionality that you
17 can bring to a system through using digital
18 technology. But also you have to recognize that, due
19 to its complexity and some of the interactions and
20 stuff, there could be challenges to things,
21 particularly with independence.

22 So you've got a kind of balance here of
23 where you're trying to -- you want this nice
24 functionality, but you also want to be able to ensure
25 safety, as well. So you want to try to maximize the

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1 ability to have this functionality but also minimize
2 the risk of using certain design features,
3 particularly with independence, which is kind of a
4 good segue with what I'm going to talk about with new
5 reactors because the next set of criteria that you'll
6 see are, basically, they're consistent with what is in
7 A and B, but they're more strict that you'll see.

8 So the first one here is that -- okay. So
9 in (D)(1), this requires communications between the
10 safety system and non-safety system shall be one way
11 and enforced with a hardware device when the safety
12 system is in operation. So, basically, what this does
13 is this would allow communications from a safety
14 system to a non-safety system. So, for example, if
15 you want to send diagnostic information or information
16 to the operators, you're still able to do that. But
17 at the same time, it's blocking any kind of challenges
18 you might get from a non-safety system failure back to
19 the safety system.

20 And then in (D)(2), what this is saying is
21 that it allows communications between a safety
22 division or a safety system if those signals are
23 required for safety. So, primarily, we realize that
24 you'll need to do voting and certain things like that.
25 So that provides that provision there.

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1 MEMBER BROWN: Before you leave that, I
2 mean, we've had considerable discussions in all the
3 new reactor designs and others on relative to the
4 sharing because of the voting issue. You obviously
5 have to vote, and the concern of corrupt digital
6 signals locking up or making non-operational all the
7 voting units simultaneously since you have to
8 obviously feed from one division to all voting units
9 in order to do the voting. And I noticed you didn't,
10 there was no explicit discussion of a diverse means of
11 monitoring the processors for lockup such that -- and
12 that's not covered by the analysis of serial data or
13 any other communications type data. It's a
14 functionality or a -- what I want to call it is a
15 characteristic of computers to get confused and stop.

16 You have not addressed that in the new
17 rule or in the conditions you've applied, yet we've
18 utilized that and it's gone, you know, moved heaven
19 and earth to try to get that across in all the new
20 reactor designs, as well as to understand -- well, we
21 actually haven't had a backfit where we've had to do
22 that, at least not recently. I can't speak to Ocone
23 because I just don't remember back six years or five
24 years, whatever it was. I can only remember the
25 Diablo Canyon routine where it, fundamentally, was an

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1 analog signal that goes out to the analog voting unit.

2 So, anyway, you're not covering it here,
3 and what's the rationale for not dealing with that now
4 in the new rule since you had the opportunity?

5 MR. JACKSON: Okay. I think I'll take a
6 shot at it and then ask Mike and Rich because they
7 were more involved with the working group than I was.
8 But I think the working group discussed that
9 particular aspect there of having, basically, a
10 hardwired way of --

11 MEMBER BROWN: A hardware-based monitor at
12 the same time.

13 MR. JACKSON: Yes, ensuring that if a
14 voting process are locked up that you would still get
15 the reactor trip function.

16 MEMBER BROWN: Or a safeguards alarm, one
17 or the other, just depending on the functionality.

18 MR. JACKSON: So I think when we looked at
19 that, the group saw it as a very, I guess a very
20 specific criteria, which we feel is covered by, for
21 example, review system integrity. And that's one of
22 the reasons why the system integrity clause was
23 enhanced by the condition to be predictable and
24 repeatable.

25 MEMBER BROWN: But that's if it's working.

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1 MR. JACKSON: Right. But we didn't -- I
2 think what we saw in the rule is that would be a very
3 specific criteria there. We feel that the rule
4 addresses the ability that it needs to operate with
5 integrity and reliability but not the need necessarily
6 to spell out a specific function.

7 MEMBER BROWN: Well, that's not a specific
8 function. If you require it to be monitored, it's
9 like anything else that you monitor. Well, go ahead.

10 MR. JACKSON: Well, I think some of the
11 other thoughts, too, is that if you lost the ability,
12 say all the voters lock up, that this is also similar
13 to the common-cause failure, which is also addressed
14 in the rule, as well. So you may have a diverse
15 actuation system that is also going to provide a
16 protective function.

17 MEMBER BROWN: Many folks don't recognize
18 that as a common-cause failure. They don't recognize
19 that it will even occur ever.

20 MR. JACKSON: Right. But we assume --

21 MEMBER BROWN: It's a little difficult if
22 --

23 MR. JACKSON: Yes, I think --

24 MEMBER BROWN: -- if you've got a mind set
25 out in the design world that says, well, you've got to

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1 be kidding me, this never happens.

2 MR. JACKSON: Well, when they're doing
3 their defense in depth and diversity analysis, they
4 have to assume that the safety function doesn't occur
5 from the primary system. So that could be failure to
6 provide a reactor trip if one is required or a safety
7 actuation if one has occurred.

8 MEMBER BROWN: Yes, but the diversity --
9 just to be contrary a little bit. Based on -- well,
10 I want to make sure we mouse milk this to the nth
11 degree here. If you look at some of the applications
12 we've looked at in the new reactor world, there was
13 not a one-for-one mapping of safety requirement, in
14 other words trip functions, into the diverse actuation
15 systems. They were based on a probabilistic risk
16 assessment of the need for certain -- whether manual
17 operations could take care of this or that. So there
18 is not a one-for-one translation into the diverse
19 actuation system evaluations. So, I mean, to use the
20 diverse means, you know, that people do do is not a
21 complete affirmation or solution to that particular
22 circumstance.

23 All right. I got your answer. I just
24 wanted to make sure we discussed that point since
25 we've been over it fairly well in a number of the new

1 reactor designs. We will have to evaluate that --

2 MR. STATTEL: I would like to chime in
3 here. So it kind of comes down to how prescriptive we
4 need the regulation to be. For new reactors, in the
5 proposed rule, we actually do put some restrictions.
6 The voting function, for example, on new reactors per
7 the new rule condition here cannot be done through
8 communications at all. It has to be hardwired,
9 basically relay type logic for transferring signals
10 between the channels and the voting.

11 MEMBER BROWN: Where does it say that in
12 here?

13 MR. STATTEL: That is actually in, for new
14 reactors it's in clause III --

15 MEMBER BROWN: (D)(2)?

16 MR. STATTEL: D -- let's see.

17 MR. JACKSON: I think we required a
18 hardwired --

19 MR. STATTEL: (D)(3), I believe it is.

20 MEMBER BROWN: It's only (D)(I) that says
21 communication for safety and non-safety much be one
22 way enforced by physical mechanism for safety to non-
23 safety. It doesn't say from safety to safety.

24 MR. STATTEL: Yes, we would allow data
25 communication for communication between --

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1 MEMBER BROWN: From a safety processor
2 that's calculating a trip, you would allow serial
3 communications to a computer-based voting unit that
4 takes data and evaluates it with headers and footers
5 and all the other junk that gets tossed in to make it
6 communicate with the other processors. So I don't
7 think that's the case.

8 MR. STATTEL: Now, the other thing I'd
9 like to point out, I think Oconee was a good example
10 because in the Oconee system there was two different
11 setups, one for the SFAS. They actually had computer-
12 based voters, and there were two of them. In the
13 (D)(3) analysis, which it kind of does provide a one-
14 for-one comparison between the design and what the
15 expectations are. The assumption was that both of
16 those voters were to fail and freeze up, and the
17 concern was not that we would have inadvertent
18 actuations but that you would lose your safety
19 function. It actually goes both ways.

20 For Oconee, they actually, for that
21 system, they put in an emergency override switch. So,
22 basically, they cut power. They just turned the
23 computers off. And that was -- they would only do
24 that -- it was manual. It was a manual switch --

25 MEMBER BROWN: You had to know what

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1 happened while you're going through a casualty --

2 MR. STATTEL: Well, essentially, so it's
3 a scenario where I have a safety injection, a high-
4 pressure safety injection in progress. My pressure is
5 going up, my voters are failed, I can't stop the
6 injection.

7 MEMBER BROWN: How do you know your voters
8 have failed?

9 MR. STATTEL: So, basically, the
10 procedures were written in a way where the operators
11 confirmed that they didn't have a condition where they
12 required the safety injection and they could operate
13 that emergency override switch that basically killed
14 power to the computers. Now, that was for their SFAS
15 system.

16 For their reactor protection system, they
17 basically used the old relay logic, so there was no
18 communications to the voters. The Oconee system uses
19 relay logic, and there was really no --

20 MEMBER BROWN: There were five stable
21 outputs out of the calculation unit into a voting,
22 multiple voting --

23 MR. STATTEL: Right, it was a matrix. It
24 was a standard matrix.

25 MEMBER BROWN: Well, that's a way to do

1 it, but they didn't have to do it that way. They
2 could have used --

3 MR. STATTEL: Correct. And the reason I
4 say that's a good example is because it shows you that
5 there are more than one, there's not only one
6 technological solution to --

7 MEMBER BROWN: Oh, Rich, I'm not
8 disagreeing.

9 MR. STATTEL: -- technological solution to
10 that problem. I think the rule establishes the
11 performance and operational expectations for the
12 system, and we don't want to restrict, you know, to
13 one solution. That was not our intent. So we were
14 very careful to basically define the criteria, the
15 expectations, the goals that need to be met and not
16 basically choose a technological solution.

17 Now, use of watchdog timers and monitoring
18 functions, you know, yes, certainly, that has been
19 accepted in several of the designs, including Ocone.
20 But it's not the only solution, so that's why it's --

21 MEMBER BROWN: Computer-based voter. You
22 know, you haven't really run through anything that
23 really addresses a computer-based multiple voting unit
24 type approach to solving that --

25 MEMBER CORRADINI: So can I ask a question

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1 since you guys are having so much fun?

2 MEMBER BROWN: We're going to finish this
3 right now.

4 MEMBER CORRADINI: So you basically want
5 to outlaw just what you said, and you're saying the
6 way it's written, it's not specifically outlawed.

7 MEMBER BROWN: They want it outlawed?

8 MEMBER CORRADINI: No, you want it
9 outlawed.

10 MEMBER BROWN: No. I want to outlaw what?

11 MEMBER CORRADINI: The computer-based
12 voting --

13 MEMBER BROWN: No, no, no, I don't want to
14 outlaw -- no, no, it has nothing to do with that.
15 It's just that if you have a software-based voting --
16 what we've done in the other plants, if you have a
17 software-based voting system, one in each division,
18 they're all fed by each division. One corrupt signal
19 can lock them all up. That's fact, as long as you
20 have a diverse means that monitors each of the voters
21 and executes a downstream trip down to the other
22 actuation --

23 MEMBER CORRADINI: And your point is
24 that's not specifically required.

25 MEMBER BROWN: It's not addressed in here.

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1 It allows, it's back to you're going to have to sit
2 down and have that discussion in each and every time.
3 They don't say a diverse means to monitor computer-
4 based voting units. And you can say, well, there's a
5 hazard analysis. If you go back to one of the other
6 5.5(I), which is AH5(I), it talks about you do a --
7 well, of course, it's a hazard -- oh, yes, safety
8 system internal and external hazards. In other words,
9 it's covered by the hazard analysis. So we will
10 evaluate the use of the voting systems, computer-
11 based, and we'll determine whether it does or does not
12 need a diverse means of monitoring.

13 MR. STATTEL: I'm a little confused. You
14 implied that that scenario that you just described is
15 not a common-cause failure or would not be addressed
16 in a (D)(3) analysis, and that's a little confusing to
17 me because I don't know why --

18 MEMBER BROWN: I'm just, I'm going back to
19 discussions we had in a couple of the new reactor
20 design world where the issue was brought up and
21 almost, we had arguments back and forth from the
22 designers, not necessarily the staff, that this would
23 never happen.

24 MR. STATTEL: Well, I'm not familiar with
25 those discussions in the new reactor designs but --

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1 MEMBER BROWN: And -- oh, one other thing,
2 Rich. And that they had algorithms to ensure that no
3 corrupt signals could ever get transmitted to another
4 computer unit --

5 MR. STATTEL: Right.

6 MEMBER BROWN: -- which is baloney.

7 MR. STATTEL: Well, for the operating
8 system designs, I can assure you that those scenarios
9 are evaluated in the (D)(3) analysis, in the (D)(3)
10 analysis.

11 MEMBER BROWN: For operating --

12 MR. STATTEL: For operating reactors. The
13 ones I've been involved with --

14 MEMBER CORRADINI: Right. But I think
15 what Charlie is saying, since I happened to be there
16 when those discussions were held, I do remember those
17 sorts of words going back and forth between the two,
18 between us and the designers.

19 MEMBER BROWN: Two different designers, as
20 a matter of fact, yes.

21 MR. WATERMAN: May I interject a comment
22 here? Clause, paragraph B up there requires that any
23 signal coming into a safety system or safety division
24 must be able to be detected. So we're looking at that
25 one safety division there, all that green stuff over

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1 there, that could be A and it could B, C, or D. Any
2 signal coming in must be able to be detected and
3 mitigated for both current reactors. The idea -- I'll
4 tell you the truth, Charlie. All the reviews I've
5 done, I've always seen these watchdog detectors, and
6 I just took it for granted that everybody is doing it.
7 It just slid right by me as far as should we put
8 something in that requires watchdog detectors on each
9 computer. It's just the systems I've seen have all
10 done watchdog detection or alerted the operator to a
11 one-channel reset, things like that, and it just -- so
12 it didn't end up in here off of any contribution of
13 mine. I just haven't seen any systems --

14 MEMBER BROWN: Well, one of the designs
15 actually, if you go read the topical reports and
16 technical reports, there's actually the implication,
17 based on the wording of the platform itself, that it
18 utilizes software in order to, not just to send out a
19 digital signal, a bistable signal that says I finished
20 my cycle, it actually uses the software to determine
21 whether the computer is locked up or not. It's just
22 -- so in other words, they're lockstep together, which
23 you could disable the monitor, as well.

24 I just, we needed to go through the
25 discussion, okay? To have all the thought processes

1 put on the table to make sure your all's thoughts were
2 thoroughly discussed.

3 MR. WATERMAN: Okay.

4 MEMBER BROWN: Okay?

5 MR. WATERMAN: Very good.

6 MEMBER BROWN: And are there any questions
7 since I've been the one that's done this consistently?
8 Do any of the other members have any additional
9 comments to make? Okay. I think we ought to roll on
10 here.

11 MR. JACKSON: Okay. So I'll move on to
12 (D)(3). Now, when we had imposed the criteria in
13 (D)(1), which is basically one-way data communication
14 from a safety system to a non-safety system, we had to
15 step back and think, well, is there any time that we
16 would need information from a non-safety system to a
17 safety system? By definition, with independence, the
18 safety system shouldn't need information from a non-
19 safety system, but we did consider that there were two
20 cases. One was if you were using the diverse
21 actuation system, at some point diverse actuation
22 system has to tie into the safety equipment to actuate
23 it. The other case is with anticipatory reactor
24 trips, for example like reactor trip on turbine trip.
25 There would be potentially some signal from the non-

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1 safety system for anticipatory reactor trip. So the
2 rule does allow for those situations there.

3 And then the criteria for (D)(4) is
4 basically, it's applied to design certifications,
5 standard and design approvals, and manufacturing
6 licenses. And this basically says if, for the new
7 reactor criteria, they want to take an alternative,
8 that when they do that alternative then they need to
9 identify all the direct and indirect data
10 communication pathways to a safety division or a
11 safety system from other systems.

12 So, basically, that concludes what we have
13 for the independence criteria.

14 MEMBER BROWN: Okay. Any other comments?
15 Let's roll on.

16 MR. STATTEL: The next section we'll
17 discuss is the diversity and defense in depth clauses.
18 So four new clauses are being introduced or proposed
19 for the regulation to address the potential for
20 software or logic implementation common-cause failure.
21 These criteria were derived directly from the staff
22 requirements memorandum on SECY 93-087, so there's
23 really nothing new here. This would be the first time
24 that these criteria appear in regulation, though.

25 CHAIRMAN STETKAR: Rich, before you embark

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1 on the details here, I don't recall whether I asked
2 during the subcommittee meeting or not, but the rule
3 language specifically says, "Plant parameters shall be
4 maintained within acceptable limits established for
5 each design basis event in the presence of a single
6 common-cause failure. The following requirements must
7 be met when addressing digital system common-cause
8 failures." The rule applies to both digital and
9 analog. Why are we only concerned about common-cause
10 failures in digital systems, and why are we not
11 concerned about common-cause failures in analog
12 systems?

13 MR. STATTEL: Well, the SECY paper was
14 really restricted to addressing the potential for
15 software --

16 CHAIRMAN STETKAR: Yes, and I understand
17 that's not -- I understand what the SECY paper was.
18 I'm asking in the broader sense. Since this is a rule
19 that's being written for going forward with any
20 reactor design, if I want to come in with a reactor
21 that's got relays in it, this should apply.

22 MR. STATTEL: So what I would have to say
23 about that is the IEEE 603 really doesn't address
24 diversity, right? And since this is an incorporate by
25 reference of IEEE 603, it was really not an issue we

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1 had initially intended to incorporate, right?

2 Now, we do evaluate the diversity issue.
3 Every license amendment that comes in, we do a (D)(3)
4 analysis. We have, in our standard review plan we
5 have -- obviously, BTP 719 provides specific criteria
6 for the diversity analysis.

7 CHAIRMAN STETKAR: But do people who have
8 to do that diversity analysis -- if I come in today
9 and I want to submit a design, for whatever reason,
10 presuming that I own a manufacturer who can give me
11 long assurances that I can, indeed, procure safety-
12 related electromechanical relays for the life of my
13 plant, I can theoretically come in with a design that
14 has safety-related electromechanical relays in my
15 protection and safeguards actuation logic. There's
16 nothing that prohibits me from doing that. I don't
17 think I'm required to do a (D)(3) analysis for that,
18 am I?

19 MR. STATTEL: And that really is the crux
20 of the matter. So (D)(3) was not something that's
21 covered in the standard and we're incorporating by
22 reference that standard, so we weren't going to
23 initially address (D)(3). However, it was identified
24 by the new reactors folks that some of the applicants
25 are basically claiming it's optional, doing a (D)(3)

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1 analysis optional, regardless of the technology
2 involved, you know. They were making claims that,
3 yes, we don't have to go through every accident
4 scenario and project this common-cause failure. So
5 that's basically what resulted in the addition of
6 these particular clauses.

7 So the NRC's position was, well, what do
8 we do now? What is our current state of affairs? Our
9 current state of affairs, every time we perform an
10 evaluation of any I&C system, not just digital, like
11 you mentioned, we do use the standard review plan, and
12 the standard review plan has us pull up BTP 719 and we
13 use that criteria for evaluating those systems. And
14 in truth, all of that is guidance. None of that is
15 really dictated by regulation.

16 MR. THORP: So what we've seen is that,
17 we've seen the need for more comprehensive regulatory
18 treatment of the need for diversity in defense in
19 depth. And we have actually written a proposal for
20 rulemaking that will establish that as a separate 10
21 CFR dot XX rulemaking. I think Steve and Art wanted
22 to address some of the discussion here.

23 MR. ARNDT: To get to your original
24 question, for all systems but particularly for I&C
25 systems, whether analog or digital, we have a set of

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1 requirements both in terms of the single failure
2 criteria and the general design criteria. For
3 example, GDC 22 directs the licensees to provide
4 appropriate redundancy and diversity.

5 The SECY was the direction by the
6 Commission on how we should interpret digital systems
7 with respect to those requirements. So the
8 requirement to do diversity analysis and redundancy
9 analysis and everything else has always been there as
10 part of the single failure criteria and GDC 22 and
11 other regulations.

12 What the Commission did in that SECY was
13 direct the staff to interpret that to include a
14 special additional requirement for software-based
15 systems, which we also interpreted for software
16 developed systems, like CPLDs and FPGAs. The
17 Commission was particularly concerned about software
18 because software is unique in that it's not a physical
19 entity and has unusual characteristics, as opposed to
20 other kinds of systems, like analog systems. But the
21 common mode failure is something associated with the
22 design of the system.

23 Does that help?

24 CHAIRMAN STETKAR: No, but it's an answer.

25 Thanks.

1 MR. THORP: But we realize, going forward,
2 we want to -- in fact, over the last year, we've
3 talked more and more about the need for --

4 CHAIRMAN STETKAR: My point is, obviously,
5 we had the Salem reactor trip breaker failure years
6 ago, and suddenly everybody got concerned about, my
7 God, we can have common-cause failures of
8 electromechanical devices. So there was a lot of
9 hand-wringing. We went through all of the ATWS
10 rulemaking. We established now non-safety related
11 diverse trips for reactor trip breakers and, lo and
12 behold, we solved that particular problem maybe.

13 And now I'm saying, going forward, we've
14 now become sensitized to common-cause failure.
15 Everybody is afraid of the boogeyman of software.
16 Nobody knows what that can happen, so, therefore, you
17 know, it can have some nondescript common-cause
18 failure.

19 Going forward, if the staff were to have
20 an applicant come in with an analog-based system,
21 would the same principles of searching for common-
22 cause failures and examining whether or not the
23 applicant applied fundamental diversity and defense in
24 depth principles to that design doesn't appear in the
25 staff guidance.

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1 Now, I'm not saying, this is not
2 realistic, necessarily, because I can't envision
3 somebody coming in with an analog-based system, but
4 they could. My whole point is, you know, why do we
5 necessarily restrict them to digital systems simply
6 because that seems to be the current focus of everyone
7 who's afraid of the software. And I understand the
8 concern with the software. I'm not arguing about the
9 software.

10 But, anyway, we've had --

11 MR. THORP: Your sense is we should treat
12 this in a broader fashion.

13 CHAIRMAN STETKAR: If diversity and
14 defense in depth is a good principle to examine for
15 digital systems, it seems to be a good principle to
16 examine for analog systems. And single failure
17 criteria and redundancy don't satisfy it because
18 that's not diversity.

19 MR. JACKSON: And I think, as John
20 mentioned, that's something the staff is looking at.

21 CHAIRMAN STETKAR: Okay.

22 MR. JACKSON: The current rule package
23 embodies what the current policy is.

24 MR. THORP: You know, you get to a point
25 where you're trying to do an incorporate by reference

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1 and you want to --

2 CHAIRMAN STETKAR: I understand --

3 MR. THORP: -- not diverse too far afield.

4 CHAIRMAN STETKAR: I understand the
5 constraints you're working under.

6 MR. STATTEL: There's probably a few other
7 things that we're not addressing in this rule, too.

8 CHAIRMAN STETKAR: Not too many actually.

9 MR. STATTEL: But we've tried to be fairly
10 comprehensive.

11 MEMBER BROWN: Interestingly enough, I
12 just went back and read all of these, if you just,
13 with the exception of 6I where you have the word
14 digital safety, there's not another mention of digital
15 --

16 CHAIRMAN STETKAR: No, that's right.
17 That's why I hung up on this one.

18 MEMBER BROWN: If you deleted that
19 sentence -- I'm not asking you to. I'm just saying if
20 you did, the words would apply --

21 CHAIRMAN STETKAR: Just delete the
22 digital.

23 MEMBER BROWN: That's what I mean.

24 CHAIRMAN STETKAR: It's just the word.

25 MEMBER BROWN: The words are not -- if you

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1 read every one of your all's --

2 CHAIRMAN STETKAR: But that is, on the
3 other hand, that's a big deletion because that is a
4 fundamental change because, in principle, if somebody
5 does come in with an analog system or if they're going
6 to replace an existing analog system with a new analog
7 system, that could cause --

8 MR. STATTEL: I think what the SRM did, it
9 changed, it really set software aside because it
10 basically said the probability is one and treat it
11 that way. Do your analysis, assume the failure.
12 Don't even argue that it's not going to fail. Assume
13 the failure occurs. And that really does set it apart
14 from the mechanical, electromechanical type devices,
15 how they are treated. And so, anyway, that's what it
16 is.

17 MEMBER BROWN: Okay. Are we done with
18 this one now? Thank you. Okay.

19 MR. STATTEL: So I wasn't going to spend
20 a lot of time on the details of these because I know
21 we've been through these in many previous meetings.
22 But this slide really shows what these four criteria
23 are, and I think you'll recognize them. The first one
24 is demonstrate that vulnerabilities to common-cause
25 failures have been addressed, evaluate to demonstrate

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1 adequate diversity within the safety system for each
2 design basis event in the accident analysis. If a
3 postulated common-cause failure could disable a safety
4 function, which is usually the case in the analysis,
5 then a diverse means which is unlikely to be subject
6 to the same common-cause failure shall be required to
7 perform either the same or a different function. And,
8 finally, a set of displays and controls located in the
9 control room shall be provided for manual system level
10 actuation of the critical safety functions and
11 monitoring of parameters that support safety functions
12 for cases where the manual operator actions are
13 credited.

14 And, basically, we pretty much stuck to
15 what the SRM says. So, I mean, I'm willing to have
16 some discussions about that, but are we going to just
17 move on to the next section?

18 MEMBER BROWN: Anybody else have any other
19 comments? Let's move on.

20 MR. STATTEL: Okay. The final proposed
21 clause pertains to documentation. 50.55a(h)(0)
22 establishes requirements for maintaining documentation
23 to support compliance with (h)(2) through (h)(8)
24 requirements, which are the new conditions that we're
25 imposing here. So, essentially, it just says that

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1 they have to develop and maintain the documentation to
2 support those analysis that are being introduced.

