

Official Transcript of Proceedings
NUCLEAR REGULATORY COMMISSION

Title: Advisory Committee on Reactor Safeguards

Docket Number: (n/a)

Location: teleconference

Date: Wednesday, November 4, 2020

Work Order No.: NRC-1204

Pages 1-57

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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680TH MEETING

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

+ + + + +

WEDNESDAY

NOVEMBER 4, 2020

+ + + + +

The Advisory Committee met via
Teleconference, at 2:00 p.m. EST, Matthew W. Sunseri,
Chairman, presiding.

COMMITTEE MEMBERS:

MATTHEW W. SUNSERI, Chairman

JOY L. REMPE, Vice Chairman

WALTER L. KIRCHNER, Member-at-Large

RONALD G. BALLINGER, Member

DENNIS BLEY, Member

CHARLES H. BROWN, JR., Member

VESNA B. DIMITRIJEVIC, Member

JOSE MARCH-LEUBA, Member

DAVID PETTI, Member

PETER RICCARDELLA, Member

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ACRS CONSULTANT:

MICHAEL L. CORRADINI

DESIGNATED FEDERAL OFFICIAL:

CHRISTINA ANTONESCU

A G E N D A

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P R O C E E D I N G S

2:00 p.m.

CHAIRMAN SUNSERI: Good day to everyone signed in. The meeting will now come to order. This is the first day of the 680th Meeting of the Advisory Committee on Reactor Safeguards.

I'm Matthew Sunseri, the Chair of the ACRS. I will now call the roll to verify quorum and to also verify that members are able to participate. Ron Ballinger?

MEMBER BALLINGER: Here.

CHAIRMAN SUNSERI: Dennis Bley? Dennis Bley? Charles Brown?

MEMBER BROWN: I'm here.

CHAIRMAN SUNSERI: Vesna Dimitrijevic?

MEMBER DIMITRIJEVIC: Here.

CHAIRMAN SUNSERI: Walt Kirchner? Walt?

MEMBER KIRCHNER: I'm here.

CHAIRMAN SUNSERI: Okay, good.

MEMBER KIRCHNER: Thanks.

CHAIRMAN SUNSERI: Great, all right, good. Jose March-Leuba?

MEMBER MARCH-LEUBA: I'm here.

CHAIRMAN SUNSERI: Dave Petti?

MEMBER PETTI: Here.

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1 CHAIRMAN SUNSERI: Joy Rempe?

2 VICE CHAIRMAN REMPE: Here.

3 CHAIRMAN SUNSERI: Pete Riccardella?

4 MEMBER RICCARDELLA: Here.

5 CHAIRMAN SUNSERI: And myself, okay.

6 Dennis Bley?

7 CHAIRMAN BLEY: Here.

8 CHAIRMAN SUNSERI: All right, great. Good.

9 I note we have a quorum. The ACRS was established by
10 the Atomic Energy Act and is governed by the Federal
11 Advisory Committee Act.

12 The ACRS section of the U.S. NRC public
13 website provides information about the history of the
14 ACRS and provides documents such as our charter,
15 bylaws, Federal Register Notices for meetings, letter
16 reports, and transcripts of all full and subcommittee
17 meetings, including all slides presented at the
18 meetings.

19 The committee provides its advice on
20 safety matters to the Commission through its publicly
21 available letter reports.

22 The Federal Register Notice announcing
23 this meeting was published on October 23, 2020 and
24 provides an agenda and instructions for interested
25 parties to provide documents or request opportunities

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1 to address the committee.

2 The Designated Federal Officer for this
3 meeting is Ms. Christina Antonescu.

4 During this meeting over the coming days,
5 the committee will consider the following. We will
6 conduct reviews and prepare reports on two technical
7 topics, the first being the latest update of the
8 Branch Technical Position 7-19, Guidance for
9 Evaluation of Diversity and Defense-in-Depth in
10 Digital Computer-Based I&C Systems. And the second is
11 a Regulatory Guide 1.200 Revision on Review and
12 Approval of New Methods for Light-Water Reactors.

13 We will also begin preparations for a
14 Commission meeting that is scheduled for December 4.
15 On Friday morning, we will have a planning and
16 procedures session.