3 A couple words on the alternatives clause.
4 Okay. So one unique aspect of 50.55a is its
5 alternatives clause, which was formally 50.55a(83).
6 And in the proposed version, it's becoming 50.55a(z),
7 which is quoted here on this slide.

8 Normally, when a licensee does not follow
9 regulation, an exemption path must be taken to avoid
10 a violation or enforcement action. The process for
11 taking an exemption from regulatory licensing
12 requirements is covered under 10 CFR 50.11 and 50.12,
13 exceptions and exemptions from licensing requirements.

14 When an applicant does not follow the
15 requirements of 10 CFR 50.55a, however, they can use
16 an alternative approach. Additionally, there's no
17 special circumstances criteria associated with
18 exercising this alternative clause. There are cases
19 in which applicants have proposed alternatives in the
20 past, so we've reviewed several of those. But in the
21 past, the conditions that we describe here were not
22 present.

23 So an example of that would be Oconee
24 actually used the 1998 version of the IEEE 603 in lieu
25 of '91, and we reviewed that as an alternative under

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1 the alternatives clause. In addition, the EPR design,
2 AREVA has proposed to demonstrate that their self
3 neutron detector design is acceptable, even though it
4 does not have the required redundancy needed to meet
5 the independence requirements of IEEE 603, and they're
6 utilizing this alternatives clause. There have also
7 been cases where applicants have proposed an
8 alternative to ASME code, several of those instances.

9 So the proposed rule, in the proposed
10 rule, this clause is not changing. This is not a
11 delta that I'm showing you here. But what's changing
12 here is, in the past, we have not had the conditions.
13 So each of the conditions we went through we had
14 extensive discussions with OGC, so, basically, if an
15 applicant chooses not to adhere to the criteria that's
16 stipulated in the condition, they are allowed to
17 utilize this alternatives clause. And that's just by
18 virtue of the fact that those requirements are located
19 in this incorporate by reference rule.

20 Okay. So I just wanted to make everyone
21 aware of that situation. Any discussion on that?

22 Okay. And, finally, Mike Waterman from
23 the Office of Research will now present --

24 MEMBER BROWN: Before we go on to the
25 1.153 -- that's where you're going, right?

1 MR. STATTEL: Yes.

2 MEMBER BROWN: I just wanted to bring up
3 one other item that we had extensive discussions on in
4 other ones, and that's relative to one of the clauses,
5 5.9, in the IEEE standard which did not change and
6 which you all developed no new conditions. And this,
7 effectively, is relative to controlled access, and the
8 words there apply -- it says, you know, the generation
9 station design has to -- and not in exact words -- has
10 to support the ability to maintain controlled access.
11 So you've got both procedural requirements for
12 operators and anybody who's in the control room to
13 keep people from going down, but the design has to
14 support the ability to maintain that controlled
15 access. And with the new configurations and computer-
16 based systems and networks, all the data coming out is
17 going into a network. The network is feeding the main
18 control room.

19 Hanging out on the network is a little
20 thing called a firewall, which is feeding off, in
21 almost all the designs we've looked at, whether it be
22 the management building or the corporate bus or the
23 internet or whatever you want to call it, that that is
24 a vulnerability that has been introduced which is
25 outside the control of the procedural and that the

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1 existing architectures, we've had to have extensive
2 back and forth to try to get that to be a non-
3 accessible, in other words a one-way hardware-based
4 non-software controlled or actuated or set up device
5 in order to -- in other words, part of the plant
6 design to support controlled access.

7 And I'd say we've been relatively
8 successful in that the designers have -- I'm trying to
9 remember where somebody has not finally given in, but
10 they have incorporated that thought process into their
11 DCDs and/or their proposals. Now, you all have an
12 opportunity now to say why you don't want to do that
13 and make it as part of the rule since it is part of
14 the overall architecture that supports the safe
15 operation and not introduce a new vulnerability.

16 I mean, whether you like it --

17 MR. STATTEL: It is --

18 MEMBER BROWN: Let me finish. The old
19 analog plants, nobody is going to come in via some
20 line somewhere. I mean, people have to go down to the
21 cabinets, take a key, open it up, play with clocks and
22 whatever else they do, even if it was an embedded
23 digital system that didn't communicate anything other
24 than, you know, to no networks and still had to have
25 a guy go down with a laptop, open the cabinets.

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1 Now you don't have that. You have all the
2 control signals and everything else is going in and
3 out through these networks. So you didn't address it.
4 Here's your opportunity --

5 MR. STATTEL: So the clause you're
6 referring to actually predates all of the technology
7 discussion that you mentioned here. The clause
8 intention was, and we did research this, the intention
9 of that clause was essentially, you know, if you put
10 yourself back in the 1970s, they wanted to make sure
11 that the right people had the access to do the things
12 they needed to do. Not the other way around. They
13 weren't thinking about intruders or outside people
14 trying to get access into the plant. They were
15 thinking about is the operator able to get to the
16 points and do the things he needs to do? Is the I&C
17 technician able to get into the system and take the
18 voltage measurements to make sure that the system is
19 operable? So can the operator make operability
20 determinations? Can the maintenance technicians do
21 the required surveillance to ensure operability?
22 That's what that clause was written for, and that was
23 the intent of that clause.

24 And in evaluating this, there's a couple
25 of other issues, and I'll let Terry speak to this, as

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1 well. Redefining that, even though the title of the
2 clause is controlled access, and redefining that
3 intent as far as cybersecurity or, you know,
4 maintaining protective measures against a nefarious
5 attack, it really creates some problems because you're
6 kind of applying an interpretation that was never the
7 intent of that clause.

8 So, now, are those concerns? Yes, they
9 are. The cybersecurity concerns are there. We
10 believe, well, our current policy is that they are
11 addressed elsewhere in terms of programmatic
12 approaches, and that's really why we have the rule,
13 the rule for cybersecurity in 73 --

14 MEMBER BROWN: I'm well aware of that.
15 The point being, though, that that's four or five
16 years after the license and the design is approved and
17 it's open to whatever you want. You make an
18 interesting argument, well, gee, that was what it was
19 before back in the old days. But what are you doing
20 now? The rule and the standard was what it was
21 before, and you have now taken the rule you've
22 incorporated by reference and you say, well, gee, even
23 the new standard doesn't deal with the new technology
24 as well as either the new rule or the old standard;
25 and, therefore, we've taken action to compensate for

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1 that by incorporating conditions to meet the necessity
2 of dealing wit the new technologies. And my point
3 being is that you can say it was there because of the
4 unique nature of having access, but, hold it, I now
5 have a new unique situation and control of access is
6 the same --

7 MR. STATTEL: But we don't want to lose
8 the original intent either.

9 MEMBER BROWN: You don't, depending on --

10 MR. STATTEL: So we apply a couple of
11 different things --

12 MEMBER BROWN: My point being is that you
13 didn't do anything with that.

14 MR. THORP: Right. We purposely did not
15 do anything with that. And I understand this issue
16 has come before the Committee a number of times, and
17 I'll have Terry speak to this in a second, but staff
18 has acknowledged the concern and has identified,
19 essentially, that where we stand right now with the
20 Commission direction is that the cybersecurity reviews
21 that we do are held within a cybersecurity program
22 requirements of 10 CFR 50.73 and using Reg Guide 5.71.
23 Those are ongoing.

24 Although operating reactors are already
25 designed and they are already out there doing their

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1 thing, it's my understanding that staff is going to
2 develop a SECY paper to let the commissioners review
3 this concern and determine whether the Commission
4 wants to direct design-oriented reviews of cyber. So
5 our intent is to proceed forward with this incorporate
6 by reference and see where the other thrust goes with
7 respect to that interpretation that you would like to
8 see for the review of design.

9 Terry, do you have any other comments?

10 MR. JACKSON: Well, I was just going to
11 say one of the challenges we have with this rule and
12 with this standard is that the rule and the standard
13 scope applies to safety systems. And I think the
14 staff takes a great extent of effort to address non-
15 malicious types of ways that could impact the safety
16 system.

17 But part of the challenge is is when we're
18 addressing some things that are kind of outside that
19 scope where you have a non-safety system talking to a
20 non-safety system, then the rule doesn't necessarily
21 apply where the standard does. So that's the
22 challenge that we had with this rulemaking with that
23 particular concern.

24 But I think, as we had mentioned in other
25 Committee members, that we understand the technical

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1 issue and actually have an appreciation for it. So as
2 John mentioned, that's why we feel that we have
3 basically a policy issue that we need to go back to
4 the Commission and say do you want us to address some
5 of these design aspects or some of these kind of cyber
6 aspects in a design review and let them give us a
7 direction then on what they feel that we should be
8 doing.

9 MR. THORP: Right. Rather than us,
10 through manipulations of the incorporate by reference
11 rule, presume to speak for them or to preempt their
12 review and decision-making on this. So that's why
13 we're not going to --

14 MEMBER BROWN: Now, I guess I would argue
15 that you're not preempting anything by limiting
16 communication to one way, regardless of whatever it
17 is. Cyber, the use of that term implies
18 maliciousness. It doesn't necessarily have to be,
19 once you've communicated bi-directionally to a
20 business network, funny things can happen coming back
21 the other way, which are totally non-malicious and
22 inadvertent --

23 MR. THORP: Right. Which is why we have
24 a --

25 MEMBER BROWN: -- which can shut down

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1 everything.

2 MR. THORP: Right. Which is why we have
3 a significant emphasis in our reviews of the security
4 development and operating environment to help identify
5 and ensure that, to the maximum extent practicable,
6 that you don't have means by which non-malicious or
7 other unintentional things occur that essentially
8 create the same problems and the same consequences as
9 a malicious type of problem that's injected. So in
10 some sense, there's some defense in depth in that
11 respect by pursuing the SDOE process that we have in
12 our design reviews for I&C systems.

13 MEMBER BROWN: Yes, but that's how the
14 systems are developed, not necessarily what I'm doing
15 going outside and connecting the network someplace
16 else. Those are down within the reactor trip systems,
17 safeguard systems. Their communications or control
18 system signals coming back doesn't address this path
19 that goes out, which can be non-malicious based on an
20 inadvertent connection. So I just wanted to get your
21 points.

22 MR. STATTEL: I would like to say there's
23 an aspect to this that really differentiates new
24 designs, forward-looking designs, versus the operating
25 plants. The operating plants really aren't doing a

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1 lot of modifications to their I&C systems, right?
2 We've had, like, two major ones in the last six years.
3 But, yet, they have a lot of digital assets in those
4 plants that potentially could be vulnerable, right?

5 So for the operating plants, it makes a
6 lot more sense to address the cybersecurity concerns
7 programmatically through inspections. We require the
8 plants to develop security plans. They identify what
9 their critical assets are. They identify what the
10 potentials are for intrusion, and they address those
11 programmatically because we don't have shots at those.
12 We don't get to do another design review of a system
13 that was designed in 1992 and, yet, it has a security
14 vulnerability.

15 So from the operating reactor perspective,
16 I can say the 73.54 rule does a lot more to address
17 cybersecurity concerns programmatically in those
18 plants because, honestly, I think the more vulnerable
19 systems are the ones that are installed and operating
20 and running in those plants, the digital assets, as
21 opposed to a brand new system that's being designed by
22 today's standards is a lot less vulnerable.

23 MR. THORP: But in piggybacking on what
24 Rich just talked about, for a major digital I&C
25 upgrade like we're seeing at Diablo Canyon, we are and

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1 have been accompanied by and joined by NSIR folks who
2 are reviewing preparations for implementation of the
3 cyber program rule and have come along with us in our
4 audits as we look at this digital I&C upgrade in order
5 to see for themselves what's being done with respect
6 to cyber.

7 So those kinds of things are ongoing.
8 Just a point that I wanted to be sure that that was
9 understood.

10 CHAIRMAN STETKAR: Charlie, let me
11 interject here. We have time marks that we have to
12 hit, and we do have --

13 MEMBER BROWN: We're just about done.

14 CHAIRMAN STETKAR: -- public that are --
15 that's fine. We have three more slides to cover, and
16 we have to hit some time marks here.

17 MEMBER BROWN: Okay. I wanted to get the
18 points out. Mike, do you want to go ahead with your
19 comment, and you'll take care of the public?

20 CHAIRMAN STETKAR: No. I was going to say
21 we do have public interest in the next topic on our
22 agenda, so we need to --

23 MEMBER BROWN: Oh, yes. Mike, it's your
24 turn.

25 CHAIRMAN STETKAR: -- be cognizant of that

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1 time.

2 MR. WATERMAN: This next part of -- this
3 is Mike Waterman. I'm in the Office of Research, and
4 my task was to write a reg guide that accompanied the
5 rule and I was late on that reg guide. And it looked
6 like an onerous task until I realized I could just
7 piggyback on the efforts of all these other people.

8 But Reg Guide 1.153 provides guidance for
9 implementing requirements of the rule. It's a reg
10 guide that -- typically, reg guides endorse standards.
11 So if you looked at the old reg guide, and I'll get
12 into that in a minute, that's essentially what it did.

13 The public and other stakeholders are
14 presented the opportunity to comment on draft federal
15 regulations by responding to Federal Register notices.
16 In the case of 10 CFR 50.55a(h), the current one, the
17 Federal Register Notice is made up of references to
18 standards and the Commission's intent regarding the
19 underlying basis of the regulation. And this
20 information is published in the Federal Register
21 Notice in the discussion section, and the regulation
22 itself is put into the Code of Federal Regulations.

23 The FRN discussion is maintained by the
24 National Archives and Records Administration through
25 the Office of the Federal Register. And the Office of

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1 the Federal Register maintains these Federal Register
2 notices on a 20-year rolling cycle, if you will. When
3 a Federal Register notice is older than 20 years of
4 age, it is transferred over to the Federal Depository
5 Library System. The Federal Depository Library System
6 consists of the Library of Congress, the regional
7 federal libraries, and things like that.

8 So if you have a Federal Register notice
9 that has the Commission's intent and that Federal
10 Register notice is older than 20 years of age, you go
11 off to the Library of Congress if you want to find out
12 what the Commission's intent was, right now the way
13 things are. And why would a Federal Register notice
14 be older than 20 years? Well, the Federal Register
15 notice that went out for incorporating IEEE Standard
16 279-1971 is pretty old. It's older than 20 years.
17 And if you go to the ops of Federal Register now to
18 find out what was the Commission thinking when they
19 put in 279, you're not going to find it there. And it
20 seemed like that was, you know, that was almost a
21 travesty because if you really want to know what the
22 heck does this regulation mean, you can't dig it up
23 anymore, other than going to the congressional library
24 or you could go to a, I believe there's a dot com
25 company, HeinOnline I think is what it's called, dot

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1 com and you can get it from there if you subscribe to
2 them.

3 But what occurred to me is, you know, are
4 they going to be here next year? How about five years
5 from now? Ten years from now? If this rule lasts for
6 20 years, are they going to be here 20 years from now
7 so somebody can actually find out what the heck were
8 we thinking about when we put 603-2009 into the rule?

9 So accompanying that regulation was Reg
10 Guide 1.153 Revision 1. And what 1.153, the current
11 version, now does is it endorses those two standards.
12 It doesn't really endorse them. What it says is that
13 all of you GDC plants and 279 plants, you can use IEEE
14 Standard 603-1991 from now on. It gives them
15 permission to do that. And it also endorsed a couple
16 of other standards. And that's it. It only has about
17 one page of guidance.

18 So what we have is we have a regulatory
19 guide that essentially mirrors the regulation. Not a
20 lot of guidance there. The real guidance, what I
21 consider real guidance, such as statements of
22 consideration and the discussion section of the
23 Federal Register notice, is often the Office of the
24 Federal Register for IEEE Standard 603-1991 or it's
25 often the congressional library for 279.

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1 So the proposed revision to 10 CFR
2 50.55a(h), in addition to IEEE Standard 279-1971 and
3 603-1991, includes 603-2009. Further, where in the
4 proposed 10 CFR 50.55a(h) will reference these
5 standards, regulations have been added to apply
6 additional conditions.

7 Notice to the proposed reg guide will
8 provide the Commission's intent. What we're doing is
9 taking all that discussion section and moving it over
10 into the reg guide verbatim. If, as a result of
11 public comments, we change the regulation, we'll have
12 to change the discussion. When the discussion
13 changes, the reg guide will change. But it will
14 capture pretty much verbatim what is in that
15 discussion section, so it's up in the reg guide. As
16 compared to where we're sitting right now where we're
17 just pointing at a couple of standards, we're now
18 going to have all of that Commission's intent and
19 references to standards up in the reg guide.

20 So that's it. There are advantages to
21 that, and I seem to be missing my -- there are
22 advantages to that.

23 CHAIRMAN STETKAR: You've got 30 seconds,
24 Mike.

25 MR. WATERMAN: This slide is going to

1 summarize some of the advantages. First, because the
2 FRN provides the underlying basis of the regulation in
3 its discussion section, that discussion section is a
4 commitment that the Commission levies on the NRC staff
5 that says, NRC staff, this is what we mean and this is
6 the only way you can interpret this regulation.

7 So by putting it up into the reg guide, we
8 have consistent interpretations between stakeholders
9 and the NRC staff. Everybody is working on the same
10 sheet of music.

11 The NRC website, the reg guide is going
12 onto the NRC public website under the reg guide
13 section. That's the logical place for telling the
14 public what the heck do we mean by this regulation,
15 right? So when somebody comes to the NRC on our
16 website and says I want to see a regulation on 603-
17 2009, 10 CFR 50.55a(h), they look at that regulation,
18 and it would seem logical that they would go what does
19 that mean that they would stay on our website to find
20 out what it means. Right now, what they have to do is
21 they come to the website to get our regulation, but
22 they go to the Office of the Federal Register to find
23 out what we means. So they have to leave our website
24 and go to the Office of the Federal Register, look up
25 the reference, dig out the discussion section out of

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1 there. It just seems like a pretty inefficient way of
2 doing it, especially when it's only going to last
3 there for 20 years.

4 And that 20-year thing, there's no time
5 limit on the availability of our underlying basis when
6 we put it in the reg guide. We have reg guides on our
7 public website now that are over 40 years old. So
8 going this route allows us to maintain control over
9 what the Commission means by that regulation. It just
10 seemed like a logical way to go.

11 MEMBER BROWN: Okay. Thank you, Mike.
12 John, you finished?

13 MR. THORP: I think we are. I'd like to
14 thank the Committee for your good questions and the
15 good discussions that we've had. And if we have any
16 other final questions or discussion, we're prepared to
17 try to address them.

18 MEMBER BROWN: You'll have to deal with
19 John if you have more questions. Okay. I want to
20 thank you all. It was a good discussion. We
21 appreciate it. Very thorough. And I think we've got
22 all the questions answered, and I'll turn it back to
23 you, John.

24 CHAIRMAN STETKAR: One procedural thing.
25 I'd like to ask for if there are any members of the

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1 public in the room who'd like to make any statements,
2 and let's see if we can get the bridgeline open. I
3 don't know if there's anyone out there.

4 While we're doing that, thanks again. You
5 crammed a lot of material into two hours, which is
6 really good. Appreciate it. I appreciate the
7 discussion, too. I mean, you know, we've had a lot of
8 discussion about these topics, as you all know, in
9 this forum and in other forums. So it's good to start
10 focusing down on some closure.

11 Just to help us out, because we're a low-
12 budget operation I have to explain this every time, if
13 there is someone out there on the bridgeline -- I hear
14 a phone ringing, so that means it is open.

15 MR. LEWIS: Hi. My name is Marvin Lewis.

16 CHAIRMAN STETKAR: Hi, Marvin.

17 MR. LEWIS: Yes, I just have a question
18 and it might be an improper time or whatever, but what
19 it is is about the electromagnetic pulse. Now, I
20 don't care whether we're talking electromagnetic pulse
21 coming from a coronal mass ejection on the sun or an
22 electromagnetic pulse because North Korea gets
23 whatever, okay, and sets off a nuclear bomb in the
24 stratosphere.

25 We were talking about electromagnetic

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1 interference and other electromagnetic problems. I
2 was wondering if the nuclear power plants are hardened
3 against an EMT event.

4 CHAIRMAN STETKAR: Okay. Marvin, thanks
5 a lot. In this kind of forum, we actually don't have
6 exchanges with the public, but we do note your
7 comments and your concerns and we'll certainly have an
8 opportunity to get back to you. Make sure that your
9 contact information is available to Christina
10 Antonescu, our staff member. And offline we will
11 reply to you.

12 Any other comments?

13 MR. EPSTEIN: This is Eric Epstein
14 checking in from Three Mile Island. We did file
15 comments in opposition --

16 CHAIRMAN STETKAR: Eric, you're a little
17 bit early. You're in for the Peach Bottom EPU,
18 though; is that correct?

19 MR. EPSTEIN: Yes.

20 CHAIRMAN STETKAR: Okay. Hold off for
21 about 15 minutes because we're just finishing up the
22 first topic on our agenda here.

23 MR. EPSTEIN: I'll just call back.

24 CHAIRMAN STETKAR: Okay. Thanks a lot.
25 We'll be on for Peach Bottom in about 15 minutes. Is

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1 there anyone else on the bridgeline who would like to
2 make a comment relative to the IEEE 6203 -- whatever
3 it is -- 603-2009, 10 CFR 50.55a(h) topic?

4 If not, thank you all. Thanks for the
5 public comments, and we are recessed until 10 minutes
6 to 11.

7 (Whereupon, the above-entitled matter went
8 off the record at 10:35 a.m. and resumed
9 at 10:50 a.m.)

10 CHAIRMAN STETKAR: We are back in session.
11 The next topic on our agenda is the Peach Bottom
12 extended power uprate, and we'll be led through that
13 by Dr. Joy Rempe. Joy, it's yours.

14 MEMBER REMPE: Thank you, Mr. Chairman.
15 Our subcommittee on power uprates reviewed the Peach
16 Bottom Atomic Power Station Units 2 and 3 extended
17 power uprate license amendment request on June 10th,
18 2014. Subcommittee members had the opportunity to
19 review the staff's draft SC, the licensee's power
20 uprate safety analysis report, staff requests for
21 additional information, and the ICC responses. And at
22 this time, I believe that the consensus of our
23 subcommittee is that this EPU application is ready to
24 be forwarded to the full committee for consideration
25 at today's meeting.

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1 Many of the topics that we reviewed during
2 our subcommittee meeting are similar to matters that
3 we reviewed in past EPU's. However, there are two
4 topics that were of special interest to our
5 subcommittee. The first topic is the licensee's
6 decision to implement plant modifications that allow
7 Exelon to eliminate Peach Bottom's current reliance on
8 containment accident pressure and analyses for LOCA,
9 anticipated transients, and Appendix R related special
10 events.

11 The second topic pertains to the approach
12 taken by Exelon to provide confidence in the testing
13 of vibration replacement steam dryers that will be
14 installed at Units 2 and 3.

15 So today we're going to hear presentations
16 on both of these topics and other issues of interest.
17 And as you notice, some of the presentations do
18 contain proprietary information, so part of our
19 session will be a closed session. And at this point,
20 I'd like to turn the meeting over to the staff, and I
21 believe that Ms. Louise Lund will begin the
22 presentations.

23 MS. LUND: Thank you. Good morning,
24 Chairman and ACRS members. My name is Louise Lund,
25 and I'm the Deputy Division Director for the Division

1 of Operating Reactor Licensing in the Office of
2 Nuclear Reactor Regulation. We appreciate the
3 opportunity to brief the ACRS full committee this
4 morning on Peach Bottom Units 2 and 3 extended power
5 uprate application.

6 Today, Exelon and the NRC staff will
7 present selected topics based on feedback from the
8 ACRS during the subcommittee meeting on June 10th.
9 These topics include the plant modifications,
10 elimination of credit for containment accident,
11 pressure and steam dryer analysis.

12 The proposed EPU power level of 3,951
13 megawatts thermal represents an increase of
14 approximately 12.4 percent above the current licensed
15 thermal power level of 3,514 megawatts thermal. Since
16 Peach Bottom had already implemented a 5 percent
17 stretch power uprate in the mid 1990s and a 1.62
18 percent measurement uncertainty uprate in the 2002,
19 the proposed EPU represents an increase of
20 approximately 20 percent above the original licensed
21 thermal power level of 3,293 megawatts thermal.

22 Our review of the proposed EPU for Peach
23 Bottom was completed using the EPU review standard
24 RS001. This review standard has been used for the 17
25 EPU reviews approved since 2005.

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1 There are no open items in the NRC staff's
2 draft safety evaluation. There are also no open
3 licensing actions associated with or linked to this
4 EPU application.

5 Unless there are any questions, I would
6 like to turn it over to Rick Ennis who is the NRC
7 project manager for the Peach Bottom EPU review.

8 MR. ENNIS: Thank you, Louise. Good
9 morning. My name is Rick Ennis. I'm the NRC project
10 manager for Peach Bottom in the Office of Nuclear
11 Reactor Regulation, Division of Operating Reactor
12 Licensing.

13 As Louise mentioned, today you will hear
14 presentations from Exelon and the NRC staff regarding
15 the proposed EPU for Peach Bottom Units 2 and 3. I'll
16 present some background information regarding the NRC
17 staff review, and then I'll discuss the agenda for
18 today's meeting.

19 Exelon submitted the Peach Bottom EPU in
20 September 2012. Following the NRC staff acceptance
21 review of the application and submittal of
22 supplemental information by Exelon in February of
23 2013, the NRC staff accepted the application for
24 detailed review, as documented in a letter dated March
25 8th, 2013.

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1 The NRC's current timeliness goals for
2 EPU's is 18 months after the staff accepts the license
3 amendment application for detailed review. As such,
4 based on the March 8th, 2013 letter, the NRC staff
5 established a forecast review completion date of
6 September 8th, 2014. Completion by this date would
7 support Exelon's implementation of the amendment in
8 the fall 2014 outage for Unit 2. Unit 3 would be
9 implemented during the fall 2015 outage.

10 With respect to the agenda, Exelon will
11 first provide an overview of the plant modifications
12 associated with the EPU, and this overview will
13 include the modifications being made to eliminate the
14 credit for containment accident pressure for the
15 emergency core cooling pumps net positive suction head
16 analyses. Exelon will then discuss the elimination of
17 containment accident pressure in more detail.

18 Following Exelon's presentation, it's my
19 understanding the ACRS will open it up for public
20 comments.

21 MEMBER REMPE: Yes.

22 MR. ENNIS: Okay. And after the public
23 comments, we'll have to go into closed session due to
24 the proprietary nature of the information that will be
25 discussed. And during the closed session, Exelon will

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1 discuss an overview on the replacement steam dryers.
2 That will be followed by an NRC staff presentation
3 regarding our review of the steam dryer analyses.

4 And unless there's any further questions,
5 I'd like to turn it over to Exelon.

6 MEMBER REMPE: Okay, thank you.

7 MR. BORTON: Hi. My name is Kevin Borton.
8 I'm the licensing manager for power uprates for
9 Exelon. This is our agenda for today, just a brief
10 introduction and some background. And as Rick stated,
11 elimination of containment accident pressure and
12 replacement steam dryer during a closed session.

13 Before I get started, I just want to
14 introduce some other people that we brought down with
15 us today to this meeting. My name again, Kevin
16 Borton. I'm the licensing manager. Craig Lambert who
17 is over here to my right, he is our vice president of
18 power uprate. Mike Massaro is our site VP at Peach
19 Bottom. John Rommel next to me here is the power
20 uprate engineering director. Ken Ainger over here on
21 this side is our project manager and director for
22 EPU's. Jim Armstrong here off to my right is our
23 regulatory assurance manager. Dave Henry to my far
24 left here is the senior manager design engineer for
25 Peach Bottom.

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1 And we have folks from operations. Jim
2 Kovalchick. He's been assigned to EPU integration.
3 He's the manager of operations. And Tony Hightower,
4 who's been with the project since its almost very
5 beginning, is our shift supervisor supporting power
6 uprates.

7 I'd like to turn it over now to Mike
8 Massaro.

9 MR. MASSARO: Good morning again. My name
10 is Mike Massaro. I'm the site vice president at Peach
11 Bottom. Some background on Peach Bottom. It's a GE
12 BWR-4 with a Mark I containment, and we got our
13 operating licenses issued in '73 and '74 and they were
14 renewed in 2003 and now carry Unit 2 until 2033 and
15 Unit 3 until 2034.

16 We've already gone over the license power
17 level. Currently, we're at 3,514, and we're proposing
18 an EPU to 3,951 megawatts thermal.

19 Next is an overview, a pictorial overview
20 of some of the modifications going on in the plant.
21 We're tracking approximately 29 modifications to
22 support the EPU implementation on each unit, and I
23 would propose to give you just a brief overview of
24 each of them as we go through, not of every one but
25 the ones that support reliability and plant

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1 operational margin. And if there are questions on any
2 of these, since I just plan to touch on them briefly,
3 please stop me as we go. John will get into more
4 detail about some of the modifications that support
5 CAP elimination.

6 We are replacing our high-pressure turbine
7 replacement. We're doing a high-pressure turbine
8 replacement. This is to support improvement margin on
9 the turbine and accommodate the increase in steam
10 flow. It's essentially a replacement of the rotating
11 element. This will be -- I should mention going into
12 this that Unit 2 has -- both units are on two-year
13 refueling outage cycles. Unit 2 has a refueling
14 outages on even years, so this year will be a Unit 2
15 refueling outage in the fall, in November. Unit 3 has
16 odd years, so next year will be Unit 3 refueling
17 outage.

18 So high-pressure turbine replacement has
19 not been performed on either unit. That will coincide
20 with EPU uprates. So we are planning on performing a
21 high-pressure turbine replacement this outage on Unit
22 2. That would include the rotor and essentially
23 diaphragms inside the existing case.

24 Main generator modifications. This
25 includes replacement of the rotor. We have already

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1 rewound on both the units. The rotor has been
2 replaced on Unit 3 in the last refueling outage, so
3 last year we replaced the rotor on Unit 3 to
4 accommodate EPU. We gained that margin. Along with
5 that, we've also replaced the exciter and the exciter
6 doghouse we call it or enclosure. So those
7 modifications have been completed and give us that
8 additional margin on Unit 3 and have been done
9 successfully.

10 This was also completed on Unit 3 last
11 year, which is essentially just an upgrade of the
12 isophase system. Again, a successful modification.

13 Feedwater heaters. We have completed a
14 study on all the feedwater heaters, looking at things
15 such as tube plugging and wall thinning, and concluded
16 that five feedwater heaters would be suitable for
17 replacement. We've completed two of those on Unit 3
18 last year very successfully. We have one scheduled
19 this year for Unit 2 and the remaining two next year
20 on Unit 3 as we enter in EPU.

21 Reactor feed pump turbine upgrades. This
22 is a replacement of the turbines. We're a three train
23 feed and condensate system, and this will coincide
24 with EPU. So this will be a replacement of the
25 turbine, not the feed pump itself. And that will be

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1 on each of the units, three per unit, again, as we go
2 for EPU. This fall, we'll do the first unit, Unit 2.

3 Next, motor-operated valves. We've
4 completed a review of our motor-operated valve margin.
5 We do that on a regular basis; but, to support EPU, we
6 identified eight valves that require margin
7 improvement, and they will have margin upgrades
8 through the outage and, again, in the next outage for
9 Unit 3. That typically requires a gear change type of
10 modification, which we've completed in the past on
11 other valves very successfully and without incident.

12 We will be adding an additional main steam
13 safety valve on each unit. We currently have two
14 dresser valves. This will add a third dresser valve
15 of same manufacturer at same set point, 1260 psig, by
16 removing a blank flange on the Charlie main steam line
17 and essentially installing the safety valve on that
18 line.

19 Main steam piping. This is new supports
20 and modifications to the main steam piping. We
21 completed this modification on Unit 3 again
22 successfully last outage. We'll implement essentially
23 the same modification on Unit 2, which will be
24 supports both inside and outside the drywell out to
25 the turbine stop valves.

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1 MEMBER BANERJEE: Has the SSV already been
2 installed or will it be installed?

3 MR. MASSARO: The SSV will be installed on
4 Unit 2 this outage as part of the EPU and again on
5 Unit 3 next outage as part of the EPU.

6 MEMBER SKILLMAN: Mike, what clairvoyance
7 allowed that flange to be available to you? Is that
8 just margin from GE on early design? Is that what
9 that was?

10 MR. MASSARO: Evidently, I'm looking
11 around --

12 MEMBER SKILLMAN: That's a curiosity
13 question, not a challenge. I'm just curious.

14 MR. MASSARO: Yes, it was a blank flange.
15 It's been there since initial construction, and we
16 just took the opportunity to use that flange.

17 MEMBER SKILLMAN: You were just taking
18 advantage of it?

19 MR. MASSARO: Yes.

20 MR. ROMMEL: There are several others
21 there, and we just took advantage of this one. Yes.

22 MEMBER SKILLMAN: Thank you. Thanks.

23 MEMBER REMPE: Did I miss -- but what is
24 the designation of the light blue versus the black
25 text in all these slides?

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1 MR. MASSARO: I actually, I had actually
2 intended to, since we had already given the ACRS
3 Subcommittee an overview of these, I thought that I
4 might just go into a couple of these in more detail
5 and kind of touch on the ones --

6 MEMBER REMPE: Okay. I just was curious.

7 MR. MASSARO: It probably didn't work all
8 that well. Reactor water cleanup modifications, we'll
9 be modifying it. We have done some of the
10 modifications. There were essentially five
11 modifications on our reactor water cleanup system.
12 This is to improve efficiency. We completed a portion
13 of those on Unit 3, again without issue. And those
14 will be completed coincident with EPU on Unit 2. They
15 don't have to be done at exactly the same time as EPU,
16 so we're marching through those. Many of those
17 modifications are online modifications.

18 Condensate pump and motor upgrades. Here
19 we are replacing both the condensate pump and motor
20 with higher capacity equipment. The motors will be
21 rated to 5,000 horsepower from the current 4,500, and
22 this is to support increased feed and condensate.
23 They will fit in the existing pump bowls. We expect
24 that to be a pretty direct replacement of similar
25 kind.

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1 Condensate filter demineralizers. We
2 currently have ten per unit condensate filters, if you
3 will. We'll be adding two on each unit of similar
4 capacity, so it will essentially increase the capacity
5 of the demineralizer system by 20 percent.

6 ATWS re-circ pump trip system. This will
7 be essentially moving the current ATWS trip to the
8 drive motor breaker for the MG sets to an interposing
9 breaker that is between the generator and the re-circ
10 pump motor. This is to get more timely trip signal to
11 the re-circ pumps to post down more timely after the
12 initiation of the signal.

13 And, finally, replacement steam dryer. We
14 have not initiated this, obviously, on either unit.
15 This will be done as part of the EPU.

16 The next modifications that are associated
17 specifically with CAP credit elimination, you can see
18 those on the board. John will be talking about those
19 as we go so --

20 MEMBER CORRADINI: Can I take you back to
21 the last slide? I think I understand -- the second to
22 the last one, re-circulation pump trip. So I think I
23 understand why you want to -- does that affect
24 anything else in terms of accident progression that
25 you now have a faster coast down of the circ pump? I

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1 don't remember this one from the subcommittee so I'm
2 . . .

3 MR. DICK: This is Michael Dick with
4 Exelon. Actually, there's two effects, and one is
5 actually a little bit more. The worse effect is is
6 for the LOCA analysis, whereas that, by relocating the
7 trip from the MG set drive motor to the pump motor
8 inlet, actually it causes the coast down to be faster,
9 obviously, which is a worse effect for the LOCA
10 analysis. And we actually took that into account with
11 our analysis that we presented in our license
12 amendment and showed that it had a small effect on
13 large break peak cladding temperature but had no
14 impact on the licensing basis PCT because Peach Bottom
15 is a small break --

16 MEMBER CORRADINI: Right. That's what I
17 remember. Thank you. Thank you very much.

18 MR. MASSARO: All right. With that, John,
19 I'll turn it over and move into CAP credit
20 elimination.

21 MR. ROMMEL: Okay. My name is John
22 Rommel. I am the power uprate engineering director
23 for Exelon, and we're going to spend the next couple
24 of slides just talking about how we eliminated the
25 reliance on containment accident pressure.

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1 As part of our initial strategy for EPU,
2 we looked at and investigated the possibility of
3 eliminating the need for containment accident pressure
4 credit. We considered it an opportunity to improve
5 our margins and effectively remove some concerns that
6 existed in the industry.

7 If you refer to this diagram, you've got
8 the simple equation for MPSH available there. The
9 term in question that we're all looking at is that H
10 atmosphere term that Kevin is pointing to, and our
11 current license will allow to take credit for that,
12 the increase in that during an accident. And what
13 we've done is to eliminate that and keep that at its
14 pre-accident conditions.

15 CAP is credited at Peach Bottom for both
16 accidents and special events. And the maximum amount
17 of CAP credit we took was 6.1 psig. Different events
18 have different amounts, but that was the maximum we
19 took and that was during our large break LOCA in the
20 long-term event.

21 When it was all said and done, we
22 concluded that we had a practical design that was
23 available to eliminate CAP credit at Peach Bottom.
24 Thus, as part of our submittal, we eliminated that.
25 And the next couple of slides, will go through some of

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1 the details on how we got there.

2 There are four key steps in eliminating
3 the CAP credit. Since we had to do it for both
4 special events and accidents, it wasn't a one-shoe-
5 fit-all type of solution, so we had to do different
6 things for different events. And we'll go through
7 that in some detail here.

8 The first step, though, was increasing the
9 RHR heat transfer capability, and we did that via two
10 different methods. One was we put in some cross-ties
11 on the RHR system and the HPSW system, and the second
12 was we increased the allowable heat transfer from our
13 heat exchangers. As part of our test data for our
14 Generic Letter 89-13 program, we saw that the actual
15 filing was less than what we, that we were seeing in
16 the plant was less than what we were considering in
17 our analysis. So we took credit for some of that
18 margin in our analysis.

19 The next step was to reduce the RHR pump
20 flow. This allowed us to increase the -- excuse me --
21 reduce the required MPSH available, required MPSH,
22 without significantly impacting the peak cladding
23 temperature results. As Mike indicated, we're a small
24 break limited plant, and reducing the RHR flow doesn't
25 really impact the small break analysis.

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1 CHAIRMAN STETKAR: John, I didn't have the
2 opportunity to attend the subcommittee meeting. How
3 did you reduce the flow? You just have fixed throttle
4 valves --

5 MR. ROMMEL: Yes, we have some fixed
6 throttle valves. And, actually, in the slide we'll
7 look --

8 CHAIRMAN STETKAR: Okay, okay. Sorry.
9 Never mind.

10 MR. ROMMEL: That's okay. The third step
11 was we had to use the condensation storage tank as a
12 water source during special events. The extra
13 inventory helps reduce the pool temperature, as well
14 as adding extra height to the pool, both of those
15 increasing the available MPSH. We'll go through some
16 several modifications that we did to make that happen.
17 And then the last thing we did was we increased the
18 boron enrichments to 92 percent from about 62 percent.
19 This --

20 MEMBER BANERJEE: Can I just interrupt?

21 MR. ROMMEL: Sure.

22 MEMBER BANERJEE: The K value, is that
23 based on experience in operating the plant now?

24 MR. ROMMEL: Yes, yes. Our Generic Letter
25 89-13 program requires us to go test and verify that

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1 value.

2 MEMBER BANERJEE: And how much of the
3 gain, you said this before but just remind us how much
4 of the gain is coming from this K value being brought
5 in line with your measurements?

6 MR. ROMMEL: Maybe Mike knows the specific
7 answer, but it's part of, it's all part of one piece,
8 it's all part of --

9 MEMBER BANERJEE: Is it 20 percent, 50
10 percent? What is that number?

11 MR. DICK: This is Michael Dick with
12 Exelon. Previous to the EPU analysis, the K value
13 that was used, I believe it's, if I recollect, it's
14 263. And we raised it through the analysis to 305.
15 So, essentially, it's about 20 percent.

16 MEMBER BANERJEE: Twenty percent. Okay.
17 That's a good answer. Thank you.

18 MR. ROMMEL: Okay. So go to the next
19 slide. This slide here just shows how the different
20 actions we took impacted the various event analyses
21 and in-grade into the overall strategy to eliminate
22 the need for containment accident credit.

23 As you can see, the cross-ties for RHR and
24 HPSW are really only for the accidents and that the
25 condensate storage tank actions are really for the

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1 special events. The heat exchanger change and the RHR
2 pump changes are more systematic changes, and they
3 affect all the events.

4 Okay. This slide gives a simple overview
5 of the RHR and HPSW across time modifications. We're
6 going to leave this on this slide as I go through the
7 details up on the screen, so you can see that as we go
8 through the details.

9 One of the big differences at Peach Bottom
10 than some of the rest of the plants is that Peach
11 Bottom has four RHR heat exchangers, two per division.
12 Our original analysis only credited one, so one of the
13 key elements in increasing the heat transfer
14 capability was to figure out a way to use that extra
15 heat exchanger on each division.

16 So if you go through -- okay. To take
17 advantage of the extra heat exchangers, we added a
18 cross-tie, and Kevin can show you there, between the
19 two RHR systems right downstream to the pumps with a
20 normally closed valve, the one in the middle there.
21 The two other valves were just maintenance valves but
22 the normally closed MOV.

23 We also added control valves upstream of
24 the heat exchangers to allow balancing of the flow,
25 and that was answering the question that you had

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1 earlier where you have some throttle valves there that
2 we control the flow with.

3 CHAIRMAN STETKAR: They're controlled, but
4 they're not --

5 MR. ROMMEL: They're control valves.

6 CHAIRMAN STETKAR: -- operator control?
7 Okay.

8 MR. ROMMEL: Okay. And then on HPSW, we
9 added, we upgraded the valve there in the middle that
10 was only used there previously for outage purposes to
11 a valve that can be opened against full flow and pump
12 differential pressure. This allowed the HPSW pump to
13 supply cooling water to the extra heat exchanger. The
14 combined effect of this was to effectively increase
15 the heat transfer capability by, roughly, 65 percent,
16 in addition to the increase in the fouling allowable.

17 With these modifications, along with the
18 reduction in the pump flow and the reduced fouling, we
19 successfully reduced the post-action pool temperature
20 to a point where MPSH available was always greater
21 than MPSH acquired and, thus, effectively eliminating
22 the need for CAP credit for accidents. And this,
23 again, was really just for the accidents more than
24 anything.

25 Okay. If you go to the next slide,

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1 there's a pictorial of the modifications for the
2 condensate storage tank which are really for the
3 special events. First, we added a stand pipe to
4 prevent draining and ensure adequate water level in
5 the CST. Next, key lock switches were installed in
6 the control room to prevent inadvertent valve
7 actuation which could result in swapping from the
8 suction from CST to the suppression pool.

9 MEMBER CORRADINI: Can we just go back?

10 MR. ROMMEL: Sure.

11 MEMBER CORRADINI: I know you guys said
12 this, and now I don't remember. Explain to me the
13 need for the added or the benefit of the added stand
14 pipe? I'm sorry. Can you just remind me?

15 MR. MASSARO: It protects the CST
16 inventory in special events from a drain down from the
17 hot well makeup reject line.

18 MR. ROMMEL: Basically, we elevated it.

19 MEMBER CORRADINI: Well, that I
20 understand, but I'm trying to understand the event
21 that would suck it, that you protect --

22 MR. ROMMEL: Go to that valve. An
23 inadvertent opening of that valve right there.

24 MEMBER CORRADINI: Oh, okay. Thank you.
25 Thank you very much.

1 MR. ROMMEL: Third, we raised the torus
2 high-level set point where swapping the HPSW suction
3 from the CST occurs.

4 MEMBER BANERJEE: But you raised it to get
5 additional head; isn't that it?

6 MR. ROMMEL: No, we raised it so that the
7 swapping, that we stayed on the condensate storage
8 tank for a longer period of time. There is a benefit
9 of extra head, but the real was we wanted to use the
10 condensate storage tank for a longer period of time
11 and not go into a re-circulation mode.

12 MEMBER CORRADINI: You just delay, you
13 just delay the time into re-circulation?

14 MR. ROMMEL: Correct.

15 MEMBER CORRADINI: Okay.

16 MR. ROMMEL: And, finally, we made some
17 procedural guidance changes to allow us to make up to
18 the CST from the refueling water storage tank. This
19 gave us just an added source of water.

20 So all these changes, along with
21 increasing the enrichment of the boron-10 combined
22 with the other RHR changes we talked about previously,
23 resulted, for special events again, MPSH available
24 being greater than MPSH required for all special
25 events. Thus, in conclusion, for all events, both

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1 accidents and special events, we came up with a
2 solution where our available MPSH was always greater
3 than the required. And, therefore, we won't require
4 containment accident pressure credit for Peach Bottom.

5 MEMBER BANERJEE: Could you just go back
6 over this reduction in RHR flow that you alluded to?
7 I figured that was for the special events --

8 MR. ROMMEL: No, no, no, it helps them all
9 for the RHR pump. We reduced the design flow here.
10 Just give me a second. I got the numbers here. We
11 reduced the design flow from 10,000 gpm down to 8,600
12 gpm. What that does is it reduces the required MPSH
13 --

14 MEMBER BANERJEE: Oh, I see. Got it.

15 MR. ROMMEL: Instead of needing this
16 amount, you need less amount to prevent decavitation.
17 Now, since, again, we're essentially a small break
18 limited plant, they really had, this change had lower
19 effect under peak cladding temperature analysis.
20 While it impacted the large-break analysis, it had
21 nowhere to impact our limiting condition.

22 MEMBER REMPE: During our subcommittee
23 meeting, we discussed a little bit about how long it
24 would take for the operators to implement the cross-
25 tie, and could you, for the rest of the full committee

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1 members, just go over that a little bit?

2 VICE CHAIRMAN RAY: And, also, normally,
3 a lock closed valve or something like that is intended
4 to ensure against the effect of a single failure
5 propagating to both trains, for example. I'm
6 completely unfamiliar with this, and I'm just looking
7 at what you're presenting just now. Could you also,
8 she asked about the operator action, but could you
9 also talk about whether there's any implication of
10 that valve now being part of the accident sequence
11 changing the single failure assessment of a system?

12 MR. ROMMEL: I'll let Tony answer both of
13 those questions.

14 MR. HIGHTOWER: This is Tony Hightower,
15 Exelon operations. To answer the single-failure
16 question first, we're making two modifications to the
17 valves. One is the RHR cross-tie valve, and that
18 cross-tie valve operates within an RHR subsystem. So
19 if that RHR subsystem is affected, we rely on the
20 other RHR subsystem for the event.

21 The other aspect to that is that RHR
22 cross-tie valve is only used during an event after
23 which a single failure has already occurred. So our
24 procedural guidance will limit us to using that RHR
25 cross-tie to events that have already included a

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1 failure of a kV bus, an emergency bus, or a diesel
2 generator that supplies --

3 VICE CHAIRMAN RAY: Okay. So that's part
4 of the consideration in opening the valve --

5 MR. HIGHTOWER: Yes.

6 VICE CHAIRMAN RAY: -- is an assessment of
7 whether you're exposing part of the system that was
8 isolated, just something that is inoperable or failed
9 somehow.

10 MR. HIGHTOWER: And we've simplified it to
11 a symptom-based criteria which will require a single
12 failure to have occurred. The approach to the HPSW
13 cross-tie is --

14 CHAIRMAN STETKAR: So just to make sure I
15 understand, that's the RHR cross-tie and that's
16 within, that's within a particular division --

17 MR. HIGHTOWER: Yes.

18 CHAIRMAN STETKAR: -- so you're not
19 talking about interdivisional effects?

20 MR. HIGHTOWER: Yes.

21 CHAIRMAN STETKAR: Okay.

22 MR. HIGHTOWER: The HPSW cross-tie,
23 however, is between, is used between two divisions.
24 And that is also going to be operated only after a
25 single failure, at least one single failure of a

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1 safety-related component.

2 To operate that valve, our procedures will
3 require that a 4 kV bus has failed, an emergency bus
4 has failed, or a diesel has failed. And that also
5 would ensure that a single failure has already
6 occurred. And from a design and licensing analysis
7 perspective, we don't have to assume the second single
8 failure.

9 MR. BORTON: And, Joy, I'll answer your
10 question, too.

11 MEMBER REMPE: Yes, there were some
12 questions, and I tried to recount what I know from
13 what I read, but I think it would be good to have you
14 --

15 MR. BORTON: I provided some information
16 to the staff. So our design, our licensing basis
17 shows that we use CAP credit up to 78 hours.

18 MEMBER REMPE: Oh, that one, yes. That's
19 good, and that's what I have in the letter or the
20 draft letter. But the timing required for the
21 operators to implement this cross-tie, my
22 understanding is that you can get it started in the
23 same amount of time you would have done without the
24 cross-tie, right?

25 MR. HIGHTOWER: Yes. The analysis assumes

1 that we place suppression pool cooling in service
2 early in the event. The analysis assumes that the RHR
3 cross-tie is placed in service following placing
4 suppression pool cooling in service. It assumes that
5 we place torus cooling in service at one hour
6 following initiation of the event. So that makes it
7 feasible for operators. We started work on the
8 procedures, and it's a simple operation consistent
9 with other RHR component manipulations that we already
10 have in our procedures.

11 MEMBER BLEY: Let me, let me push a little
12 bit on the single failure built into the procedures,
13 and it's hard to think fast enough here to get it
14 right. But the thing I'm a little concerned with is,
15 you know, from a licensing point of view, that sounds
16 like the normal thing, thinking about single failures.
17 The real world and your PRA, too, looks at
18 combinations of other failures.

19 I suspect there are combinations of other
20 failures, pumps or things out for maintenance, that
21 could get you in this same spot, such that it would
22 be, you'd need to open this valve. And I'm just
23 wondering if you've shoe-horned yourself in the
24 procedures into requiring specific single failures you
25 thought of ahead of time, rather than giving you the

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1 capability to do this when, functionally, the system
2 needs it to work.

3 MR. HIGHTOWER: And we did look at that as
4 part of our strategy, developing our strategy. And
5 failure of a diesel or a 4 kV bus is what would drive
6 us to need to use that valve. It's --

7 MEMBER BLEY: That's one failure that
8 could lead you to need that valve. You could have
9 others, I suspect. The things that are driven by that
10 diesel could fail themselves. I mean, if we've got a
11 procedure that says, unless the diesel or the bus
12 failed, you don't open that valve, it might not be the
13 best thing for you.

14 MR. HIGHTOWER: The failure that we're
15 looking at where we would need that cross-tie valve is
16 a failure of HPSW pump and a RHR pump concurrently.
17 So it is a certain combination of failures that would
18 require us to have that flexibility. We do have two
19 HPSW pumps and two RHR pumps in each subsystem, so if
20 those combinations of failures haven't occurred we
21 don't need to use a cross-tie. So we did go through
22 a rigorous evaluation of --

23 MEMBER BLEY: So I haven't seen the
24 procedure. Now, if the procedure is linked out to all
25 the combinations you just described, that's probably

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1 good.