17 Those that read the agenda prior to today,
18 you will note that there was an information briefing
19 scheduled for OKLO's combined license application.
20 However, that item is being rescheduled at the request
21 of the applicant and we will use part of that time for
22 report preparation.

23 A phone bridge line has been opened to
24 allow members of the public to listen in on the
25 presentations and committee discussions. We have

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1 received no written comments or requests to make oral
2 statements from members of the public regarding
3 today's session.

4 There will be an opportunity for public
5 comment and we have set aside time in the agenda for
6 comments from members of the public if any are
7 listening to our meeting.

8 Written comments may be forwarded to Ms.
9 Christina Antonescu, the Designated Federal Officer.

10 A transcript of the open portions of the
11 meeting, with the exceptions of our report
12 preparations and planning and procedure session is
13 being kept and it is requested that speakers identify
14 themselves and speak with sufficient clarity and
15 volume so that they may be readily heard.
16 Additionally, participants should mute themselves when
17 not speaking.

18 And I will ask the members, do you have
19 any questions about the agenda or where we're going
20 this week? Or if any member has anything they want to
21 say? Okay.

22 Before we start today's agenda, I have two
23 announcements to make. It is with overwhelming
24 sadness that I inform you that our colleague and
25 friend Paula Dorm passed away last Thursday.

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1 As a pillar of the NRC, Ms. Dorm's career
2 extended beyond 35-plus years. Most recently, she was
3 a management analyst in PMDA, here with the ACRS,
4 where she supported the committee in operational
5 activities such as information technology and,
6 earlier, with conference room management.

7 Before joining the ACRS, Ms. Dorm worked
8 as a management analyst in the offices of Nuclear
9 Material Safety and Safeguards, Chief Information
10 Officer, and Research. Her work was invaluable to the
11 committee and created the needed infrastructure for
12 the committee to meet and conduct our business.

13 Paula will be missed immensely. Please
14 keep her family and those close to her in your
15 thoughts.

16 I also acknowledge that the ACRS was
17 saddened to learn that Dr. B. John Garrick, former
18 chairman of the U.S. Nuclear Regulatory Commission's
19 Advisory Committee on Nuclear Waste, passed away this
20 past Sunday.

21 Dr. Garrick was a recognized international
22 authority on the application of risk sciences to
23 complex technological systems in the nuclear space,
24 defense, chemical, marine, and transportation fields.

25 He served for ten years, four of which as

1 chairman, on the ACNW. In 2004, Dr. Garrick was
2 appointed by President George W. Bush to the U.S.
3 Nuclear Waste Technical Review Board as chairman and
4 served two terms, ending in 2012.

5 At UCLA's School of Engineering, he is the
6 founder of the B. John Garrick Institute for Risk
7 Sciences.

8 NRC and its advisory committees are
9 indebted to Dr. Garrick's leadership and technical
10 guidance and we honor his memory and decades of work
11 in nuclear risk analysis as we meet today.

12 Please check your NRC daily updates for
13 more information as it becomes available on the loss
14 of these two colleagues.

15 We will now turn to our agenda. And I
16 will introduce Member Charles Brown for leading us on
17 the review of the latest update of the Branch
18 Technical Position 7-19. Charlie? You with us,
19 Charlie? Christina?

20 MEMBER BROWN: I got it. I didn't turn my
21 mic on, sorry about that, Matt.

22 CHAIRMAN SUNSERI: No, no, that's okay.
23 We've had -- there's been a number of weather-related
24 influences over the last couple of days and so, it's
25 understandable. Go ahead, you have the floor,

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1 Charlie.

2 MEMBER BROWN: Okay, thank you very much.
3 Eric, Wendell, you all both are there? I see you're
4 signed in, can you hear?

5 MR. BENNER: Yes, we can.

6 MR. MORTON: Yes, we can.

7 MEMBER BROWN: Okey doke. Eric, would you
8 like to have any opening remarks before we commence?

9 MR. BENNER: I would.

10 MEMBER BROWN: Okay. Proceed.

11 MR. BENNER: First, I share your sadness in
12 the loss of our colleagues Ms. Dorm and Dr. Garrick.
13 So, on that, definitely is something to be mindful of
14 as we conduct all of our activities.

15 I want to say that, regarding this
16 document, I very much appreciate all the feedback that
17 the subcommittee has provided us. The members of the
18 staff who have been working on this document all
19 genuinely believe it is a much better product because
20 of the interactions we've had with the subcommittee,
21 as well as the stakeholder feedback we've received on
22 the document.

23 As we hope for expanded safe use of
24 digital technologies in the nuclear industry, it is
25 instrumental that we have clear guidance for how the

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1 staff would review any modifications that need a
2 license amendment for an operating reactor or,
3 obviously, how we would do the initial review of a
4 system for a new reactor.

5 The staff has taken great pains to try to
6 construct this guidance in a manner that, if followed
7 by the staff, it will have -- demonstrate a clear
8 basis for how the regulations, applicable regulations
9 have been met in this area, at the same time making it
10 clear the flexibilities and different pathways that
11 licensees and applicants have to address the technical
12 issue of common-cause failure in a digital I&C system.

13 So with all that, the document, the
14 guidance document before is not perfect, it never will
15 be perfect, but I think -- Member Brown did point out
16 at the subcommittee meeting that part of this is just
17 to use it, right?

18 That we can evolve and learn as we use any
19 guidance document and as long as we have the right
20 safety and regulatory perspective, we will make good,
21 sound regulatory decisions and can take the lessons
22 learned from those regulatory decisions to further
23 refine the document.

24 To that last point, we have embedded in
25 our presentation today how we have incorporated

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1 lessons learned from those reviews that we consider
2 most successful in the past to help shape how the
3 staff would look at future applications.

4 So that's the end of my opening remarks
5 and not knowing how you want to proceed, Member Brown,
6 certainly, Wendell Morton will be the lead presenter
7 for the presentation today, but he has a team of folks
8 on standby to address any questions that the committee
9 may have.

10 MEMBER BROWN: Okay. Thank you very much,
11 Eric. I would like to make one observation relative
12 to your introductory comments, which I think is
13 appropriate. We had three subcommittee meetings on
14 this document, if I'm not mistaken. I went back and
15 looked and counted up.

16 You may remember, Eric and Wendell, the
17 first one, there was suggestions or observations from
18 a couple of the members, I know Dennis and myself,
19 that the document kind of wandered around a little
20 bit.

21 And you all, I think, took that to heart,
22 did some very significant reorganization, so that it
23 has become, whether we agree with each and every
24 little point and everything, the flow of the document
25 makes sense. And the ease of use, in my mind, is

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1 significantly above that of Rev 7, which I did line-
2 by-line and paragraph-by-paragraph comparisons with
3 two years ago, or a year and a half ago.

4 So I did want to give credit to the staff
5 for listening to both the committee, as well as the
6 public and the industry, in putting together their
7 revisions. So we'll start that off on a positive
8 note. And, Wendell, if you would like to start off,
9 have at it.

10 MR. MORTON: Yes, sir. Thank you, Member
11 Brown. Once again, good afternoon, ACRS members,
12 members of the public, NRC staff. This is Wendell
13 Morton, I'm the team lead for the BTP 7-19 Revision 8
14 project.

15 And I want to thank my fellow team
16 members, starting off with Rossnyev Alvarado, David
17 Rahn, (telephonic interference) and of course, our
18 illustrious PM Tekia Govan, who will be driving for me
19 this afternoon, thank you, Tekia, appreciate it.

20 We're going to go over some of the changes
21 we've made to the BTP up to this point, that includes
22 the previous three ACRS meetings we've had, and thank
23 you, Member Brown, for keeping that in mind, because
24 we have been talking to the subcommittee a number of
25 different times and there's been a lot of different

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1 feedback provided by ACRS and we appreciate the
2 positivity we've got so far.

3 We did take a lot of the feedback we
4 received from ACRS to heart, very much so. And one of
5 the main goals of the BTP was to make sure that the
6 document itself was usable. Before you even get into
7 the technical content, is it actually usable in terms
8 of can a person pick it up and read it and understand
9 exactly where you're going in the document to find
10 useful information? And that was definitely one of
11 the goals that we had.

12 As part of this process, we also had a lot
13 of feedback from our stakeholders, both internally
14 with the staff and also with the industry at large,
15 which we've had a number of different public meetings.