2 MR. HIGHTOWER: The procedure is a
3 practical application of the outcome of our evaluation
4 that we did.

5 MEMBER BLEY: Well, in any case, we
6 haven't seen the procedure in detail, so I hope we're
7 not somehow trapping ourselves when the real world
8 gives us a case you didn't lay out inside the
9 procedures.

10 MR. HIGHTOWER: Certainly.

11 VICE CHAIRMAN RAY: But, nevertheless, I
12 want to be on the record saying this is a good thing.

13 MEMBER BLEY: Oh, yes, it's a very good
14 thing.

15 MEMBER SKILLMAN: John, in your
16 discussion, you've used the term "special events" a
17 number of times. Would you explain the difference
18 between accident and special event, please?

19 MR. ROMMEL: Kevin, you can go to the one
20 slide that has the table. That's probably the best
21 way to go through that. So the DBA LOCA and -- the
22 first two columns are DBA LOCA and obviously an
23 accident. The second one is a small steamline break,
24 obviously an accident. And then you have events for
25 Appendix R, which is a fire, ATWS event, and an SBO,

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1 all considered special events. And they have
2 different, obviously different transients that you
3 have to evaluate.

4 So I guess that's the difference between
5 the two. And, you know, we needed to have different
6 solutions to make them work analytically for each one,
7 and that's why the whole series of changes versus just
8 one shoe type fits all.

9 MEMBER SKILLMAN: Okay. Is the term
10 "special event" described in your license, or is that
11 just one that you're using in slang in this
12 discussion, or is that one that has some formality in
13 your documentation?

14 MR. ARMSTRONG: This is Jim Armstrong,
15 regulatory assurance manager at Peach Bottom. Special
16 events are clearly a category in our license. You
17 know, you have accidents and then you have special
18 events that you're required to analyze for, so these
19 are the three special events we're required to
20 analyze.

21 MEMBER SKILLMAN: Thank you.

22 CHAIRMAN STETKAR: John, I'm very quickly
23 trying to find my list, and I can't. Is Peach Bottom
24 converting to NFPA 805 risk-informed fire protection,
25 or are you staying with the Appendix R?

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1 MR. ROMMEL: We're staying with Appendix
2 R.

3 CHAIRMAN STETKAR: Okay, thanks.

4 MEMBER BANERJEE: And you do need to
5 increase the boron for the ATWS?

6 MR. ROMMEL: Correct. We're going to
7 increase it to 92 percent, and it's about 62 percent
8 right now.

9 MEMBER REMPE: Okay. At this point,
10 because of the fact that we have to close the session
11 for proprietary information, we're going to take a
12 break and open up the phone lines and let a member of
13 the public who's requested the opportunity to talk
14 speak. Are the phone lines open so he can speak? Mr.
15 Epstein, can you hear us and can you respond back? Is
16 there anyone --

17 CHAIRMAN STETKAR: I'm sure he can hear
18 us. I doubt that the phone line is actually open.

19 MEMBER REMPE: Okay. I was getting
20 different information --

21 CHAIRMAN STETKAR: We're checking on it
22 now.

23 MEMBER REMPE: But is there anyone in the
24 audience, while we're waiting, that wanted to make a
25 comment? Because this is going to be the only time

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1 for public input during this session. Okay. So we're
2 going to have to just wait for the phone lines then.

3 CHAIRMAN STETKAR: No, we can't go into
4 closed session with the phone line open, and we do
5 need to provide the opportunity for public comments.
6 So we're going to wait. We're on the record here, so
7 just put us off the record so you don't pick up all of
8 the extraneous comments and we'll go back on the
9 record.

10 (Whereupon, the above-entitled matter went
11 off the record at 11:29 a.m. and then
12 resumed at 11:30 a.m.)

13 CHAIRMAN STETKAR: We are now back on the
14 record, and Joy?

15 MEMBER REMPE: Okay. You're good, too?
16 Okay. So, Mr. Epstein, this is your opportunity to
17 provide comments. We have you scheduled for five
18 minutes.

19 MR. EPSTEIN: Okay. Can you hear me?

20 MEMBER REMPE: We can.

21 MR. EPSTEIN: Yes. I guess I'm at a loss
22 here because I filed comments at the subcommittee and
23 have received no feedback or responses. So my comment
24 is threefold. One, has the subcommittee reviewed my
25 comments? Has the Committee reviewed my comments?

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1 And will we be receiving any input to the testimony I
2 delivered?

3 CHAIRMAN STETKAR: Mr. Epstein, the answer
4 to your first comment is -- this is John Stetkar. I'm
5 the chairman of the Committee. The subcommittee does
6 not speak for the Committee. So I'm sure that the
7 subcommittee received your comments, but,
8 unfortunately, that's kind of irrelevant to the
9 current proceedings.

10 The more relevant issue is, yes, indeed,
11 the full Committee did receive your comments. We have
12 them and they will be made part of the record of the
13 proceedings of this meeting. They will be appended to
14 the record of the proceedings.

15 And I've read your comments. I can tell
16 you that the ACRS typically does not address
17 environmental issues. However, because your comments
18 were submitted as part of this meeting, the NRC staff,
19 I'm sure, will review them and address them in the
20 context of the environmental issues associated with
21 the site.

22 So I can give you those assurances. I
23 can't give you an answer to your specific questions
24 because, as I said, we don't do that. A, we don't do
25 that in this forum; and, B, we typically, at the ACRS,

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1 do not become directly involved with environmental
2 issues, which the majority of your comments addressed
3 those environmental issues.

4 MR. EPSTEIN: Well, I guess I would
5 suggest, for future reference, you know, because we
6 spent a lot of time putting the comments together and
7 we made a trip to D.C. So to be told that the
8 comments that I made to the ACRS subcommittee was
9 irrelevant I find deeply --

10 CHAIRMAN STETKAR: They're not irrelevant,
11 sir, except for the fact that the subcommittee does
12 not speak for the ACRS. The subcommittee's function
13 is to gather information for further deliberation by
14 the full committee. The full committee is the
15 operative body; so, therefore, communications with
16 both the public and the NRC Commission.

17 So we certainly appreciate the effort that
18 you've made to both come to Washington and address the
19 subcommittee because we do, in the subcommittee
20 meetings, provide that opportunity for members of the
21 public, and we do take those statements very seriously
22 during the subcommittee meetings. The only problem is
23 the subcommittee cannot speak for the full committee,
24 so that's why you have this opportunity to make oral
25 statements in the full committee meeting so that your

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1 oral statements are on the full committee meeting
2 record. And as I said, your full written comments
3 will be included in the record of this meeting, so
4 they will not be lost.

5 MR. EPSTEIN: Well, let me ask you
6 something just in terms of political mechanics. Are
7 you going to vote today up or down to approve the EPU
8 or what? I mean, because if you're going to get back
9 to me with comments and today you're going to vote one
10 way or the other on the EPU, you know, I'm a little
11 confused on how that works.

12 CHAIRMAN STETKAR: We'll have to be a
13 little bit cognizant of time here. The ACRS does not
14 vote to approve or disapprove the EPU. We simply
15 draft a letter report with our recommendation to the
16 Commission. The Commission will make the final
17 determination.

18 So if the answer to your question is do we
19 plan to write a letter report to the Commission during
20 this meeting, the answer to that question is, yes, we
21 do. I cannot get --

22 MR. EPSTEIN: I don't want to take up any
23 more of your time because, frankly, you know, I just
24 want to state for the record that I would appreciate
25 if the NRC did formally respond to the comments

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1 because it's very disheartening as a member of the
2 public to put that much time and effort into comments
3 not to get a response. And just for your edification,
4 we will be suing at the DEP regarding the company's
5 request for a water quality permit. That's fair play
6 that I apprise you of that.

7 But I guess, I guess this thing I'm still
8 wondering is will the NRC respond to the testimony or
9 will it simply --

10 CHAIRMAN STETKAR: I'll let the staff
11 speak for that right now. As ACRS, I can't guarantee
12 you things one way or the other, but perhaps the staff
13 would like to weigh in.

14 MR. ENNIS: This is Rick Ennis with the
15 NRC staff. Consistent with the guidance for this type
16 of license amendment, the NRC had previously published
17 a draft environmental assessment and finding of no
18 significant impact, which we published in the Federal
19 Register for public comments. We did receive some
20 comments, and we did resolve those comments and issue
21 a final environmental assessment and finding of no
22 significant impact, which we also published in the
23 Federal Register.

24 So as far as this license amendment, we
25 have completed our environmental review. So we

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1 wouldn't, we wouldn't, in the course of this review,
2 address any other environmental comments at this time.

3 CHAIRMAN STETKAR: And we now have that
4 statement on the record of this meeting also.

5 MR. EPSTEIN: Yes, I don't want to waste
6 your time or my time. Gentlemen and gentlewomen, have
7 a great day. Disappointing. But we'll check with you
8 down the road.

9 CHAIRMAN STETKAR: Great. And thank you
10 very much for your comments and your time. We do
11 appreciate that very much.

12 Is there anyone else on the line who would
13 like to make a statement? And as Dr. Rempe mentioned,
14 if you're on the line this is your only opportunity
15 because, from this point forward, we will be closing
16 the line.

17 MEMBER REMPE: Because of proprietary
18 information that will be discussed.

19 CHAIRMAN STETKAR: So hearing nothing, we
20 will close the bridgeline in both directions. And
21 we'll have to change the record. The other thing that
22 I'll ask both the licensee and the staff to confirm
23 that every one in the room is cleared to hear the
24 proprietary information. So staff and licensee, make
25 sure that you know everyone here.

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1 Make sure that we have, the bridgelines
2 are closed.

3 MEMBER REMPE: But while we're in between
4 records, clearly -- right? We're not on either record
5 right now?

6 CHAIRMAN STETKAR: We are.

7 MEMBER REMPE: We are on one or the other
8 records? Okay.

9 CHAIRMAN STETKAR: We have not closed the
10 meeting. As soon as I have confirmation that the
11 bridgeline is closed -- just make sure that we have
12 the bridgeline closed.

13 Just for our purposes, because of the
14 number of people who are identified as being
15 connected, could we ask each person who's on the
16 bridgeline currently to both state your name and your
17 affiliation, please?

18 (PHONE LINE INTRODUCTIONS.)

19 CHAIRMAN STETKAR: Okay. We seem to
20 finally be in a good situation here. We are now
21 entering closed session for the record.

22 (Whereupon, the above-entitled matter went
23 off the record at 11:42 a.m. and then
24 resumed at 2:00 p.m.)

25 CHAIRMAN STETKAR: We are back in session,

1 and the next topic on our agenda is review of the
2 mPower design-specific review standard Chapter 7,
3 instrumentation and control systems. And we'll be led
4 through that topic by Charlie Brown.

5 MEMBER BROWN: Okay. This is kind of a
6 wrap-up session. I mean, we have had a couple of
7 meetings, subcommittee meetings, and they have
8 published this before, this DSRS chapter for public
9 comments. We've seen those and incorporated them. We
10 had another meeting after that, and now they are
11 hoping that we will complete this review today at the
12 full committee and they will be able to pilot this for
13 their first opportunity.

14 So I want to make sure, did you have any
15 opening remarks, or do you want to segue right to Tim?
16 Tim, have at it.

17 MR. MOSSMAN: Thank you. Good afternoon.
18 My name is Tim Mossman. I currently serve in the
19 Office of New Reactors in the Instrumentation and
20 Controls Branch 2, which is led by Ian Jung, who is
21 seated to my right. Also with me today is Joe
22 Ashcraft, who is one of our senior engineers in the
23 branch who has logged a significant amount of time in
24 the development of the Chapter 7 DSRS.

25 Before I begin, I want to note that,

1 previously, the full committee was briefed on DSRS
2 Chapter 7 by Milton Concepcion, who, along with Joe
3 and many of the other I&C staff in our branch, did
4 much of the hard work on this document. Milton has
5 since left the agency for a position in the private
6 sector, but we do appreciate the work that he put in
7 on this product.

8 In addition, I wanted to point out our
9 project management staff from DARR, Division of
10 Advanced Reactors and Rulemaking, who have provided
11 significant support to us in the development of
12 Chapter 7 and helping us coordinate with the other
13 chapters in the DSRS.

14 Also with us today is some of our folks
15 from DCIP, vendor quality, Paul Prescott and Mary
16 Anderson, who have worked on the quality section.

17 Today's agenda is as follows: I wanted to
18 kind of give you a brief overview of what the
19 objectives of Chapter 7 were. I wanted to introduce
20 Section 721 on quality, which was not completed 18
21 months ago when we last briefed the full committee,
22 although it was completed in time to go out in the
23 version that went out for public comment. I wanted to
24 go over the ACRS formal recommendations that we
25 received approximately a year and a half ago, as well

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1 as some other comments that we got recently from the
2 subcommittee in May and how we considered those and
3 then wrap up.

4 Okay. Since we previously briefed Chapter
5 7 of the DSRS to the full committee, we've only
6 included a brief overview of the major changes to the
7 I&C section. The major change to Chapter 7 was to
8 reorganize the SRP content from a system focus to
9 focus on I&C design principles and design attributes
10 in the DSRS. In addition, we took the opportunity to
11 remove redundant staff guidance and non-applicable
12 information. The SRP has a lot of staff guidance for
13 review against IEEE 279, which is very applicable for
14 operating plants but will not be applicable to newer
15 plants or the SMRs.

16 Staff also had a number of lessons learned
17 from other design certification reviews that we
18 attempted to reflect in the guidance. One of the most
19 notable ones resulted in the inclusion of appendices
20 on hazard analysis, systems architecture, and
21 simplicity, which we expect will enable applicants to
22 better communicate their designs to staff, facilitate
23 our review, reduce the number of RAIs, and make this
24 a smoother process.

25 MR. JUNG: I just want to take this

1 opportunity to visually show -- I shared this some
2 time ago. This is the DSRS. Both are double-sided.
3 And this is SRP as it is right now. And removal of
4 redundant and non-applicable information really
5 focused, so all the information here that's applicable
6 to new reactors are incorporated. And, actually, one
7 of the sections has actually a complete matrix that
8 talks about how this was transferred here. That's
9 been scrutinized by the committee, so this is
10 complete.

11 So I just want to highlight from a simple
12 user-friendly staff guidance perspective, this will
13 provide clear mapping areas to look at, which area to
14 look at. Any design or any system related to I&C,
15 just looking at the table of contents will show, oh,
16 I need to address this, I need to work on determining
17 the predictable repeatable behavior.

18 I just want to highlight even a simple
19 restructuring of the guidance, I think we made a
20 significant difference.

21 MEMBER SCHULTZ: And you haven't had a
22 chance to test drive this yet, but have there been
23 tabletop exercises with staff to go through the
24 document to validate what you just told us about ease
25 of use?

1 MR. JUNG: Not quite there yet. We were
2 really hoping to pilot this with mPower. But I think,
3 overall, this has been scrutinized by the applicant,
4 both the mPower, addressed most of their comments, and
5 staff has been working on it. They are trained by
6 being part of the development.

7 So I think they're excited about this.
8 And in addition, as Tim mentioned, to incorporate a
9 better way of doing it, those appendices on the
10 concepts of simplicity, architectural design
11 information, and hazard analysis. Even additional tab
12 is in addition to this here. So I think this will be
13 a great platform that we can continue to build up on
14 our guidance.

15 MEMBER SCHULTZ: We share your excitement,
16 and thank you for the demo.

17 MEMBER BROWN: Let me -- along that line,
18 you said you had talked or NuScale has been involved
19 in looking at this, as well. Have you thought about
20 how you're going to translate this thing that says
21 mPower at the top to say NuScale? And the second part
22 of that question is, aside from the FMR applications,
23 we had mentioned in one of our letters that we ought
24 to be giving some thought to this at even reorganizing
25 what I would call new reactor, like big reactors,

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1 review plan along the same organizational setup. Did
2 you all give anymore thought to that at all, or is it
3 downstream?

4 MR. MOSSMAN: In answer to the two
5 questions, one, we have provided a draft of the, we're
6 working on the draft of the NuScale DSRS Chapter 7,
7 and it will look remarkably similar to the mPower 1 by
8 design. We tried to make the Chapter 7 as common to
9 SMR as possible, so that, eventually, it might get to
10 a point where it's just an SMR DSRS or SMR, SMR SRP or
11 something to that effect.

12 We've talked about applicability to other
13 reactors, and I think, if an applicant came in
14 expressing interest in having us review against the
15 DSRS, we'd have to discuss that. We'd certainly give
16 it serious consideration, but, at this time, I think
17 we're really focused on trying to get it to an SMR
18 review first before we expand it out. But it's
19 something we would consider.

20 MEMBER BROWN: There was an ISG we put
21 together for licensing. I can't remember what the
22 number is. Six, seven, five? And that's structured
23 a little bit relative to this fundamentals approach
24 and what detail will you need. So I'm just trying to
25 think ahead. Whether anybody new is going to come

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1 forward in today's environment and decide they want to
2 design a new reactor is going to be interesting, to
3 say the least. But I just, the fundamental format and
4 the focus on fundamental principles up-front and then
5 identifying details I think is a good way to get a
6 more coherent and integrated view of what somebody is
7 submitting. So, yes --

8 MR. ASHCRAFT: I would just like to add
9 that some of our last signed certifications for the
10 large light waters, they revamped their sections and
11 wanted to add in principles discussions and so forth.
12 So even though we wouldn't use this, this would have,
13 those appendices would help us even in that respect of
14 when they came in.

15 MEMBER REMPE: So when I was reading this,
16 since we're talking about how you're going to apply
17 it, I noticed that it -- well, I know 10 CFR 50.34
18 specifies instrumentation requirements for beyond
19 design basis accidents, and you've accommodated that
20 somewhat in this section. And I'm not quite sure that
21 was one of the thoughts that crossed my mind, so if
22 you could educate me what happened on any plant that's
23 come in for construction permit after '97 and how that
24 was implemented. But if you go into 10 CFR 50.34, it
25 requires that you have instrumentation that would

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1 survive severe accident conditions, and I was
2 wondering how you're going to do that or has it been
3 done? Because where's the cutoff frequency, for
4 example? And you don't do it to a meteor strike or
5 whatever, and how do you do that?

6 MR. JUNG: One of the sections in 7.213
7 has a section on displace and monitoring, and it
8 incorporated the existing guidance regarding
9 Regulatory Guide 1.97, which endorses IEEE 497 with
10 clarifications. So in 497, it talks about the
11 variables for various types of scenarios, manual
12 actions, automatic actions, and variables.

13 The tougher variables we have known to be
14 important. I think many of them are covered. But as
15 you know, because of the post-Fukushima, some action
16 items, because of the timing and because of the ISGs
17 and other guidance being developed, you know, working
18 with them in operating reactors, some of those areas
19 are not specifically covered. So even for some of the
20 COL combined license reviews we are seeing, they're
21 creating separate chapters, Chapter 20, of that
22 nature, to address post-Fukushima items that's
23 encompassing some of the new topics that came from the
24 Fukushima accident.

25 So we didn't want to inject those moving

1 targets in our guidance. This project started just
2 about a year after Fukushima event so --

3 MEMBER REMPE: I understand you don't want
4 to put the details here. I'm just wondering what's in
5 your mind and what you're going to do. Reg Guide
6 1.197 is for design basis conditions, and so there may
7 be other sensors and then what kind of conditions the
8 sensors have to survive. And perhaps it will be a lot
9 easier with the small modular reactors and all, but
10 it's just -- one answer you might have given me is,
11 oh, I'm going to use a risk assessment and we're going
12 to look at, you know, some of the risk dominant events
13 or something. But I just am not sure what you're
14 thinking, and I would be interested in what you're
15 thinking.

16 MR. MOSSMAN: A couple of things. And I
17 think it was kind of what we got from our chairman
18 here at the subcommittee on 7.213 about the tie to the
19 operating experience and the Fukushima orders. And so
20 we did actually put some additional language of the
21 7.213 to make that tie stronger to --

22 MEMBER REMPE: I didn't know you discussed
23 this already.

24 MR. MOSSMAN: And so we attempted to
25 strengthen that tie to make sure that the Fukushima

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1 orders or other relevant operating experience does get
2 reflected and that display is monitoring.

3 In addition, and I'm not our agency expert
4 on IEEE 497 or Reg Guide 1.97, but I talked to our
5 representative to that committee. He said that their
6 next, the next revision to IEEE 497 is going to have
7 expanded guidance on --

8 MEMBER REMPE: I heard that, too.

9 MR. MOSSMAN: -- essentially, beyond
10 design basis events, although I think they're calling
11 it something else. And the way the DSRS is written is
12 we do not endorse a specific version of the IEEE
13 standards that are guidance or the reg guide. It's
14 whatever version is in place six months prior to
15 submission. So as that gets evolved, the DSRS should
16 be able to automatically pick that up if we go ahead
17 and endorse that.

18 CHAIRMAN STETKAR: By the way, one thing
19 in response to some of the things Ian was saying, we
20 just had an opportunity recently at the subcommittee
21 level to see Chapter 20 for one of the new design
22 centers in terms of response to the Fukushima orders,
23 and that chapter was entirely silent on survivability
24 of instrumentation in severe accident. It had a lot
25 to do with designing spent fuel pool level

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1 transmitters until level gets to the top of fuel in
2 the spent fuel pool but was entirely silent on any
3 severe accident type qualification for
4 instrumentation. So it's not going to be resolved in
5 that format for either the currently certified designs
6 or any of the designs that are in the review pipeline,
7 unless things change.

8 MEMBER CORRADINI: If they were to change,
9 where would they change? I'm trying to understand.
10 We're not supposed to care about only technical
11 things, but, from a process standpoint, I'm still
12 confused because what John is speaking about is true,
13 that, basically, it's what you'd expect to be, I want
14 to have level instrumentation, I want it to be of a
15 particular quality and accuracy. But then, after
16 that, it basically is the spent fuel is determining
17 the environmental conditions that they must perform
18 in.

19 So if you're going to go beyond the design
20 base, what process does the staff have to understand
21 what I'm going to specify beyond the design base?

22 CHAIRMAN STETKAR: And that's, I mean, we
23 saw spent fuel, but, more importantly, it's
24 containment parameters, things like temperatures and
25 pressures and what all you might to look at what's

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1 going on inside the containment and what may or may
2 not be left of the core. And it's entirely -- I mean,
3 you know, the Chapter 20 thing, we're entirely silent
4 on that.

5 MEMBER CORRADINI: I was going to say,
6 except for spent fuel and orders in spent fuel level
7 indication, is there anything in terms of Fukushima-
8 related activities that actually suggests any sort of
9 additional instrumentation?

10 MEMBER REMPE: It's reactivity that ACRS
11 . . .

12 MEMBER CORRADINI: Some members of ACRS
13 recommended that.

14 MEMBER REMPE: The committee passed it.

15 MEMBER CORRADINI: Some members
16 recommended that.

17 CHAIRMAN STETKAR: The simple answer is
18 no.

19 MEMBER CORRADINI: I didn't think so
20 because the only reason I'm asking is that, I mean,
21 let's just take something that we know is out there
22 but there is no instrumentation because I have a
23 hydrogen plant. So is there a process by which staff
24 is going to start saying, okay, I must have a
25 thermocouple and a pressure transducer that must

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1 quality to this temperature and pressure and radiation
2 level so that it survives the extreme environment to
3 actually measure something?

4 So my question is, okay, now show me the
5 process that determines the right temperature and
6 pressure and radiation level. That, to me, is tough.

7 MR. CARUSO: Mark Caruso with the staff.
8 I'm trying to pass that -- we have something that
9 might help. I think, you know, this is really an
10 evolving area. We had some discussion of this when
11 talked about Chapter 19 the last time where we have
12 incorporated guidance about our interaction with this
13 group when we look at the severe accident analysis.

14 But I think the most important thing
15 that's happened recently is the Commission has
16 directed the staff and the SRM to modify, when we put
17 in the design certification rule, you know -- there
18 used to be a clause in there that said if there's a
19 changed process for anything that's required for X
20 vessel severe accident mitigation needs to be captured
21 in Tier 1 and this change process applies. Well, they
22 opened that up to all things that would apply to
23 severe accident mitigation and directed the staff to
24 ensure that, when the rule is written, that it
25 accounts for that and to make sure that in their

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1 reviews that the items that are important to those
2 features are captured in Tier 1, which would then open
3 you up to ITAACs and additional review, I mean a
4 review on a level that, say, we did for the BiMAC.

5 So I think this is an evolving area. I
6 think the Committee and subcommittees have been at the
7 forefront of asking these questions because they asked
8 the same kind of things to us. So I think that's what
9 happened there is a significant development in this
10 area because it opens up a door for us in our review
11 through the severe accident analysis and assistance
12 from them to identify features and identify what it
13 takes to make sure these things do what they're
14 supposed to do and to get them captured in Tier 1 of
15 the DCD. So I don't know if that helps or not.

16 MR. ARNDT: As you know --

17 CHAIRMAN STETKAR: Identify yourself.

18 MR. ARNDT: I'm sorry. Steven Arndt from
19 the staff. One of the Tier 3 activities in the post-
20 Fukushima agency activities was to look at severe
21 accident instrumentation at the recommendation of the
22 Committee, and that is an ongoing research project, as
23 you're familiar with the Tier 3 designation.

24 The other activity that Tim mentioned
25 earlier is the revision of the IEEE standard, and that

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1 is, if that includes the kind of instrumentation that
2 we're referring, then that would logically flow into
3 the reg guide and then into the standard review plan.

4 So all of those activities are going along
5 in parallel. How much of it actually gets into a
6 guidance and/or regulation depends a lot on cost
7 benefit analysis, what we find out from the research,
8 and where the technical community goes.