16 And we solicited specific feedback and
17 specific concerns that licensees and applicants have
18 had in trying to utilize the previous rev of the
19 document, to incorporate those lessons learned from
20 previous licensing activities and some of those
21 previous challenges that folks may have had, including
22 things the staff identified as areas for improvement.
23 And you will see these things incorporated into this
24 version of the document.

25 Like I said, we are going to talk about

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1 many of the things we've had, at least post those
2 previous ACRS meetings. And I do want to note, just
3 for the record, the document is still technically in
4 concurrence. So I just want to make that -- keep that
5 in (telephonic interference) for the ACRS members.
6 So, Tekia, please go to slide two.

7 So today, in terms of the agenda, similar
8 to the previous meeting, we're going to talk about
9 some of the objectives that I just kind of covered in
10 some more detail. The various topics and concepts
11 that are covered within the BTP 7-19 Revision 8.

12 We'll talk about some of the key changes
13 we made in the document, for your consumption. Some
14 of those changes included the scope of the draft of BTP
15 7-19. I'll also discuss in more detail the
16 refinements we made based upon all the great ACRS
17 feedback we've received.

18 Another topic, we'll talk about is the
19 safety significance determination, which we previously
20 understand used to be referred to as the graded
21 approach. We made further refinements on that
22 particular topic, as well as the overall D3 assessment
23 itself, and some additional items we'll talk about.
24 And then, we'll talk about the status and next steps.
25 Tekia, please go to slide number two.

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1 And of course, like I said earlier, our
2 objective generally is to present those changes that
3 we've made, updates and refinements we've made to the
4 document to receive further feedback from ACRS. Sorry
5 for the typo we have inside there, it says
6 subcommittee, it should say full committee at this
7 point, I apologize for that.

8 And of course, we're looking for obtaining
9 the ACRS recommendation letter for the project.
10 Tekia, could you go to slide number four?

11 So some of the specific topics, sort of
12 like we just kind of discussed, you see a number of
13 important items we've changed, and many of these
14 aspects have been updated or refined based upon the
15 public comments we received, based upon internal
16 feedback we had with our own staff discussions and
17 licensing activities, and based upon our interactions
18 with the public and industry through the numerous
19 public meetings we've had in the last year and a half
20 or so, and also, just looking at the document, taking
21 a clean reading and seeing where could we make
22 improvements in some of these of these topics.

23 So each one of these received some level
24 of refinement or improvement based upon the various
25 interactions that we've had with the public, with

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1 ACRS, and with our own internal discussions on some of
2 them.

3 And like Eric referred to earlier, there
4 are a number of lessons learned that we've had in our
5 successful licensing reviews that have been
6 incorporated into this version of the BTP, to
7 streamline the process and make it more clear and to
8 firm up the regulatory basis and of the technical
9 aspects of the document as well. Tekia, please go to
10 slide number five, please?

11 So the summary of key changes. One of the
12 major changes we've had, and we kind of discussed this
13 in some detail at the subcommittee meeting, was that
14 the document really is staff guidance, it's not
15 necessarily intended to be treated as a reg guide per
16 se, although we understand that people use it as such.

17 But the guidance really is clarified to be
18 directed towards staff reviewers, that's one of the
19 key changes we made. That's why the tone and tenor of
20 the document changed since previous revs that focused
21 on what we have seen, some of the changes were
22 directed towards that end.

23 We also added and made technical
24 requirements to the failure types considered within
25 the BTP 7-19. For example, we tried to clarify that

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1 with regard to some topics, like spurious operation,
2 there are some types of failures that are within
3 design basis to cover and there's those types of
4 failures that are beyond-design-basis events.

5 So we clarified that discussion based upon
6 feedback we've heard from industry and public
7 comments, where there may have been confusion about
8 what specific types of failures are under the scope of
9 the BTP.

10 We also clarified the term latent design
11 defect and we recognized we were previously using the
12 term latent defect, but that's one of the things that
13 based upon interaction with industry and public
14 comments, as well as some internal discussions, and
15 especially with some interaction we had with ACRS, we
16 decided to refine the term to better align it, the
17 actual name of the term to better align with the
18 definition that we have inside here.