9 MEMBER REMPE: Out of curiosity, what
10 happened with -- we were talking about this the other
11 day, and what happened with AP1000, did it happen
12 before the 10 CFR 34 was passed or was it after? And
13 if it was after, did cost benefit kind of dominate on
14 what was done?

15 MR. ARNDT: I can't speak to that.

16 CHAIRMAN STETKAR: First of all, it's Part
17 50, and AP1000 is Part 52.

18 MEMBER REMPE: CFR 50.34? Is it --

19 CHAIRMAN STETKAR: I just --

20 MEMBER REMPE: -- action. And it says
21 anything that has a construction permit after 1997
22 needs to consider design basis --

23 CHAIRMAN STETKAR: But AP1000 does not
24 have a construction permit. That's the whole point.
25 It's licensed under Part 52.

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1 MEMBER REMPE: Oh, so both of them have to
2 do --

3 CHAIRMAN STETKAR: I'm not sure how. The
4 applicants actually do address the post-TMI issues,
5 but I'm not sure --

6 MEMBER REMPE: Yes, that's what --

7 CHAIRMAN STETKAR: I know they do address
8 those issues in their application, so it's not silent.

9 MR. MAGRUDER: This is Stu Magruder from
10 the staff. I can address your question. Part 52 has
11 a requirement for any new application to address all
12 the TMI requirements, so that's how we get the
13 50.34(f) requirements.

14 MEMBER REMPE: So since you only have one
15 more slide, can I pull the string a little further?

16 MR. MAGRUDER: Of course.

17 MEMBER REMPE: What did they do? Did they
18 do cost benefit, or how did they address it with
19 AP1000 to say we have instrumentation that will
20 survive severe accidents?

21 MR. MAGRUDER: I don't know. I'd have to
22 ask Ian or Joe or somebody about the specifics of I&C,
23 but, from a licensing perspective, that's how we get
24 the --

25 MEMBER REMPE: Yes, I figured it was done,

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1 and I just was curious. And if someone could give me
2 some information later, I'd appreciate it.

3 MR. MAGRUDER: Okay.

4 MEMBER REMPE: Thanks.

5 MEMBER POWERS: You probably just avoided
6 all that Idaho stuff.

7 MEMBER BROWN: You're going to make some
8 other mention of this later in your slides, if I'm not
9 mistaken. I had taken a quick look through, and you
10 do mention a change that was made to 7.213. It's
11 generic in nature, but, yet, it has some comment
12 relative to -- without being specific -- the analysis
13 or what information you expect. So I would suggest
14 you let him grind through the slides, okay? Even
15 though there's only 11 slides and you want to take as
16 much time as you could.

17 All right. Go ahead. You're still on --
18 oh, you've now transitioned to slide four.

19 MR. MOSSMAN: Slide four. As I mentioned,
20 Section 721 of the DSRS, which is entitled "Quality,"
21 it's I&C quality, was under development late in the
22 calendar year 2012 when staff previously briefed this
23 committee. However, this section was completed and
24 included in the DSRS version that was released for
25 public comment, so our public comments did reflect

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1 review of this section.

2 The new section on I&C quality
3 incorporates the review guidance that was contained in
4 the SRP, including the material from BTP 714. One of
5 the driving goals behind developing this section was
6 achieving greater coordination with NRC's vendor
7 quality staff. The regulatory basis for I&C quality
8 are the same as the regulatory basis for quality of
9 other safety-related components in nuclear power
10 plants, specifically 10 CFR 50 Appendix A GDC 1, 10
11 CFR 50 Appendix B, and 10 CFR 50.55a(a)(1).

12 Staff's expectations are that we can
13 achieve a review that is more efficient by leveraging
14 existing staff expertise in quality, that's largely
15 our DCIP folks, while ensuring that the I&C technical
16 staff are able to focus on aspects of quality that may
17 be unique to I&C systems.

18 Next, I was going to walk down the formal
19 recommendations that we received late in 2012 from the
20 full committee. There were four formal
21 recommendations. The first recommendation was fairly
22 straightforward, and this was one of the easiest ones
23 to address, was to release Chapter 7 and we released
24 the entire DSRS for public comment, which we did.

25 Staff received a number of formal comments

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1 from the public on the DSRS. Approximately, 2,000 in
2 total from the public were provided. That was on the
3 entire DSRS, which were considered by the staff. A
4 hundred and nineteen of those comments were directed
5 specifically to Chapter 7. Generation mPower, NEI,
6 and NuScale provided the majority of public comments
7 on Chapter 7 with one comment being submitted from an
8 individual at IAEA.

9 While the majority of the comments were
10 editorial in nature, we did receive approximately
11 three dozen technical comments. Of the technical
12 comments, approximately half of those were just
13 requesting clarification on particular positions or
14 statements in DSRS Chapter 7.

15 We believe we successfully resolved all
16 the comments. We did not consider any of the
17 technical comments to be showstoppers, nor did any of
18 the resulting comment resolutions change our approach
19 to Chapter 7.

20 If there's any particular public comments
21 you have questions about, we're happy to discuss.
22 But, generally, they were fairly benign relative to
23 the direction we're going.

24 MR. JUNG: I'll just note that, after that
25 letter of recommendation we received, the staff

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1 formally responded to it. We are just updating that
2 we have executed the commitments to be made in the
3 response letter. So it was good to go back and read
4 through on what has happened since then.

5 MR. MOSSMAN: Recommendation two is one
6 that Charlie just kind of ghosted a little bit ago.
7 The thought was that the DSRS Chapter 7 may be
8 applicable to more than just the mPower SMR. It may
9 be applicable even up to and including large reactor
10 designs. Staff agreed that it certainly may have
11 applicability beyond the mPower design. We certainly
12 hope it does, given the time and effort we put in on
13 it.

14 However, those opportunities will need to
15 be identified on a case-by-case basis. And right now
16 our primary focus is on getting Chapter 7 a trial run
17 before making any wholesale changes to other I&C
18 review guidance because we want to go through a
19 learning cycle on what we put together.

20 The guidance, ultimately, the guidance
21 very likely will be migrated to another DSRS in the
22 very near future and possibly may be migrated to other
23 guidance documents, as appropriate. So we agreed.

24 The third recommendation had to do with a
25 very specific design implementation to be applied to

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1 reactor designs to comply with control of access.
2 Staff acknowledges the Committee's concern and
3 recognizes that the issue addressed by ACRS
4 Recommendation 3, control of access, has wider
5 equatability that just to the mPower design and its
6 corresponding DSRS.

7 As such, as detailed in the staff's letter
8 to the ACRS dated April 3rd of this year, the staff
9 intends to develop a correspondence to the Commission
10 to seek their guidance on how to proceed with this
11 issue. Staff does not perceive that there's any
12 technical disagreement with the Committee regarding
13 what the Committee wants to accomplish via the
14 recommendation. I think we're in very good agreement
15 with what we want to accomplish.

16 I think the issue is simply where the
17 confirmation of adoption of the appropriate defensive
18 architecture boundaries should occur as to whether it
19 should be via cybersecurity inspections under the
20 cybersecurity program, or do we augment that with
21 review in licensing space with the design
22 certifications. And we will keep ACRS informed as to
23 our progress on this correspondence.

24 MEMBER BROWN: For members and since
25 you've heard all of the dialogue in the previous

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1 meeting this morning, I don't see any sense in
2 grinding through that dialogue again. The issue is
3 the same. The back and forth is, roughly, the same.
4 And we will have to evaluate how we go forward with
5 what they intend.

6 MEMBER CORRADINI: And your opinions are
7 the same?

8 MEMBER BROWN: My thought processes, as
9 coherent and cogent as they are, are still the same,
10 yes.

11 MR. JUNG: I just want to, Member Schultz
12 asked us at the subcommittee meeting. If you look at
13 the slides, staff is developing a SECY paper for more
14 of a, not just that issue, more other, other technical
15 issues. So this is an opportunity just to share. The
16 staff, mPower, DSRS, and some of the rulemaking
17 efforts you've seen this morning, it's sort of looking
18 at what we've seen is the immediate changes to the
19 regulatory framework to address the lessons learned.

20 But we are continuing, the staff has
21 continuously seen new challenges even now. One of the
22 topic is such as embedded digital devices. These
23 digital devices are going into execute features of the
24 safety systems, pumps and valves, MCCs, protection for
25 turbine missile issues. You've seen cases. It's in

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1 bits and pieces, but, I think, for new reactors in
2 particular, we'll probably see a significant, if not
3 most of the mechanical electrical equipment in the
4 future, we expect to see an introduction of these
5 devices. And given the current framework being
6 structured based on traditional protection system, I&C
7 is going to continuously challenge us.

8 So we are looking at those issues and
9 also, recently, there was an issue of -- of course,
10 non-safety systems themselves are also employing a
11 significant number of digital systems where some of
12 the failure modes may result in a plant condition that
13 is not analyzed under safety analysis or it could
14 introduce your secure actuation scenarios or
15 conditions that's beyond the analyzed.

16 So it has become somewhat challenging in
17 those areas. So we are looking at it broadly and
18 looking at not next five years but looking at 15 - 20
19 years. If you don't start now, rulemaking takes about
20 five to ten years. So we are looking at for the
21 future. That's one option. It's an options paper we
22 are developing for the Commission. So at the end, the
23 Commission might say just address this particular
24 issue the ACRS has addressed or it could be look into
25 a more broader setting where the global I&C

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1 instrumentation challenge and some other examples. Is
2 there a way to really take a global leadership and
3 maybe including harmonization? And also we're looking
4 at the 2008 policy statement on reactors. It clearly
5 talks about simplify systems, inherent safety systems,
6 easy to explain to the public, easy to analyze for
7 safety and conformance to the regulations.

8 So we are looking at that as an
9 opportunity, rather than missing this opportunity. So
10 we'll brief the Committee in the future on that
11 aspect, but the staff is working hard to develop a
12 logical SECY paper to the Commission with a certain
13 set of recommendations. It's still in the works. In
14 the next several months, we are working on the paper.

15 MEMBER BROWN: Just before you go to this,
16 just a little bit -- flip back. I didn't use this
17 this morning because we were running out of time, so
18 I will just -- I did receive from another former
19 member, as a matter of fact, who does excellent
20 research a note about a hacker that broke into a
21 control system network for a public utility through
22 their vulnerabilities and their remote access at their
23 utility. He used brute-forcing techniques. In other
24 words, he made attempt after attempt after attempt.
25 Finally got the password. They were compromised.

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1 They were configured for remote access capability that
2 was bi-directional, had passwords and stuff like that,
3 which they lost them. And this came out of Homeland
4 Security, and this ICS, that's industrial control
5 systems, identification noted that tools even as
6 common as Google and other search engines give people
7 who are skilled the ability to go in and find and pull
8 out passwords and other access information in order to
9 do this.

10 So you'll have to understand my reluctance
11 to accept or -- not accept -- to agree that we can
12 take another five years for the SECY paper and SRMs
13 and the constant back and forth of what, you know,
14 legal and everything else that needs to be done when
15 a simple design architecture inclusion in our design
16 documents, which is totally separate from any
17 malicious cyber thought process, just a fundamental
18 design, like you put a diode between the safety system
19 and stuff going somewhere else, is pretty easy to do
20 and doesn't require hordes of PhD theses in order to
21 come to a conclusion.

22 So just bring this particular item up.
23 I've summarized two pages of stuff in about ten
24 sentences to note that. And on the embedded device
25 things, that's another interesting issue, depending on

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1 how those, it was a power supply. The analog systems
2 takes an analog in place of power supply. Those do
3 come now with embedded software in them, and if that
4 embedded software has an external connection that goes
5 into the network, you have no idea what could be done
6 with even something so simple as a power supply.

7 So I just wanted to make you aware that
8 this sleeping dog is not just laying here. I'm
9 speaking about myself. I'm not speaking for the
10 Committee. I'm speaking for myself.

11 MR. MOSSMAN: I completely appreciate
12 where you're coming from, and I think, to the best of
13 our ability as a staff, we have attempted to engage
14 vendors jointly as both, whether it be NRR, NRO, I&C
15 staff, along with the NSIR cyber staff, to give a
16 single message to the vendors about defensive
17 architectures, about what's essentially prescribed
18 that ought to be in there cyber security plan, and if
19 it's not it's not going to get approved, which
20 features a lot of one-way communications.

21 And the message we've tried to give to
22 vendors, and I think they've been very receptive of
23 it, is, even though the cyber provisions apply to
24 licensees, not to vendors, because it's an operational
25 program, the message to vendors is please set your

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1 licensees up for success, not failure, and that if you
2 do the right things in design your licensees will have
3 a much easier time complying with the cyber provisions
4 and making sure that those protections not only are in
5 place in day one but for the life of your facility.

6 And so I think we've gotten pretty good
7 feedback from the vendors from that message, and we've
8 been actively reaching out. We even actually had an
9 agreement or an engagement with a -- a foreign
10 regulator came over, and we actually gave him a joint
11 briefing with the same message.

12 MEMBER BROWN: Well, we've had some
13 success with the designers, over and above the fact
14 there's no requirement, that they have eventually used
15 the word caved and have incorporated that feature in
16 the designs to enable us to at least write a letter
17 that said something.

18 Anyway, I just wanted to bring that up to
19 say, just to let you know that this is really not an
20 abstract and as off the wall as it sounds. That's
21 all. So you can proceed.

22 Oh, I'm sorry. I didn't --

23 MR. CALDWELL: I'm Bob Caldwell. I'm a
24 deputy division director for the Division of
25 Engineering at NRO.

1 MEMBER BROWN: Oh, okay.

2 MR. CALDWELL: And we do understand your
3 concern, and we are going to take it back. And I'm
4 previously from NSIR, so I'm familiar with the
5 situation.

6 MEMBER BROWN: Okay. Thank you very much.
7 And I'm sorry I missed you out there.

8 CHAIRMAN STETKAR: That's what I'm here
9 for.

10 MEMBER BROWN: Are you trying to tell me
11 something? Okay, Tim. Have at it.

12 MR. MOSSMAN: We're in agreement with you.
13 We want to achieve the same thing. So recommendation
14 four had to do with a very particular, a very specific
15 section of Appendix B, which was on system
16 architecture, DSRS Chapter 7 Appendix B which
17 addresses system architecture to augment what kind of
18 diagram should be provided. And so staff agreed in
19 the letter, and we responded about a year and a half
20 ago. We agreed with the recommendation. We did
21 augment item three of the relevant information section
22 of Appendix B. The additional text emphasized that
23 the purpose of providing this information was to
24 facilitate staff review on the fundamental design
25 principles and design attributes in Section 7.1 and

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1 7.2.

2 You can see in the little box at the
3 bottom of the slide, the words in black were the ones
4 that existed when you last looked at the DSRS a year
5 and a half ago. And the new content is in red.

6 MEMBER BROWN: I'm looking at it right
7 now.

8 MR. MOSSMAN: Okay. In addition,
9 Regulatory Guide 1.206, combined license applications
10 for nuclear power plants which contains guidance on
11 development of a complete design certification
12 application, is currently under consideration for
13 revision. The current version was released in 2007.
14 Any revision to Reg Guide 1.206 would also include
15 lessons learned from the development of DSRS Chapter
16 7. And I happen to know a guy who is our point guy on
17 Reg Guide 1.206, so I don't have to go far to make
18 sure those lessons get incorporated.

19 MEMBER BROWN: Okay.

20 MR. MOSSMAN: In addition, as was noted,
21 we briefed the digital I&C subcommittee back in May of
22 this year, and we had a lot of discussions amongst
23 ourselves. Based upon the discussions we had at that
24 meeting, the following were some of the changes we
25 made to, additions that we made to the DSRS Chapter 7

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1 in response to the subcommittee.

2 The one at the top on independence, I
3 believe Chairman Stetkar had noted that there may be
4 possible situations where prior decisions regarding
5 actuation of the safety function may be conditional.
6 And so we added a statement in there that, in the
7 event that there are some conditional priorities, that
8 those should be identified and justified.

9 On the bottom left, 7.213 displays a
10 monitoring. And we augmented that to make sure that
11 we had a stronger tie to the Fukushima-related orders,
12 as well as instructing staff to circle back with the
13 operating experience folks to make sure any relevant
14 recent operating experience is reflected in the staff
15 review of 7.213.

16 And then --

17 MEMBER BROWN: These were in addition to
18 the ones we reviewed during the -- you've added --

19 MR. MOSSMAN: Yes, yes.

20 MEMBER BROWN: Okay. That's what I
21 thought.

22 MR. MOSSMAN: Yes, so these were new since
23 May.

24 MEMBER BROWN: Since May. Okay, thank
25 you. I know we discussed these, and we went over

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1 comments during the meeting?

2 MR. MOSSMAN: Yes, yes.

3 MEMBER BROWN: Okay, got it.

4 MR. JUNG: Just as usual, we went through
5 all of the transcripts.

6 CHAIRMAN STETKAR: By the way, those were
7 not ACRS comments. Those were subcommittee comments.
8 So be careful how you characterize those.

9 MR. MOSSMAN: They were discussions, and
10 we felt there was enough merit to go back and tweak
11 some words.

12 MR. JUNG: I was going to take this
13 opportunity, I was looking at the 7.213 related to
14 Member Rempe's discussion on the -- I assume that she
15 is here.

16 MEMBER REMPE: I thought I'd confuse you
17 and sit over here.

18 MR. JUNG: I'm sorry.

19 MEMBER CORRADINI: You can stay there if
20 it's okay with him.

21 MR. JUNG: I can elaborate a little bit
22 more later, but I think the current section goes
23 through all the sections of the 50.34 section related
24 to variables, including severe accidents. I'm just
25 going to read one section. There are multiple

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1 sections.

2 MEMBER REMPE: Is this from the IEEE
3 standards you're reading or --

4 MR. JUNG: No, that's DSRS.

5 MEMBER REMPE: Okay.

6 MR. JUNG: So it says the reviewer should
7 note that the position regarding 1.97 expands the
8 guidance for type C variables beyond what is stated in
9 IEEE Standard 187. And then it talks about working
10 with the severe accident technical staff and the PRA
11 for assistance in identifying the necessary
12 information. And then the reviewer should consider
13 the following attributes: the variables monitored and
14 range and accuracy of information provided to monitor
15 these variables should conform with the severe
16 accident analysis submitted under, pursuant to 10 CFR
17 Section 52.47(a)(23).

18 The instrumentation provided for
19 monitoring severe accident conditions should be
20 designed to operate in the severe accident environment
21 -- that's what Mr. Stetkar was talking about -- for
22 which it is intended and over the time span for which
23 it is needed.

24 MEMBER CORRADINI: Can you repeat that,
25 please?

1 MR. JUNG: These instrumentations should
2 be designed to operate in the severe accident
3 environment for which it is intended and over the time
4 span for which it is needed.

5 MEMBER CORRADINI: Which instrumentation,
6 though? That's what I --

7 MR. JUNG: These are instruments that
8 include in both accident prior to core damage, as well
9 as post-core damage severe accident conditions.

10 MEMBER CORRADINI: But the instrumentation
11 identified is what I was trying to understand. It
12 can't be all instrumentation --

13 CHAIRMAN STETKAR: Well, the licensee or
14 applicant has to identify what instrumentation is
15 needed.

16 MEMBER CORRADINI: So if they don't
17 identify any, they don't have to qualify any?

18 CHAIRMAN STETKAR: Well, they have to
19 identify post-accident monitoring instrumentation.
20 That's a requirement.

21 MEMBER REMPE: And they'll have to come up
22 with some --

23 CHAIRMAN STETKAR: What particular
24 instruments it is --

25 MEMBER CORRADINI: I mean, we have a

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1 little bit of time, so just to go over the point. I
2 don't remember anything in AP1000 or ESBWR that was
3 identified.

4 CHAIRMAN STETKAR: The ESBWR, there was a
5 lot of discussion. I don't remember how they resolved
6 it. I did a quick check on AP1000, and I think it's
7 really vague and hazy. They refer you back to Chapter
8 19, which is the PRA, and they identify, I think,
9 although I haven't done enough reading here in
10 realtime, instrumentation that's supposed to survive.

11 MEMBER REMPE: I thought they also did
12 some cost benefit analysis --

13 CHAIRMAN STETKAR: That I didn't get far
14 enough. But I --

15 MEMBER REMPE: I was kind of wondering how
16 this was --

17 CHAIRMAN STETKAR: I think, as the designs
18 have, the design reviews have matured, certainly the
19 later ones are identifying that inventory of
20 instrumentation. There's a lot of give and take
21 between the applicant and the staff.

22 MEMBER CORRADINI: So you've seen there
23 was stuff identified?

24 CHAIRMAN STETKAR: I don't know for ESBWR
25 because I know there was quite a bit of discussion in

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1 terms of the staff requesting the list and push back
2 saying we can't identify that list yet because we
3 don't have our I&C system developed and, once we
4 develop the I&C system and the HFE, which is all
5 backed, then we'll provide the instrumentation. But
6 I could be mis-remembering that.

7 MEMBER REMPE: Doesn't there also have to
8 be some SAMGs involved or some sort of --

9 CHAIRMAN STETKAR: But that's all, that's
10 all post -- any procedures are post-COL.

11 MEMBER REMPE: Yes.

12 MR. TANEJA: This is Dinesh Taneja from
13 the I&C. You're correct about the ESBWR being DAC.
14 But we spent considerable time on the USAPWR because
15 they elected to provide us with variables, and we've
16 gone through their EOPs, which are preliminary, and
17 we've talked with them, but we did not get into the
18 SAMG area. That, again, is a Chapter 19 area. But we
19 did, you know, Reg Guide 1.97 is performance based
20 where they have to demonstrate the instruments that
21 they need to mitigate or monitor design basis events.
22 So, you know, we spent quite a bit of time with them
23 in developing that parameter list.

24 MEMBER CORRADINI: But I guess, just to
25 make sure I'm clear about my curiosity, my curiosity

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1 is about something that's either being built or is
2 certified, not to be certified, and to what
3 instruments are identified. So the ESBWR --

4 CHAIRMAN STETKAR: My recollection for
5 ESBWR is it was punted off into DAC space.

6 MEMBER CORRADINI: For AP1000? For
7 AP1000?

8 CHAIRMAN STETKAR: That was before -- I
9 don't remember. I was doing a quick search here, and
10 I don't --

11 MEMBER CORRADINI: I'm kind of curious
12 because I don't remember anything.

13 CHAIRMAN STETKAR: I don't remember a
14 list, and that's why I did a couple of quick searches
15 here and I couldn't find one. But I'm trying to
16 listen to presentations and search at the same time,
17 which means I'm not doing well on either.

18 MR. MOSSMAN: Oh, yes, the last one was
19 the bottom right, seven to eleven on multi-unit
20 stations. Although we didn't anticipate for mPower
21 having shared systems, we added some stronger language
22 in there to consider failures in non-safety systems,
23 and it actually kind of goes to head to other SMR
24 designs we might get that it might be more applicable
25 for. So it may or may not do much for the mPower

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1 review, but it sets us up for --

2 MEMBER BROWN: That's just a stake in the
3 ground.

4 MR. MOSSMAN: It does. Okay. And then
5 one last item, part of the formal recommendation
6 letter that we received 18 months ago had some
7 discussion on lockup conditions, reviewing lockup
8 conditions. And so we just extracted -- this was some
9 verbiage that was already, it's already in the DSRS on
10 7.21 under independence that addresses --

11 MEMBER BROWN: You all had -- this was
12 incorporated in the version we reviewed. I mean, I
13 recognize this.

14 MR. ASHCRAFT: This is Joe Ashcraft. I
15 think why we just put this slide is you had made a
16 comment in the May meeting that, hey, I put the words,
17 you know, and these were some of the words that we
18 didn't find in that previous slide, but they were
19 already -- they're actually in a stronger place in the
20 DSRS.

21 MEMBER BROWN: Okay, all right.

22 MR. MOSSMAN: All right. In summary, we
23 think the DSRS Chapter 7 is ready to be piloted for
24 review of a digital I&C design. We have interacted
25 with numerous stakeholders throughout the process and

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1 have generally gotten very good feedback and positive
2 contributions. We believe we've achieved the
3 objectives we set out to accomplish via this guidance,
4 which would be an accomplishment of a more efficient
5 and effective licensing review, guidance that will
6 support a more efficient and effective licensing
7 review, and we look forward to piloting it.

8 CHAIRMAN STETKAR: I have a question. One
9 issue that you didn't cover in the presentation and
10 one change that was made from the earlier draft that
11 the committee saw and the current version is that
12 you've, in the introduction, you've developed a
13 framework that categorizes SSCs or, in this case,
14 instrumentation and control issues into four
15 categories that are designated as -- A1 is safety-
16 related risk significant; A2 is safety-related non-
17 risk significant; B1 is non-safety related risk
18 significant; and B2 is non-safety related non-risk
19 significant.

20 Those four categories are remarkably the
21 same as categories RISC one through four in 10 CFR
22 50.69, except they're renumbered and renamed. And in
23 particular, A1 is risk one; A2 is risk three; B1 is
24 risk two; and B2 is risk four. So we can't even keep
25 the numbers straight.

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1 So that leads to a point of confusion.
2 But that's not where I'm headed with this. The
3 confusion is confusing, and we ought not to have
4 confusion. But that's -- I can accept being confused.

5 The more important issue is that the
6 guidance now says that a, the highest level of review
7 will be applied to both A1 and A2 categories, which
8 are the safety related, regardless of risk
9 significance. And then let's call it a less stringent
10 review but more stringent than completely non-safety
11 related non-risk significant will be applied to the B1
12 category so that we apply the most stringent review to
13 anything that's given the name safety related,
14 regardless of its risk significance. And then the
15 non-safety related but risk significant issues get
16 enhanced review compared to things that are both non-
17 safety related and non-risk significant.

18 The structure, regardless of the names
19 that we give these things, is good because the intent
20 of the design-specific reviews were to be both design
21 specific and risk informed so that part of this
22 increasing efficiency and focus on the things that are
23 most important to real plant safety for that
24 particular design would achieve the highest attention
25 during the review process.

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1 This doesn't do that. This says that,
2 regardless of the risk significance, if something is
3 given the name safety related, I do a very in-depth
4 review of it. And anything that's not safety related
5 but risk significant gets a lesser review. That
6 doesn't seem consistent, so I'd like you to address
7 that. We had some discussion over this.

8 And the reason I bring it up here is, in
9 the context of digital I&C, it's important. But as a
10 practical matter, this is the first section of the
11 design-specific review standard that's being issued.
12 So at this higher level, in terms of organizing the
13 review and how you think about performing the review,
14 it will be the template that I'm assuming will be
15 followed by all other chapters, whether I'm looking
16 at, you know, pumps and pipes and valves or, you know,
17 whatever.

18 MR. MOSSMAN: We had a lot of discussion
19 about this topic post-subcommittee meeting.

20 CHAIRMAN STETKAR: And that's why you
21 didn't have a slide on it.

22 MR. MOSSMAN: It probably is fertile
23 conversation for an entire session on its own. But I
24 think the one, your one thought at the end, I'm not
25 sure I can speak generically to any of the other

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1 chapters in the DSRS as to how they will address the
2 categorization and how it influences their review.
3 And I think that was one impression that I think
4 afterwards we probably felt folks might have walked
5 away with is that the Chapter 7 is the way it will be
6 treated throughout the rest of the DSRS and not
7 necessarily true.

8 For the I&C section, at this point in
9 time, our regulatory framework and our guidance is not
10 really set up to address relaxation of safety-related
11 items. And at this point in time, heading into the
12 mPower review, I don't know that we anticipated
13 having, I don't know that we can point to an A2 system
14 to even know --

15 CHAIRMAN STETKAR: But categorization is
16 a different issue. At one level, I'm more concerned
17 because I can hear the people who are looking at the
18 Chapter 6 systems, the Chapter 9 systems, the electric
19 power systems, everything else, saying those same
20 words. At this point in time, we're not set up to do
21 this, so we're going to keep status quo. And it was
22 my impression that wasn't the intent of risk-informing
23 and streamlining the, the whole purpose of developing
24 this risk-informed streamline review process for the
25 small modular reactors.

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1 So by you saying that, well, at this point
2 in time, in Chapter 7, we don't know how we would do
3 that, the other chapters are just going to mimic those
4 same words. You know, unfortunately, you're first off
5 the block.

6 MEMBER BLEY: Yes, but, in any case, it
7 seems to, while we haven't written anything for a
8 while on this, but we have written related things, so
9 it's almost a spot for the whole committee but
10 certainly for me. Taking something that's analyzed to
11 be risk significant and giving it less review
12 intentionally makes no sense from a safety point of
13 view to us, or to me for sure. And, you know, you can
14 argue about, well, if it's safety related, we got to
15 do it. Well, that's okay. If you have to, you have
16 to. But to say that you'll take a thing that you know
17 is more important than something else and give it less
18 seems contrary to good practice. It just really does.
19 And that really bothers me quite a bit.

20 And I would hope, I wouldn't hope -- the
21 idea that Chapter 7 doesn't speak for all the other
22 chapters is even more disturbing to me because we
23 ought to be getting consistency throughout this thing.
24 So that's really bothersome. I'm sorry, Mike. I cut
25 you off.

1 MEMBER CORRADINI: Oh, no, no. So I guess
2 I don't appreciate, since I've never been a reviewer,
3 what more or less review means. So explain to me what
4 that means. If I'm a reviewer and I get those
5 directions, what am I supposed to do? Spend ten hours
6 here, eight hours there, six hours there? I'm not
7 sure exactly what that means. Can you help me?

8 MR. JUNG: Member Corradini, that's a
9 generic question that actually all the different
10 disciplines discussed with the projects branch in
11 trying to understand. So I would refer to Stu, if you
12 want to kind of --

13 MEMBER CORRADINI: Because I'm kind of in
14 agreement with what John and Dennis were saying, which
15 is it really kind of seems kind of counterintuitive or
16 maybe even wrong to do it that way. But I'm not sure
17 what that entails, so I have no way of feeling how
18 wrong that might be.

19 MS. STAREFOS: This is Joelle Starefos.
20 From a larger picture, we understand that concern and
21 we've done a lot of work in developing the
22 introduction part two to the SRP to give guidance on
23 what this means to the reviewers and how to actually
24 develop the DSRS.

25 One of the lead PMs on that project is

1 Mike Jones, and he's at the microphone. I'll ask him
2 to just make a few statements on that.

3 MR. JONES: Yes, hi. Just a couple of
4 clarifications, I guess. First, there is a difference
5 in treatment between A1 and A2 in the guidance. A2
6 allows you to start to consider alternative approaches
7 to taking a look at meeting the design requirements,
8 and so A1 is not the same as A2 in the guidance. So
9 if you look at the diagram that's included in the
10 introduction, it gives you a place to start to use a
11 different approach and start to use some risk
12 informing if you think it's appropriate.

13 MEMBER BROWN: Are you talking about the
14 DSRS?

15 MR. JONES: I'm talking about the SRP
16 introduction part two, which is where this risk-
17 informing approach --

18 CHAIRMAN STETKAR: But we're talking
19 specifically here about DSRS, and we were instructed
20 earlier to not confuse that with the SRP because the
21 staff didn't know from one direction how this
22 particular guidance was eventually going to get into
23 the SRP or not. So please don't confuse the Committee
24 by bouncing back and forth between the SRP and this.
25 We're addressing this specific review standard and

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1 guidance.

2 MS. STAREFOS: This is Joelle Starefos.
3 Let me just try to clarify for a moment. The SRP is
4 our standard review plan for all of our normal
5 guidance. In order to do the DSRS and develop it as
6 required or requested by the Commission, we had to
7 develop what we called introduction part two of the
8 standard review plan. That was our avenue to allow
9 all of this DSRS to occur, and that gave us our
10 direction on how we were going to do everything that
11 the Commission had requested during and throughout the
12 SECY paper interactions.

13 So what Mike is sharing is the overall
14 guidance to everyone in allowing this to happen this
15 way --

16 CHAIRMAN STETKAR: I understand that. But
17 I will quote verbatim for the record Section 3A. I'm
18 in Section 7.0. And in this guidance, it says, "For
19 SSCs determined to be safety related and risk
20 significant (A1) and safety related non-risk
21 significant (A2), the level of review will involve
22 detailed analyses and evaluation techniques to satisfy
23 the acceptance criteria contained in the DSRS." It
24 does not differentiate between A1 and A2, regardless
25 to whatever, an introduction to section whatever you

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1 cited in the SRP. This does not follow through on
2 that. So if this is contrary to the intent of the
3 SRP, it is then contrary to the intent of the SRP.

4 MR. JONES: This is Mike Jones again. I
5 understand your comment. I think what the I&C folks
6 are saying is that this differentiation between A1 and
7 A2 is going to be difficult in the realm of I&C SSCs.

8 CHAIRMAN STETKAR: That's a different
9 issue because that says if I look at pump A versus
10 pump B I might not be able to -- that's throwing the
11 individual SSCs or the elements into boxes. If I
12 can't populate box A2, that distinction doesn't change
13 how I think about reviewing box A2 if I could populate
14 it. And this says, if I can populate that box A2, I
15 must treat it the same as box A1. I don't care if box
16 A2 is empty. I don't care. It says I don't, I don't
17 need to care about it.

18 So from a pragmatic sense, if they say
19 that they don't know how you can differentiate between
20 A1 and A2 in the particular context of digital I&C, I
21 can accept that. That's fine. I can accept that.
22 But the guidance should still be set up saying that if
23 you could do that, if some clever, creative applicant
24 comes in and says I've done a very, very detailed
25 analyses and here's my justification for

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1 differentiating between A1 and A2 and if the intent is
2 to provide less stringent review guidance for A2
3 compared to A1, this doesn't do that. So you're
4 essentially precluding or, in some cases, providing a
5 disincentive for somebody to come in and try to do
6 that. Why would I, as an applicant, try to even
7 justify it if I don't think I can get any benefit from
8 it?

9 VICE CHAIRMAN RAY: Well, maybe there is
10 no justification for it.

11 CHAIRMAN STETKAR: That's a different
12 issue.

13 VICE CHAIRMAN RAY: Well, I know that.
14 But they're both in A.

15 MR. CARUSO: Excuse me. This is Mark
16 Caruso from the staff. I feel like I'm hearing
17 fingernails across a blackboard here. And I was
18 heavily involved in developing this process. I guess
19 I'm not, I know that there are some issues with the
20 I&C DSRS on this topic specific to them, and I don't
21 know what they are. I can't really speak to that.

22 But I want you to know that what Mike was
23 saying is we have, we wrote down guidance, general
24 guidance for the development of DSRS in this SRP
25 introduction zero that talks about this whole process

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1 of how the staff should do it. And there it's very
2 clear that the treatment of A1 versus A2, B1, B2, is
3 as you would want to it to be, and it says it in SRP-
4 0. It tells the staff generally. And I know from all
5 the work that's been done on the other DSRs, Chapter
6 9, Chapter 6, chapter whatever, that that is being
7 followed.

8 CHAIRMAN STETKAR: Okay. We haven't seen
9 those.

10 MR. CARUSO: Well, you have not seen
11 those, but I want you to know that the general
12 approach here is not to treat A2 the same as A1. The
13 general approach to the staff is to look for
14 opportunities in A2 because they're not risk
15 significant to find ways to, you know, rely on perhaps
16 operational programs as a basis for showing down the
17 line that something is okay, rather than spending a
18 lot of time reviewing. But, you know, as we've all
19 said, you know, there are a number of things that you
20 have to still do, especially with respect to design.

21 So, anyway, I just wanted to make that
22 clear because I didn't think that was getting through.

23 CHAIRMAN STETKAR: No. And as I said,
24 this is the only chapter that we've seen so far of the
25 DSRs. So it's our only solid frame of reference in

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1 terms of, you know, our state of knowledge at the
2 moment.

3 MR. TANEJA: Just, you know, a little bit
4 of background on this particular introduction section.
5 When we were writing that, Milton Concepcion and I, we
6 had a long discussion on the actual design. Now, if
7 you have a safety-related system, A1, A2, regardless,
8 when we look at the I&C systems we have a safety-
9 related platform and you have a non-safety-related
10 platform, typical designs that we have seen so far.

11 So if I have an A2 system, I would still
12 put that instrument or that system by my safety-
13 related platform. So I really have single treatment
14 of safety-related platform.

15 So, really, it's very difficult for me to
16 distinguish, you know, how I do A1/A2 because I'm
17 using single platform predictor of all safety systems.
18 That's really what the thought process of --

19 MEMBER BROWN: When you say platform, do
20 you mean like the reactor trip system will use a
21 Common Q platform?

22 MR. TANEJA: Correct.

23 MEMBER BROWN: And another ancillary
24 system that feeds that or does whatever is a still
25 safety, it's called safety related, but it uses a

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1 Common Q but it's not as risk significant. Does that
2 -- I'm trying to get, I'm trying to understand your
3 use of the word platform.

4 MR. TANEJA: Platform is like -- let's say
5 we are using Common Q as an example, right? So I have
6 a Common Q platform, four divisions, displays
7 associated with them. Now, if I say post-accident
8 monitoring, it's an indication only. Is it critical,
9 not critical? That's a different issue. But I will
10 be putting those instrument indications on my safety-
11 related displays, not on my non-safety system.

12 So my treatment of that safety-related
13 platform is a single treatment. I'm going to apply
14 the rigorous review criteria to make sure that that
15 platform is a solid fundamentally-safe platform, which
16 will support all my safety-related function in the
17 plant. That was the thought process that went into,
18 and it was very difficult for us to say, when it comes
19 to I&C, how can we, you know, degrade A2s because I'm
20 running it on the same platform. That's why. I just
21 wanted to --

22 MEMBER BROWN: So the pan, the pan is not
23 a safety related --

24 MR. TANEJA: It is safety related.

25 MEMBER BROWN: Oh, okay.

1 MR. TANEJA: But, you know, I don't know
2 if somebody wants to make an argument that it is A2.

3 MEMBER BROWN: It's A2, yes. But it --

4 MR. TANEJA: Yes, but I will still be on
5 that.

6 MEMBER BROWN: It would still be using a
7 Common Q platform for it?

8 MR. TANEJA: Right.

9 CHAIRMAN STETKAR: There's a couple of
10 things here, and, obviously, this is kind of a charged
11 issue. But one is consistency in the guidance
12 throughout the regulatory, all chapters, same basic
13 philosophy. And if the basic philosophy is that one
14 should treat A1 differently from A2, that should be
15 reflected consistently in all chapters.

16 If the population of A2 is zero for
17 whatever reason, that's okay. That's fine, that's
18 fine. There's no problem with that.

19 The other is communications with potential
20 applicants and licensees to say that, if we want to
21 provide incentives for people to use the principles of
22 risk assessment and performance to help streamline the
23 entire review process, we don't necessarily want to
24 provide disincentives by saying, well, look, we've
25 created these four categories, but there's absolutely

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1 no incentive for you to go to try to do this
2 assessment. Maybe somebody can come up with a really
3 clever way of justifying why something in the digital
4 I&C safety-related arena could be an A2. That might
5 be a challenge to them. It might be a challenge to
6 the staff to review it. But we don't necessarily want
7 to preclude that based on our experience to date or
8 some preconceived notions about what might happen in
9 practice or what has happened in practice so far.

10 So that's the other part of the coin is to
11 keep, if we're establishing this framework, let's
12 establish it and make sure that everybody understands
13 what it means.

14 MR. CARUSO: John, Mark Caruso again from
15 the staff. I wanted to say one more thing, and I
16 think it relates to what you just said but more so
17 from your comments in the beginning about the
18 confusion about the boxes being named differently.
19 Remember that this framework that we're talking about
20 is strictly for the staff to use to help organize its
21 review. We are not, in any way, shape, or form,
22 asking applicants to do any kind of bidding of SSCs in
23 boxes. We are not asking applicants to do a de facto
24 5069 assessment. We are only asking applicants to do
25 what they've done in the past, which is, A, categorize

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1 their SSCs as to whether or not they're safety
2 significant in accordance with 50.2 of the
3 regulations; and, B, to have a wrap program and to
4 assess all SSCs with their wrap program and identify
5 a list of SSCs that they consider to be risk
6 significant.

7 We'll take that information, staff will
8 take just that information and it will be the one to
9 see what goes in the boxes. And one of the things
10 that we, when we were first rolling this out and
11 putting it out there, we were meeting with mPower, and
12 they were under the impression that we were asking
13 them to do 5069. So as far as the confusion goes,
14 it's a two-edge sword.

15 CHAIRMAN STETKAR: Yes, I understand that
16 there's some intention there, and that's right. On
17 the other hand, if they voluntarily want to come in
18 and classify those things that way --

19 MR. CARUSO: Sure, if they wanted to. But
20 I --

21 CHAIRMAN STETKAR: Not formally under the
22 5069, but if they want to say, well, we believe that
23 we differentiated even within the safety-related
24 category based on this risk significance, and we would
25 expect from the staff differentiation in the level of,

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1 you know, do I get 37 RAIs because I'm in A1 but only
2 six because I'm in A2, that's up to them.

3 MR. CARUSO: And we've had discussions
4 with at least one vendor about them wanting to do that
5 but with three boxes. So in any case, I was getting
6 the impression that maybe you thought we were asking
7 them to do this kind of bidding, and we're not.

8 MR. MAGRUDER: This is Stu Magruder from
9 the staff, and I want to follow up on this discussion.
10 A couple of take-aways. One is I think we can look
11 again at Chapter 7. I understand now more clearly
12 your point, Dr. Stetkar, and we can look and see if we
13 can write it in such a way that would not preclude
14 somebody from doing it separately. Like you said, if
15 we want to leave it open, if somebody can think of a
16 good way to do it, I think we should be open to it
17 because, you're right, we want to maintain the same
18 philosophy throughout the entire document that there's
19 a --

20 CHAIRMAN STETKAR: And from Mark said, if
21 other chapters already have established that
22 hierarchical philosophy, it seems that it should be
23 reflected consistently. And if you already thought
24 that process through in the SRP section that we can't
25 seem to find --

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1 MEMBER BLEY: I just pulled down SRP 7.0
2 and the SRP introduction, and it ain't in there. So
3 it might be a new version that's not up on the website
4 yet.

5 MR. MAGRUDER: No, it's on the website.
6 I can show you. It's at the very bottom of the page.

7 CHAIRMAN STETKAR: We can do that offline.

8 MR. MAGRUDER: But the other takeaway I
9 have is I think the staff needs to work with the
10 Committee and come back at a future date and go
11 through how we're approaching this categorization for
12 an actual design, whether it's mPower or NuScale, give
13 you some examples, talk about how reviewers are doing
14 things differently, and --

15 CHAIRMAN STETKAR: You know, that would
16 come out, in principle, in the piloting part, but if
17 the pilot is going to be performed sort of within this
18 version of the framework, you won't necessarily
19 challenge that aspect of the piloting under at least
20 Chapter 7. And, again, unfortunately, for many good
21 reasons, Chapter 7 is first off the block because
22 that's obviously, in many cases, the most difficult
23 part of the review, the most complex. It's been the
24 source of many, many concerns in the new reactor
25 licensing and certification process, so it's good to

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1 get this on the table as early as possible. The other
2 chapters might have been easier to assess from a
3 piloting --

4 MEMBER BLEY: I just want to clarify one
5 thing I had said. I can understand, for practical
6 reasons, there might be cases where either you cannot
7 distinguish A1, A2, B1, B2, or, even if you can
8 distinguish it, you would want to apply the same
9 review. That's not what we're talking about. What
10 we're talking about is that structure that's there for
11 those cases where you can distinguish them and would
12 apply a different review, it ought to be consistent
13 with the ideas of safety and risk.

14 MEMBER BROWN: We're going to be writing
15 on a letter on this, so we need to have you to the
16 primary progenitors of this to be on the same page and
17 have an idea of what you want to do when we proceed.
18 I tried to find part two of the introduction with what
19 I had, and I didn't --

20 CHAIRMAN STETKAR: You couldn't find it
21 either.

22 MEMBER BROWN: Well, I didn't go on the
23 internet to find it. I was looking --

24 CHAIRMAN STETKAR: That's okay. We can,
25 I'm sure the staff --

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1 MEMBER BROWN: I have one remaining
2 question. The way this reads in item three on page
3 seven of the introduction, according to what you
4 pointed out, the introduction to NUREG 800,
5 introduction part two describes the licensing review
6 philosophy and framework to be applied by the staff
7 for new IPR and COL applications under Part 52 with
8 the incorporation of risk insight classified as
9 follows, and that's the table. That's in the DSRS
10 introduction item three, page seven.

11 Then it goes on to the next page where it
12 goes 3A, and 3A then, whatever part two says is part
13 two, but now it says specifically for A1 and A2 they
14 will involve detailed analysis, as you said. So I
15 don't know if there's an inconsistency between part
16 two and what it says and what it says here because I
17 don't know what's in part two. That's my concern
18 after listening to the -- is there an inconsistency
19 within the DSRS relative to what part two says,
20 relative to what 3A says, because that literally, as
21 you pointed out, is very specific that they will be
22 detailed and B1 and B2 will be somewhat less detailed
23 because they're non-safety related only. I'm just
24 looking --

25 CHAIRMAN STETKAR: I didn't see an -- you

1 know, when I read those sections, I didn't see that
2 kind of, if you want to consider it a --

3 MEMBER BROWN: Between part two?

4 CHAIRMAN STETKAR: Right.

5 MEMBER BROWN: Well, I don't know that's
6 in part two. I couldn't -- I didn't know what that
7 was.

8 MEMBER BLEY: I just got part two. That's
9 where it's supposed to be.

10 MEMBER BROWN: Okay.

11 CHAIRMAN STETKAR: Anyway, we can do some
12 --

13 MEMBER BROWN: We can look around on that.
14 All right. We'll just have to come to some
15 conclusion. Anything else from anybody else on this
16 issue? Did you want to say something else?

17 MR. JONES: Just one last comment.

18 MEMBER BROWN: Name again just to make
19 sure?

20 MR. JONES: It's Mike Jones.

21 MEMBER BROWN: Okay.

22 MR. JONES: And, again, the use of the
23 methodology that's in the new part two introduction
24 gives each reviewer and each group and each discipline
25 a tool to risk-inform their particular review. And so

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1 if, in fact, I&C has taken a look at this and said
2 we've taken that opportunity and we don't see a
3 practical way to implement that, they've, in essence,
4 done what they could do under the new methodology.

5 CHAIRMAN STETKAR: And I think I'll just
6 speak for myself because that's all I can speak for.
7 I wouldn't have a problem with that if it was
8 presented that way. We recognize the framework and,
9 for practical reasons, in this particular area, we
10 don't feel that we can distinguish between A1 and A2.
11 It's not a problem.

12 MR. JONES: So it may just be a language
13 issue here. I think they've done their best to try
14 and apply the general guidance, which is consistent
15 with what you were looking for. Maybe we have to
16 dress it up better.

17 But the last thing is the whole
18 methodology here, the whole use of DSRs and this
19 conformed methodology, is optional. Nobody is
20 required to do this. Applicants are not required to
21 use it. They can -- use Westinghouse, for example.
22 They may say we don't want application engagement.

23 CHAIRMAN STETKAR: That's fine. I mean,
24 that's their decision. The staff then performs the
25 review based on however the applicant wants to submit

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1 their application. But if there are applicants who
2 are interested in heading down this pathway, you know,
3 I think, collectively, we need to be sensitive to that
4 notion and make sure that we apply it consistently and
5 that we don't somehow provide disincentives to that
6 whole process.

7 MR. JONES: One last comment. Whether you
8 apply this or not, the acceptance criteria for the
9 SSCs don't change. It's giving you a different method
10 to decide whether you've satisfied the criteria or
11 not, but the acceptance criteria themselves don't
12 change.

13 MEMBER BLEY: I'm going to toss in a last
14 thing on this, too. I did get a chance to look at
15 part two. I can't find the words in the text yet, but
16 the picture and the words on it, if we're consistent
17 with that, I'd be much happier than I am with what I
18 read. But I've got to look at it some more. That's
19 the first look.

20 MEMBER BROWN: Okay. Are you ready for
21 your summary page? Did we finish with that?

22 CHAIRMAN STETKAR: I let them get through
23 with everything before -- I was looking at this slide
24 when I brought up the topic.

25 MEMBER BROWN: John, in spite of the fact

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1 that we started 15 minutes late, I am turning this
2 back over to you 20 minutes early. That is management
3 of the first degree. I'm expecting some action in
4 return.

5 CHAIRMAN STETKAR: I'm eternally thankful.
6 Do we have, by the way, because we have to do this,
7 any one in the room who'd like to, members of the
8 public in the room who'd like to make a comment? And,
9 Christina, if we can get the bridgeline open, if
10 there's anyone out there who would like to say
11 anything. I think we may be open. If there is anyone
12 out on the bridgeline, just do us a favor and say
13 hello or utter some words so we know that it's open.
14 Is there anyone out there?

15 PARTICIPANT: Yes.

16 CHAIRMAN STETKAR: Thank you very much.
17 Trust me, if you've not gone through this process, we
18 have no way of knowing that the bridgeline is open in
19 this direction without someone saying something. Now,
20 given the fact we know it's open, is there any member
21 of the public or anyone else on the bridgeline who
22 would like to make a comment?

23 PARTICIPANT: Nothing here.

24 CHAIRMAN STETKAR: Thank you very much.
25 Hearing nothing, thanks very much to staff. You've

1 covered the material, and I think we had a fruitful
2 discussion. And with that, we are in recess until --
3 come back at ten minutes to four. I'll give you 20
4 minutes, but we have a lot of things to cover.

5 (Whereupon, the above-entitled matter went
6 off the record at 3:27 p.m.)

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Rulemaking for 10 CFR 50.55a

Incorporation by Reference of Institute of Electrical and Electronics Engineers Standard 603-2009



Presented by: IEEE Std. 603 Rulemaking Working Group

John Thorp (NRR)
Richard Stattel (NRR)
Michael Waterman (RES)
Terry Jackson (NRO)



Agenda

- **Describe Reasons for this Rulemaking Activity**
- **Describe changes made to IEEE Std. 603**
- **Describe Proposed Changes to Regulation**
 - Incorporate new version of IEEE 603 2009 by reference into 10 CFR 50.55a.
 - Make changes to applicability of the standard
 - Impose new conditions on the use of IEEE 603
- **Discuss Draft Reg. Guide to update RG 1.153 which is being issued concurrently with this rule**



Reasons for Changing the Rule





Reasons for this Rulemaking Activity

- **The current IBR Standard IEEE 603-1991 has become out of date:**
 - It does not address the introduction of digital technologies such as FPGA based systems into I&C safety systems
 - It does not address certain design concepts that have been made possible with digital technologies:
 - Data Communications
 - System Self Diagnostics
 - Integration of systems
 - Consolidation of Functions
- **Newer I&C systems are being designed and built to the newer versions of the standard.**
 - New I&C systems are designed to 1998 standard
 - Alternative Standard Evaluations required for license submittals
- **There has been much discussion between the NRC staff and applicants over the existing applicability statements (Clarification of applicability is needed)**



Objectives of Rulemaking Activity

- **The proposed rule would update the current NRC regulations to include the most recently promulgated version of IEEE Std 603-2009**

“Criteria for Safety Systems for Nuclear Generating Stations”

- **Define the conditions which would allow existing licensees to replace plant equipment while maintaining existing licensing basis.**
- **Defines the conditions for which existing permit, license, certificate, standard design, and standard design approvals would be required to address the new standard in modifications and applications.**
- **Imposes conditions upon the use of IEEE 603-2009 in the areas of system integrity, diversity and defense-in-depth analyses, independence, maintenance bypass, and maintenance of records.**



What Changed in the Standard

The new version of the standard:

1. Addresses potential safety issues that might arise from incorporating components using advanced technologies in safety systems.
2. Contains additional and updated references and eliminates references that are no longer in effect.
3. Provides added guidance to address electromagnetic compatibility issues for I&C safety systems.
4. Adds new criteria to address the potential for common cause failures
5. Adds classification requirements for equipment not credited to perform a safety function but connected to safety-related equipment
6. Removes a requirement in section 6.7, "Maintenance bypass," for meeting the single failure criterion during maintenance activities
7. Adds a specific requirement for electrical isolation and digital communication independence between safety systems and non-safety systems



What Changed in the Standard

The new version of the standard:

1. Addresses potential safety issues that might arise from incorporating components using advanced technologies in safety systems.

Sections affected:

Definitions – Expanded the definition for “Component” to include non-hardware based system components such as software, and firmware.

Multiple references to IEEE 7-4.3.2 added to address computer and digital technology based systems. (5.3, 5.4, 5.5, 5.6.4, & 5.15)



What Changed in the Standard

The new version of the standard:

2. Contains additional and updated references and eliminates references that are no longer in effect.

Sections Affected:

Entire Standard. It is normal practice for IEEE to completely update all references within a standard as a part of the revision process.

The NRC endorses many of these referenced standards through its Regulatory Guidance documents. We therefore rely upon updates to these Reg. Guides to address standard updates.



What Changed in the Standard

The new version of the standard:

3. Provides added guidance to address electromagnetic compatibility issues for I&C safety systems.

Sections Affected:

Informative Annex B was added to the IEEE Std. 603 standard during the 1998 revision.

Section 4 “Safety System Design Basis” Item “g” includes a foot note which refers to the new EMC annex.



What Changed in the Standard

The new version of the standard:

4. Adds new criteria to address the potential for common cause failures

Sections Affected:

- 5.16 – Common-cause failure criteria – This new clause was added to the standard. It refers to IEEE Std. 7-4.3.2.



What Changed in the Standard

The new version of the standard:

5. Adds classification requirements for equipment not credited to perform a safety function but connected to safety-related equipment

Sections Affected:

5.6.3.1 Interconnected equipment – (Subsection of Independence Criteria)



What Changed in the Standard

The new version of the standard:

6. Removes a requirement in section 6.7, “Maintenance bypass,” for meeting the single failure criterion during maintenance activities

Sections Affected:

Section 6.7 – Maintenance Bypass - Establishes performance criteria for situations requiring systems or portions of systems to be placed in a bypass state.



EXCEPTION Clause of Section 6.7

Maintenance Bypass (in Clause 6.7 of IEEE Std. 603-1991) Capability of a safety system to accomplish its safety function shall be retained while sense and command features equipment is in maintenance bypass. During such operation, the sense and command features **shall** continue to meet the requirements of 5.1 and 6.3.

EXCEPTION: One-out-of-two portions of the sense and command features are not required to meet 5.1 and 6.3 when one portion is rendered inoperable, provided that acceptable reliability of equipment operation is otherwise demonstrated (that is, that the period allowed for removal from service for maintenance bypass is sufficiently short to have no significantly detrimental effect on overall sense and command features availability).



EXCEPTION Clause of Section 6.7

Maintenance Bypass (in Clause 6.7 of IEEE Std. 603-2009) Capability of a safety system to accomplish its safety function shall be retained while sense and command features equipment is in maintenance bypass. During such operation, the sense and command features **should** continue to meet the requirements of 5.1 and 6.3.

NOTE: For portions of the sense and command features that cannot meet the requirements of 5.1 and 6.3 when in maintenance bypass, acceptable reliability of equipment operation shall be demonstrated (e.g., that the period allowed for removal from service for maintenance bypass is sufficiently short, or additional measures are taken, or both, to ensure there is no significant detrimental effect on overall sense and command feature availability).



What Changed in the Standard

The new version of the standard:

7. Adds a specific requirement for electrical isolation and digital communication independence between safety systems and non-safety systems

Sections Affected:

5.6.3.1 – Interconnected Equipment – Added the following sentence:

“Isolation devices shall ensure electrical isolation and digital communication independence.”

5.6.4 – Detailed Criteria – Added reference to IEEE 7-4.3.2 for criteria on separation and isolation of data processing functions of interconnected computers.



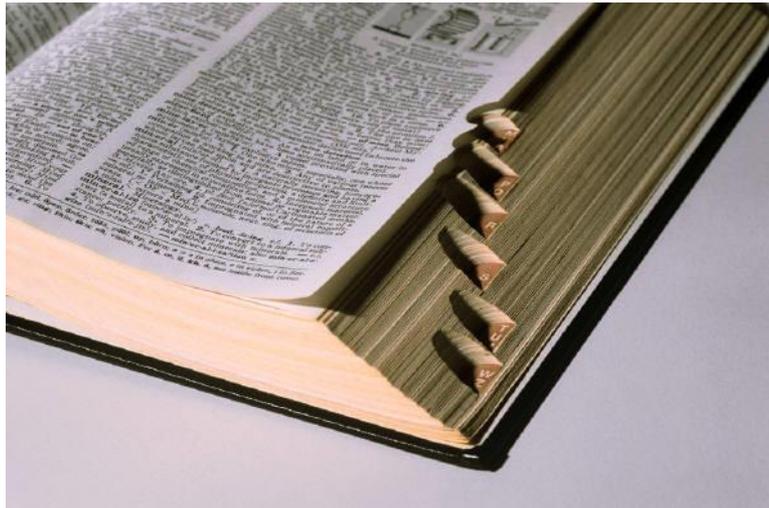
What is Changing in the Regulations

The proposed Rule:

1. Provides definitions for several terms used in various standards and within the proposed regulation.
2. Establishes conditions for applicability of the new and previously incorporated versions of the standard.
3. Imposes several conditions for the use of IEEE Std. 603 2009.
4. Retains the incorporation by reference for IEEE Std. 279-1971, IEEE Std. 603-1991, and the IEEE Std. 603-1991 correction sheet dated January 30, 1995.



New Definitions





Definitions Provided in FRN

1. Terms Defined in FRN

- Protection System / Safety System
- Best Estimate
- ***Current Reactors***
- ***Data Communication***
- Defense-in-depth
- Diversity
- Function / Functionality
- ***Hardwired Connections***
- ***New Reactors***
- ***Physical Mechanism***
- ***Predictable***
- ***Repeatable***
- ***Safety Benefit***
- Safety Function
- Safety System Function
- ***Signal Sharing***
- ***Support(s) the Safety Function***



What is Changing in the Regulations

2. Establishes conditions for applicability of the new and previously incorporated versions of the standard.

Construction Permit, Standard Design Certification, Combined License, or Manufacturing License Issue Date	10 CFR 50.55a(h)(2) Paragraph	Standard Applicability ¹
Nuclear power plant construction permits issued before January 1, 1971	(h)(2)(i)	Licensing Basis IEEE Std 603-1991 ²
Nuclear power plant construction permits issued on or after January 1, 1971 and before May 13, 1999	(h)(2)(ii)	IEEE Std 279-1971 IEEE Std 603-1991
Standard design certifications issued before May 13, 1999	(h)(2)(iii)	IEEE Std 279-1971
Standard design certifications issued on or after May 13, 1999, but before 30 days after [THE EFFECTIVE DATE OF THE RULE]	(h)(2)(iv)	IEEE Std 603-1991
Standard design certifications issued 30 days after [THE EFFECTIVE DATE OF THE RULE]	(h)(2)(v)	IEEE Std 603-2009
Applications submitted 30 days after [EFFECTIVE DATE OF THIS RULE] for nuclear power plant construction permits and operating licenses under 10 CFR part 50.	(h)(2)(vi)	
Nuclear power plant combined licenses and manufacturing licenses under 10 CFR part 52 issued 30 days after [THE EFFECTIVE DATE OF THE RULE]	(h)(2)(vii) Referenced SDC ³ issued before 30 days after [THE EFFECTIVE DATE OF THE RULE]	IEEE Std 279-1971 IEEE Std 603-1991
	(h)(2)(vii) Referenced SDC ³ issued 30 days after [THE EFFECTIVE DATE OF THE RULE]	IEEE Std 603-2009



Examples of modifications and replacements of components, functions, and systems

Example	Modification or Replacement Example	Was Functionality, Technology, Independence strategy, or Diversity strategy changed?				Applicable Standard
		F	T	I	D	
1	Power supply replaced in one power train division	N	N	N	N	Licensing Basis Standard
2	Pressure measurement instrumentation replaced with new pressure measurement instrumentation in all four channels of the protection system	N	N	N	N	
3	DNBR safety function replaced with improved DNBR safety function	N	N	N	N	
4	Added functionality to DNBR safety function to allow manual selection of one of four channels of input data for each DNBR channel	Y	N	Y	N	IEEE Std 603-2009 (subject to the conditions in paragraph (h)(4) through (h)(7))
5	Modified a protection system with components based on a different technology	N	Y	N	N	
6	Modified channels or divisions such that independence was changed	N	N	Y	N	
7	Modified a safety function such that protection system diversity strategy was changed	Y	N	N	Y	



What is Changing in the Regulations

3. Imposes several conditions for the use of IEEE 603 2009.

Regulations Affected:

50.55a(h)(4) – Amplify “System Integrity” requirements

50.55a(h)(5) – Amplify “Independence” requirements

50.55a(h)(6) – Amplify requirements for “Common Cause Failure”

50.55a(h)(7) – Correct reference, “Checking Operational Availability.”

50.55a(h)(8) – Clarify requirements for use of “Maintenance Bypass”

50.55a(h)(9) – Provide requirement for “documentation”



System Integrity

50.55a(h)(4) – Amplify “System Integrity” requirements

Applicable Section of IEEE 603:

Section 5.5 “System Integrity”

New requirement added:

In order to assure the integrity and reliable operation of safety systems, safety functions shall be designed to operate in a predictable and repeatable manner.



Independence





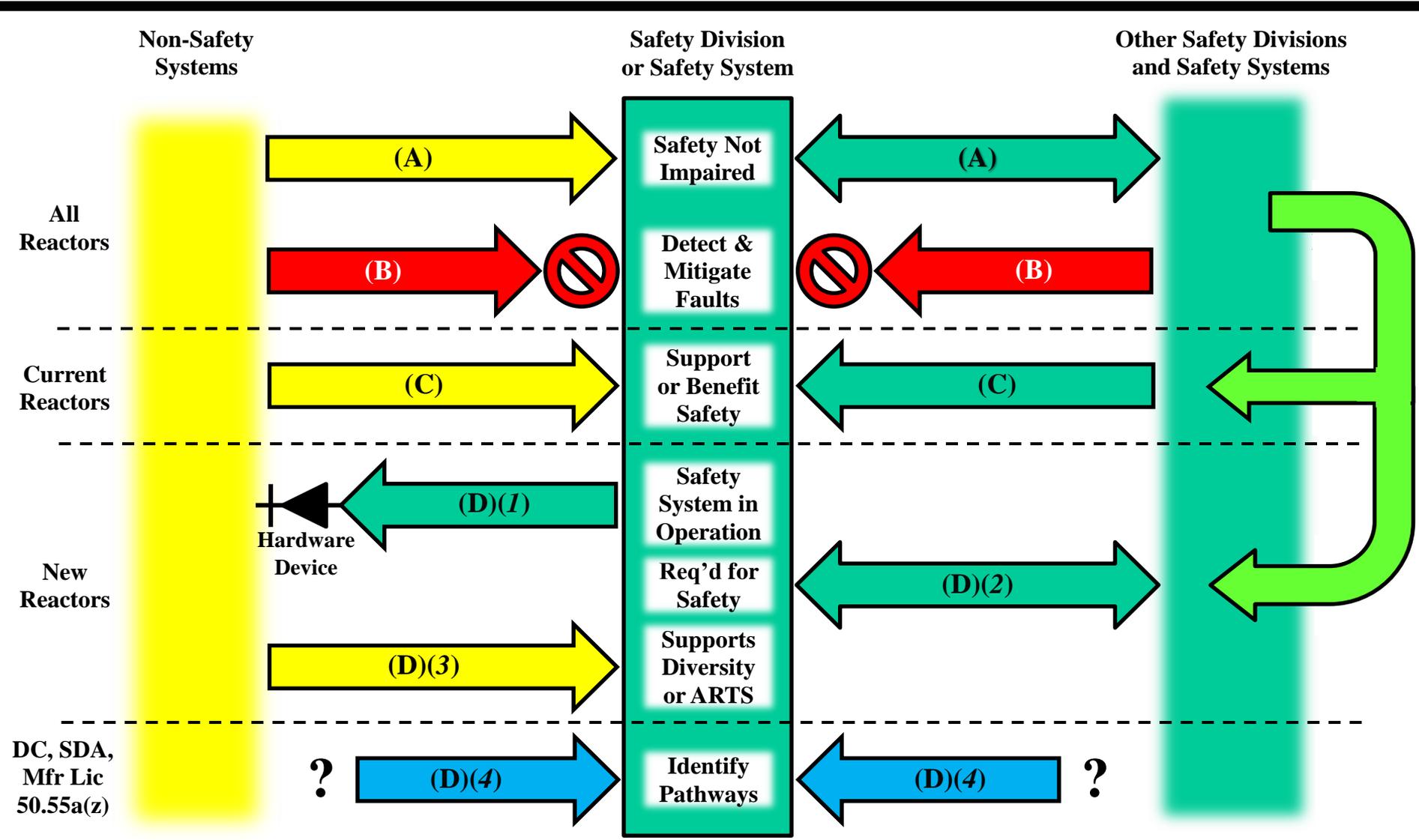
General Independence Requirements

10 CFR 50.55a(h)(5)(i) & (5)(ii)

- **Address independence between**
 - Redundant portions of safety systems – (5)(i)
 - Safety systems and other systems - (5)(ii)
- **Analyze**
 - Safety system internal and external hazards
 - Extent of interconnectivity
 - Impact of failures and degradation
- **Digital communication independence extended to include other signal technologies**
 - 5.6.3.1.a.2.ii
 - 5.6.3.1.b



Specific Independence Requirements 10 CFR 50.55a(h)(5)(i)





Diversity & Defense-In-Depth





Defense-In-Depth Criteria

Staff Requirements Memorandum to SECY 93-087

1. Demonstrate that vulnerabilities to common-cause failures have been addressed.

2. Evaluate to demonstrate adequate diversity within the safety system for each design basis event in the accident analysis.

3. If a postulated common-cause failure could disable a safety function, then a diverse means unlikely to be subject to the same common-cause failure shall be required to perform either the same function or a different function.

4. A set of displays and controls located in the main control room shall be provided for manual, system-level actuation of critical safety functions and monitoring of parameters that support the safety functions.



Documentation





Documentation to Support Compliance

50.55a(h)(9) – Documentation supporting compliance

Applicants and licensees shall develop and maintain documentation, analyses, and design details demonstrating compliance with paragraphs (h)(2) through (h)(8) of this section.



Alternatives





Alternatives Clause 10 CFR 50.55a(z)

50.55a(z)

(z) Alternatives to codes and standards requirements. Proposed alternatives to the requirements of paragraphs (b), (c), (d), (e), (f), (g), and (h) of this section or portions thereof may be used when authorized by the Director, Office of Nuclear Reactor Regulation, or Director, Office of New Reactors, as appropriate. The applicant or licensee shall demonstrate that:

(1) Acceptable level of quality and safety. The proposed alternative would provide an acceptable level of quality and safety; or

(2) Hardship without a compensating increase in quality and safety. Compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.



Draft Reg. Guide 1.153

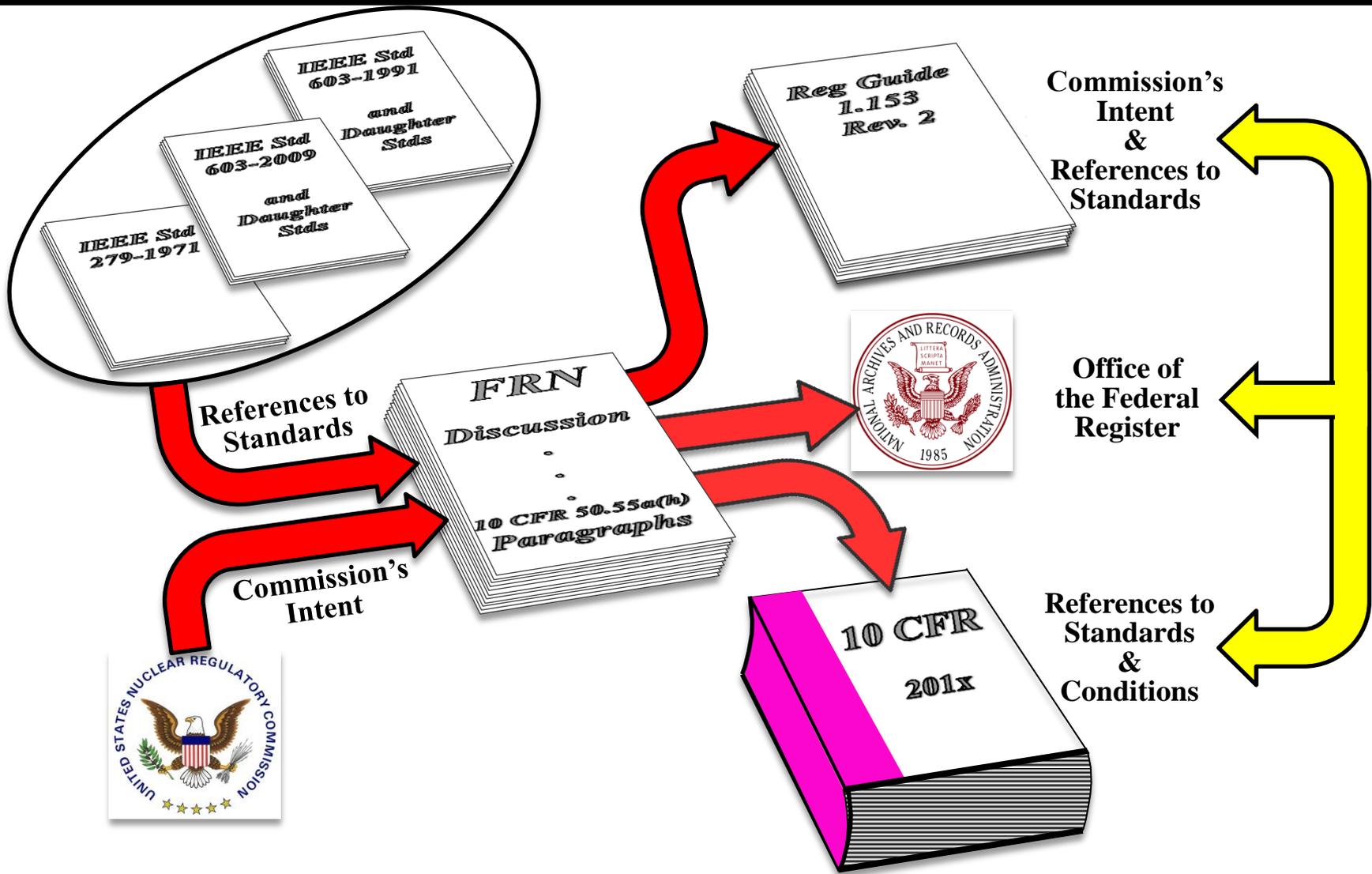
Draft Regulatory Guide (DG)-1251 (RG 1.153,

“Criteria for the Power, Instrumentation, and Control Portions of Safety Systems for Nuclear Power Plants,”

Provides additional guidance for implementing the requirements of the rule. This Guide is based upon the discussion in the FRN, and does not modify the scope of 50.55a(h).



10 CFR 50.55a(h) and Reg Guide 1.153





Draft Reg Guide 1.153

- **10 CFR 50.55a(h) FRN provides the underlying basis of the regulation**
- **Consistent interpretations**
- **NRC website is the logical repository**
- **NRC website thereby provides Commission's**
 - **definitions of terms**
 - **reasoning behind Rule paragraphs**
 - **NRC Staff commitments on applying the Rule**
- **No time limit on availability of underlying basis**



END



Peach Bottom Atomic Power Station Extended Power Uprate

**Advisory Committee on Reactor Safeguards
July 09, 2014**



Exelon Generation®

Introductions

Peach Bottom Atomic Power Station (PBAPS) Extended Power Uprate

Agenda

- **Introductions**
- **EPU Project Overview**
 - Background
 - Modification Summary
- **Elimination of Containment Accident Pressure (CAP) Credit**
- **Replacement Steam Dryer Overview**
(closed session)

Key Team Members Present

- Kevin Borton - Power Uprate Licensing Sr Manager
- Craig Lambert - Power Uprate Vice President
- Mike Massaro - PBAPS Site Vice President
- John Rommel - Power Uprate Engineering Director
- Ken Ainger - EPU Project Management Director
- Jim Armstrong - PBAPS Regulatory Assurance Manager
- Dave Henry - PBAPS Sr Manager Design Engineering
- Jim Kovalchick - PBAPS Sr Manager Operations, EPU Integration
- Tony Hightower - PBAPS Operations Shift Supervisor

EPU Project Overview

**Background
Modification Summary**

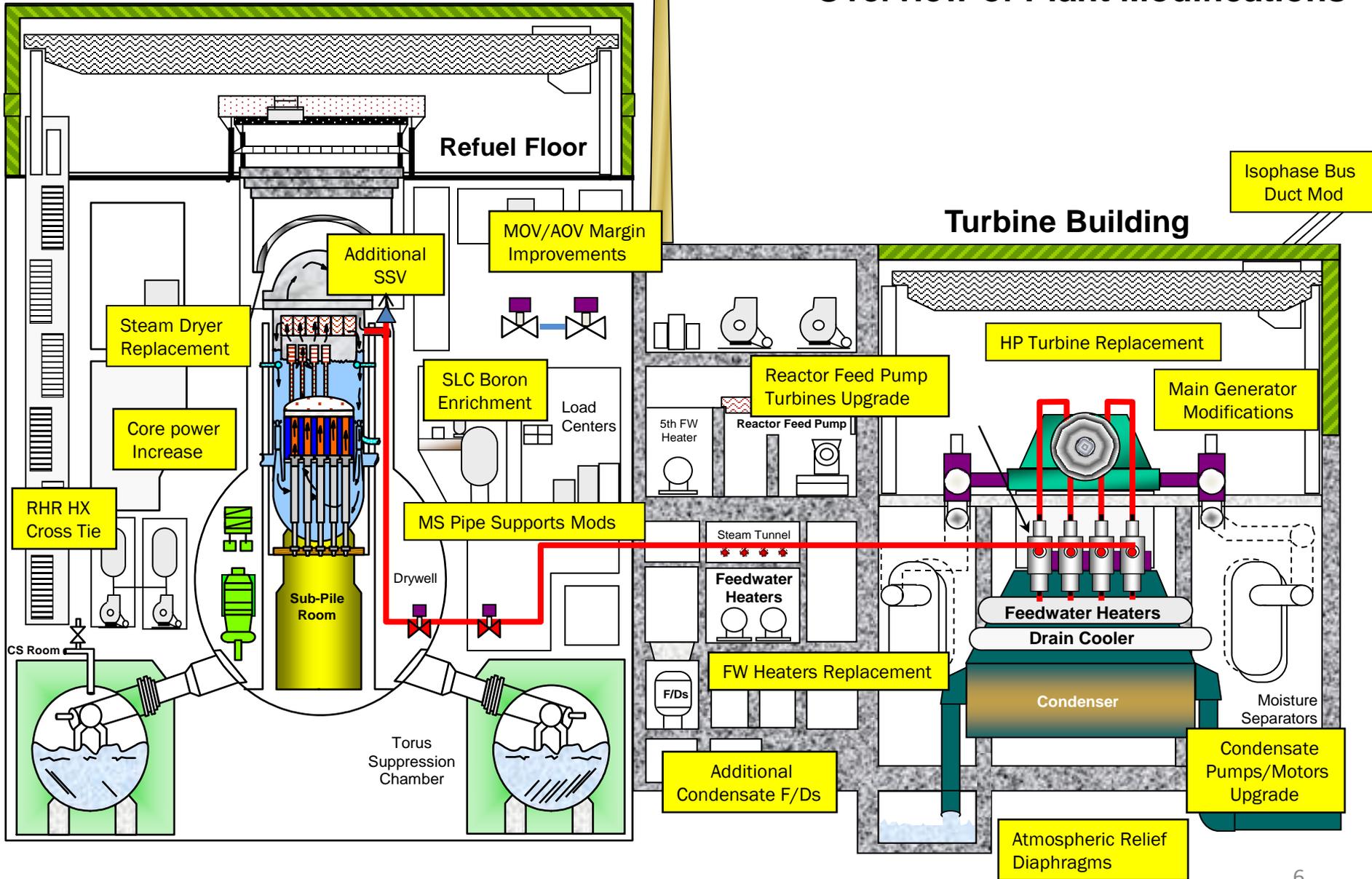
**Mike Massaro
PBAPS Site VP**

Peach Bottom Atomic Power Station Overview

- GE BWR 4 Mark I Containment
- Operating License issued 1973 (U2) and 1974 (U3)
- Commercial Operation commenced 1974
- Renewed License issued in 2003 (U2 and U3)
- Licensed Thermal Power History
 - Original Licensed Thermal Power (OLTP) 3293 MWt
 - Stretch Uprate in 1994 and 1995 3458 MWt
 - MUR power uprate in 2002 to CLTP 3514 MWt
 - Proposed EPU (20% OLTP, 12.4% CLTP) 3951 MWt

Reactor Building

Overview of Plant Modifications



Major Modification Summary

Modifications to Improve Reliability and Operating Margins

High Pressure Turbine Replacement

Accommodates increase in steam flow at EPU

Improves operating margin for Main Turbine Control system

Main Generator Modifications

U3 rotor replaced in 2013, U2 rotor to be modified for new rating

Restores generator margin at higher MVA at EPU

Isophase Bus Duct

Several portions of existing IPBD will be replaced

Restores IPBD margin at higher MVA at EPU

Feedwater Heaters

Replace five (1 on U2 and 4 on U3) to restore margin at EPU conditions

Other FW heaters analyzed and verified to be acceptable for EPU

Reactor Feed Pump Turbine Upgrades

Accommodates higher blade stresses at EPU

Improves reliability

Major Modification Summary

Modifications to Improve Reliability and Operating Margins (continued)

Motor Operated Valves

MOVs affected by changes in EPU response were evaluated
Improves margin at EPU conditions

Additional Main Steam Spring Safety Valve (SSV)

One additional SSV on each unit
Increases margin for ATWS analysis at EPU

Main Steam Piping

New supports and support modifications
Assures margin to Code requirements at EPU conditions

Reactor Water Cleanup

Flow diffusers to be installed on all four RWCU demineralizers
Improves efficiency to maintain chemistry limits at EPU conditions

Major Modification Summary

Modifications to Improve Reliability and Operating Margins (continued)

Condensate Pump/Motor Upgrades

Impellers to be replaced and larger motors installed
Improves margin at EPU conditions

Condensate Filter/Demineralizer

Two additional demineralizers to be installed on each unit
Maintains chemistry limits and operational flexibility at increased FW flowrate

ATWS-Recirculation Pump Trip

The ATWS-RPT relocated from MG sets to Recirculation Pump motor breaker
Provides faster coastdown time for Recirculation Pumps to support ATWS analysis

Replacement Steam Dryer

Replacing steam dryers to improve structural margin
Improves Moisture Carryover (MCO) performance lowering in-plant radiation doses

Major Modification Summary

Modifications Associated with CAP Credit Elimination

RHR Heat Exchanger Cross-Tie

Includes new cross-tie valve allowing two HXs to be supplied from one RHR pump
Increases RHR heat removal capability

HPSW Cross-Tie

Replaces existing cross-tie with valve able to open against full flow differential pressure
Increases RHR heat removal capability

Condensate Storage Tank

Provides protected CST volume and safeguards against fire-induced swapover to torus
Allows crediting of CST as suction source

Standby Liquid Control System

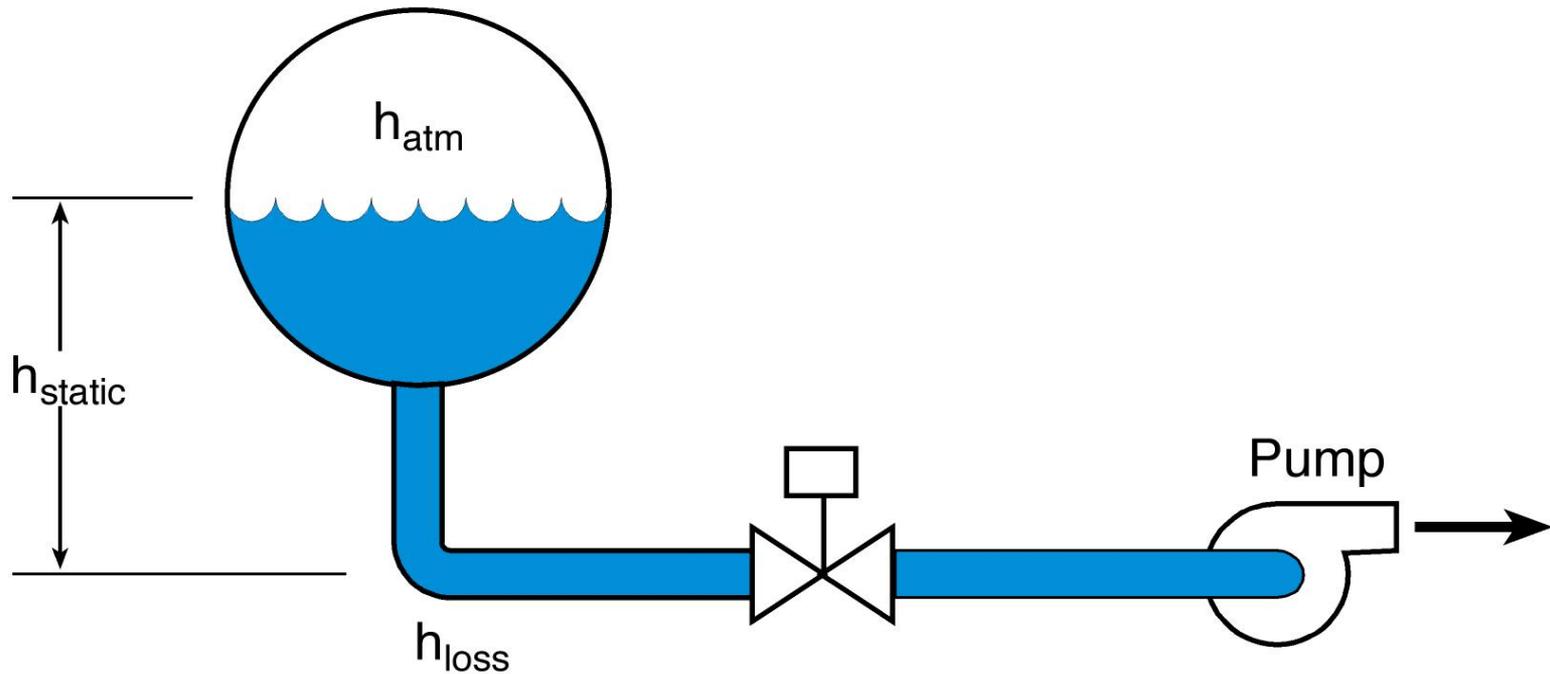
Boron-10 enrichment increased to 92 atom percent in SLC Storage Tank solution
Lowers Suppression Pool temperature during ATWS

Elimination of Containment Accident Pressure Credit

John Rommel
Power Uprate Engineering Director

Elimination of CAP Credit

$$\text{Available NPSH} = h_{\text{atm}} + h_{\text{static}} - h_{\text{loss}} - h_{\text{vp}}$$



Elimination of CAP Credit

- Opportunity to improve margins and remove concerns associated with Containment Accident Pressure (CAP) Credit
- Became key project goal
- Credible options existed to eliminate CAP Credit at PB

Elimination of CAP Credit

Actions to Eliminate CAP Credit

- **Increase Residual Heat Removal (RHR) system heat removal capability**
 - RHR and High Pressure Service Water (HPSW) cross-tie modifications
 - Increase RHR Heat Exchanger (HX) K-Value
- **Reduce RHR pump flow**
- **Credit Condensate Storage Tank (CST) as suction source for special events**
- **Increase Standby Liquid Control (SLC) system Boron-10 enrichment**

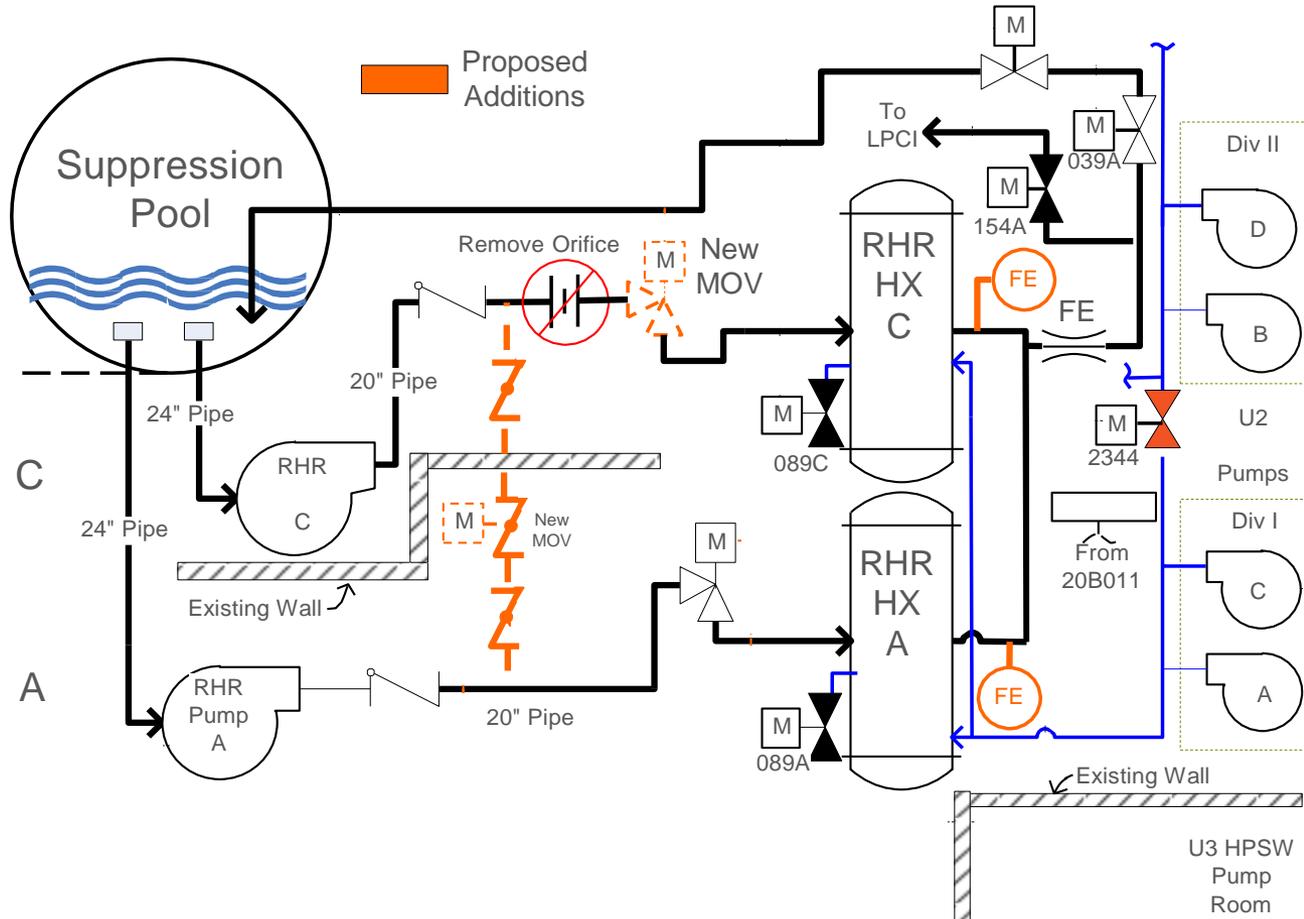
Elimination of CAP Credit

Methodology

<u>Modification or Analytical Change</u>	DBA-LOCA	SSLB	App R	ATWS	SBO
RHR HX Cross-tie and HPSW Cross-tie mods	X	X			
Increased single RHR HX K-Value from 270 to 305	X	X	X	X	X
Reduced RHR flow rate from 10000 gpm to 8600 gpm	X	X	X	X	X
Credit CST as HPCI and/or RCIC suction source			X	X	X
Increase SLC Boron Enrichment				X	

Elimination of CAP Credit - Accidents

U2-DIV I RHR and HPSW Cross-Tie

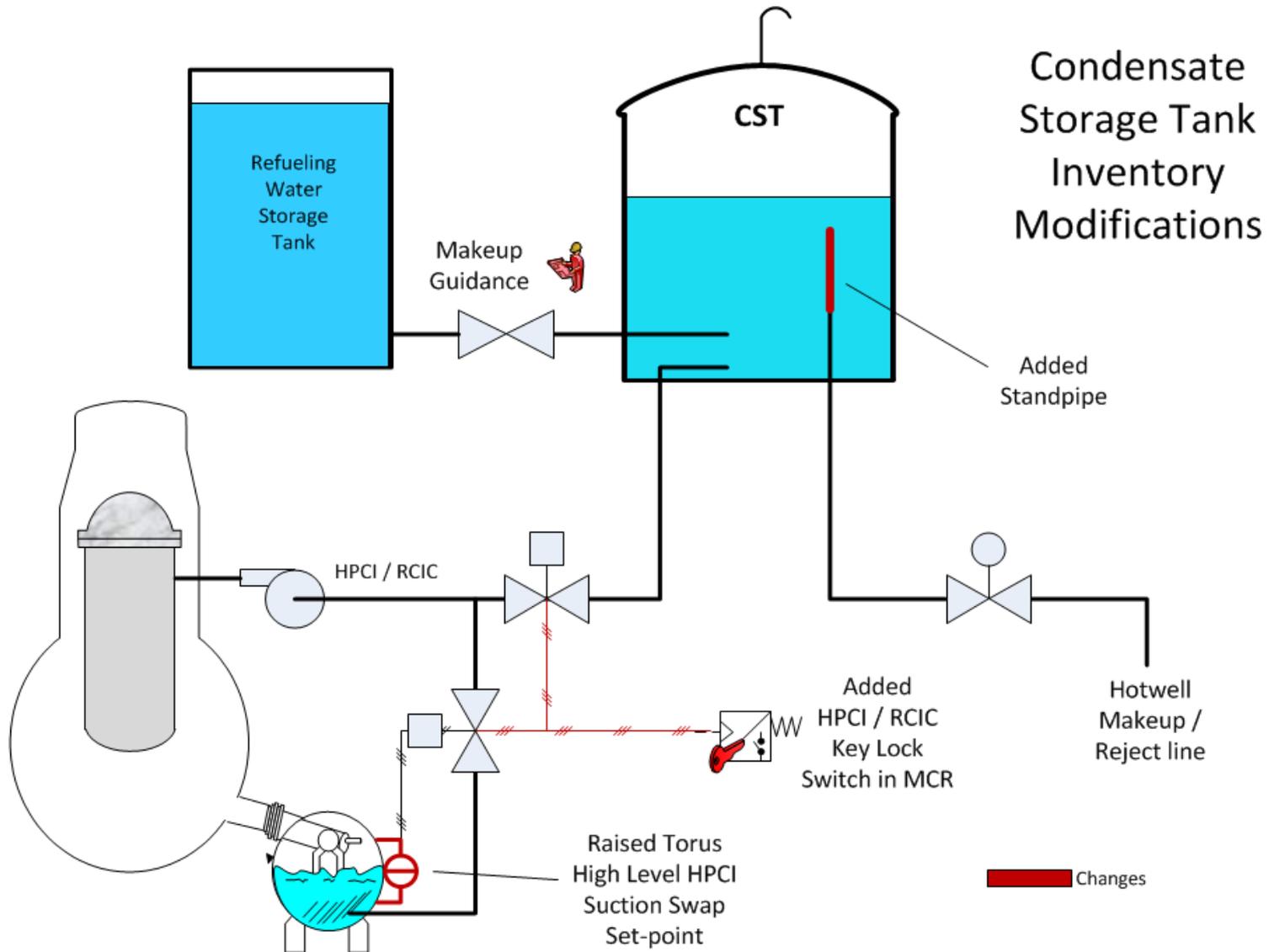


Elimination of CAP Credit - Accidents

RHR/HPSW Cross-tie Modifications

- **Modifications will:**
 - Allow two RHR HXs to be supplied from one RHR pump
 - Improve rate of Suppression Pool cooling
 - Lower peak Suppression Pool temperature, increasing NPSHA
 - Lower required RHR flow, decreasing $NPSHR_{eff}$
- **Modifications consist of:**
 - New cross-tie line with a normally closed cross-tie isolation on discharge of RHR pumps
 - New flow control valves upstream of each heat exchanger to balance flow
 - Replacement of existing HPSW cross-tie valve with one that can be repositioned against the full flow and differential pressure of a single HPSW pump

Elimination of CAP Credit - Special Events



Elimination of CAP Credit – Special Events

CST Modifications

- **Modifications will:**
 - Ensure adequate inventory in CST
 - Ensure that HPCI /RCIC pump suctions remain aligned to the CST
 - Produce additional heat capacity in Suppression Pool
 - Lower peak Suppression Pool temperature, increasing NPSHA
 - Provide additional volume (height) in torus, increasing pump NPSHA
- **Modifications consist of:**
 - A standpipe to protect the CST volume
 - Installation of key lock switches in the Control Room to prevent inadvertent suction source swap
 - Raising torus high level setpoint to prevent premature automatic switch of HPCI suction to Suppression Pool
 - Revised procedural guidance to ensure adequate CST inventory makeup from RWST

Elimination of CAP Credit

Conclusions

-For all events

- $NPSHA > NSPHR_{eff}$

-No CAP Credit is required

CLOSED SESSION

Replacement Steam Dryer - Exelon

Acronym List

- ATWS – Anticipated Transient Without Scram
- BOP – Balance of Plant
- BWR – Boiling Water Reactor
- BWRVIP – Boiling Water Reactor Vessel Internals Program
- CD – Condensate System
- CLTP – Current Licensed Thermal Power
- CLTR – Constant Pressure Power Uprate
- CPR – Critical Power Ratio
- CRDA – Control Rod Drop Accident
- CST – Condensate Storage Tank
- DBLOCA – Design Basis Loss of Cooling Accident
- EPU – Extended Power Uprate
- HP – High Pressure
- HPCI – High Pressure Coolant Injection
- HPSW – High Pressure Service Water
- HX – Heat Exchanger
- MASR – Minimum Alternating Stress Ratio
- Mlbm – Million pound mass
- MNGP – Monticello Nuclear Generating Plant
- MOV – Motor Operated Valve
- MPS – Minimum Recirculation Pump Speed
- MS – Main Steam
- MSIV – Main Steam Isolation Valve
- MSL – Main Steam Line
- MWT – Megawatt Thermal
- NPSH – Net Positive Suction Head
- NPSHA – Net Positive Suction Head Available
- NPSHR – Net Positive Suction Head Required
- NPSHR_{eff} – Effective Net Positive Suction Head Required
- NSSS – Nuclear Steam Supply System
- OLTP – Original Licensed Thermal Power
- PBAPS – Peach Bottom Atomic Power Station
- PORC – Plant Operations Review Committee
- PRFO – Pressure Regulator Failure Open
- psia – pounds per square inch absolute
- psig – pounds per square inch gauge
- RCIC – Reactor Core Isolation Cooling
- RCPB – Reactor Coolant Pressure Boundary
- RHR – Residual Heat Removal
- RIPD – Reactor Internal Pressure Difference
- RPV – Reactor Pressure Vessel
- RSD – Replacement Steam Dryer
- RTP – Rated Temperature and Pressure
- RWST – Refueling Water Storage Tank
- SBO – Station Blackout
- SRV – Safety Relief Valve
- SLC – Standby Liquid Control
- SSLB – Small Steam Line Break
- TS – Technical Specification
- VPF – Vane Passing Frequency



U.S.NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

Protecting People and the Environment

ACRS Full Committee Meeting

NRC Staff Review of Extended Power Uprate for

Peach Bottom Atomic Power Station Units 2 and 3

July 9, 2014

Opening Remarks

Louise Lund

Deputy Director

Division of Operating Reactor Licensing

Office of Nuclear Reactor Regulation

Background

- **Peach Bottom Proposed EPU:**
 - **3514 to 3951 Megawatts Thermal (MWt)**
 - **12.4% increase**
- **EPU Review done with Review Standard RS-001:**
 - **RS-001 used for 17 EPUs since 2005**
- **No open items in draft safety evaluation**

Introduction

Rick Ennis

**Senior Project Manager
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation**

Review Schedule

- **September 28, 2012 – Application submitted to NRC.**
- **February 15, 2013 – Exelon submits supplemental information.**
- **March 8, 2013 – Application accepted by NRC for review.**
- **September 8, 2014 – NRC forecast for review completion based on 18 months from date of acceptance.**

Agenda

- **Plant Modifications**
- **Elimination of Credit for Containment Accident Pressure**
- **Steam Dryer Analysis**



U.S. NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

Protecting People and the Environment

**ACRS Full Committee Meeting
mPower DSRS Chapter 7, I&C
July 9, 2014**

Tim Mossman

Joe Ashcraft

Ian Jung

Office of New Reactors

Agenda

- Objectives of DSRS Chapter 7
- Development of Section 7.2.1, Quality
- ACRS Recommendations
- Other ACRS Comments Resolved
- Summary

Objectives of DSRS Chapter 7

- Reorganize review guidance
 - Fundamental design principles
 - Safety focus and efficiency
- Remove redundant and non-applicable information
- Incorporate lessons learned from large light-water reviews
- Introduce the use of hazard analysis

Development of Section 7.2.1, Quality

- Section added after 2012 ACRS meeting
- Goal to enhance coordination between I&C reviewers and quality assurance (QA) staff
 - Strategy uses qualified QA staff to review QA programs
 - I&C reviewers focus on aspects of quality that may be unique to I&C systems

ACRS Recommendation 1

Full Committee Letter 12/18/2012

DSRS Chapter 7 should be issued for industry and public comment

Summary Formal Public Comments

- Comments on Chapter 7 primarily received from Generation mPower, NEI, and NuScale
- The full DSRS received nearly 2000 comments
 - 119 comments received on Chapter 7
- None of the resulting comment resolutions altered the staff's approach to Chapter 7

ACRS Recommendation 2

Full Committee Letter 12/18/2012

DSRS provides a review standard that is likely to be applicable to large reactor designs...[and] other...SMRs.

The staff agrees that Chapter 7 of the DSRS may have applicability beyond the mPower review.

ACRS Recommendation 3

Full Committee Letter 12/18/2012

A specific design implementation should be applied to comply with control of access

Control of Access

- Staff acknowledges the Committee's concern and position
- Resolution of this recommendation has wider applicability than just for the mPower DSRS and involves policy-level issues
- The staff intends to develop a SECY paper regarding a number of I&C technical issues which would address the ACRS recommendation

ACRS Recommendation 4

Full Committee Letter 12/18/2012

DSRS Chapter 7, Appendix B, Instrumentation and Controls System Architecture, should be augmented

System Architecture

DSRS 7.0 APPENDIX B

3. Diagrams of the overall architecture **should illustrate the I&C system architecture principles and concepts (as addressed in Item 1 above). The staff review should ensure that sufficient detail is provided as follows:**
 - A. **Physical architectures to include**
 - i. All of the safety systems and relevant control systems
 - ii. Connections between the above systems
 - iii. Identification of signal / data barrier devices
 - B. **Functional block diagrams to include**
 - i. Major components from sensor(s) to actuation device(s), including various channels / divisions used for signal / data processing, voting unit(s) and actuation devices
 - ii. Signal / data flow paths

Other ACRS Comments Resolved

DSRS 7.1.2 - INDEPENDENCE

III.9 Priority modules should be safety-related. A command initiating a safety function should have the highest priority and should override lower priority commands. **Any instance in which a command initiating a safety function does not have the highest priority should be identified and the conditions that justify the reduction in priority should be explained.** All requirements that apply to safety software should also apply to priority module software. The priority module software should be stored in the nonvolatile memories to prevent online alteration.

DSRS 7.2.13 - DISPLAYS AND MONITORING

I.6 **Severe accident and PRA evaluations in the application to confirm that information displays conform to analyses of severe accidents and any applicable Fukushima-related orders.**

In addition, operating experience staff should be consulted to determine if any operating experience relevant to displays and monitoring may inform the staff's review of this section.

DSRS 7.2.11- MULTI-UNIT STATIONS

III.2.D **Failure or undesirable behavior of non-safety I&C systems shared among multiple units do not impair the ability of the I&C systems to perform credited safety functions in individual units.**

Other ACRS Comments Addressed

7.1.2 INDEPENDENCE

III.3 For designs that implement sharing of data between trip processing units and voting unit processors, or among voting unit processors, the reviewer should confirm that the proposed design includes provisions to cope with a trip processing unit or voting unit processor experiencing a lock-up condition (also known as hang or freeze), whether the processor controls a reactor trip or engineered safeguards system function. Such design provisions should include the following:

- A. Any voting unit processor or trip processing unit experiencing a lock-up condition will produce an alarm in the main control room and send a trip signal to all voting unit processors or trip processor units for that channel/division.
- B. If any two or more voting unit processors or trip processing units experience a simultaneous lock-up condition, an alarm will be displayed in the main control room and a reactor trip will result.
- C. The means used for ensuring that a trip signal is produced from either a trip processing unit or voting unit processor that experiences a lock-up condition should be completely independent among safety divisions, should be hardware-based, and completely independent of software.

Summary

- DSRS Chapter 7 is ready to be piloted for a review of digital I&C
- Staff has interacted with numerous stakeholders throughout this process
 - Overall, staff received highly positive feedback from the stakeholders
- Staff achieved the objectives for the guidance, which will contribute to more efficient and effective licensing reviews