19 And also the safety significance
20 determination scheme, the quality of assessments,
21 spurious operation guide, all received some level of
22 refinements and improvements based on our interactions
23 with ACRS, as well as public comment and feedback
24 we've gotten from industry and the public. Tekia,
25 please go to slide number six.

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1 So in terms of the basic scope of the
2 document, we covered in the subcommittee meeting that
3 we refined the document to clarify what specifically
4 is expected to be covered with the Branch Technical
5 Position 7-19, to ensure that the scope of the
6 document, the types of failures, software, hardware,
7 et cetera, that is expected to be addressed by the
8 staff who are utilizing the BTP itself, to make sure
9 it fully aligns with the Commission direction in SRM
10 to SECY-93-087.

11 And as Eric said, we recognize that there
12 are areas for improvement and we're always trying to
13 make sure we were refining this so it was clear and
14 understandable what the scope of the draft document is
15 about. In Revision 8, we made a concerted effort to
16 make sure that this is very clear and present for the
17 folks who picked it up and read it. Slide number
18 seven, thank you.

19 And now, we're going to get to some of the
20 more detailed discussion, in terms of the requirements
21 we made based on ACRS feedback.

22 The first bullet you see there, something
23 that we got into a lot of discussion about in the last
24 subcommittee meeting, which talked about within the
25 background section maybe having some more information

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1 about how your basic architectural design for your I&C
2 system is in and of itself a barrier against digital
3 common-cause failure, if you do the right things in
4 terms of the design of the architecture itself, before
5 you get into any other types of aspects that you get
6 into the BTP about.

7 And that was on the recommendations
8 clarified from ACRS, we agree wholeheartedly with
9 that, and we did add some additional details about
10 that aspect into the BTP in the background discussion.

11 And Member Brown sort of referred to, a
12 number of the other bullets talk about how we tried to
13 revise the document to be more clear and concise and
14 so that there is not information hanging over here or
15 hanging over there, it does not have an ambling
16 discussion, that there is clear and specific
17 connectivity between each topic inside there and that
18 there's clear transitions from one topic to the next
19 topic, so that it's understandable that you go from
20 background to safety significance determination, to
21 the D3 assessment itself and all the things that
22 encompasses that, and all the other supporting
23 aspects.

24 So we made a concerted effort to make sure
25 that the connectivity was there, so it was clear and

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1 concise what we're trying to talk about here.

2 And, obviously, there were other topics,
3 those were some of the bigger ones that I wanted to
4 kind of express to the full committee that there were
5 a number of excellent comments made towards that end.

6 And for example, Member Brown referred to
7 us the November 11, 2011 letter with regard to
8 spurious operations and making sure that we were still
9 taking into account that feedback and that we did
10 incorporate that feedback to the extent practicable as
11 well.

12 So we wanted to make sure we were
13 consistent with ACRS's previous feedback as well, but
14 more recent feedback as well. So if there's no
15 questions on this slide, we'll go to slide number
16 eight. Thank you, Tekia.

17 So the safety significance determination.
18 So one of the things that we also refined based upon
19 ACRS feedback, as well as some additional feedback we
20 received from industry, is that there may be a little
21 bit of redundancy and some non-clarity within the
22 original categorization that we had.

23 If you recall from the previous version,
24 we did have four categories. We thought that, based
25 on some feedback we heard from industry and then from

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1 the previous subcommittee meeting and ACRS, we thought
2 it may be better to consolidate some of the categories
3 for simplicity's sake, so that it's a little more
4 clear about what the expectations are when you're
5 making your significance determination.

6 This is how we're doing the quote/unquote
7 graded approach. So rather than focusing on that
8 particular aspect, we're focusing more on the
9 characteristics of the system.

10 So, as you see, the first bullet is for
11 high significance systems.

12 The second bullet you have here is the
13 consolidation in two previous categories, where we
14 covered non-safety-related systems that perform a
15 safety significant function and those safety-related
16 systems that don't perform necessarily a safety
17 significant function.

18 Rather than having them be two separate
19 categories, we decided to consolidate them for
20 simplicity's sake and for the fact that it didn't
21 really make sense necessarily to have four categories,
22 when it's simpler to have three.

23 And this better conforms with the guidance
24 within the D3 assessment, because we didn't
25 necessarily need to have all of the extra category in

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1 order to provide an adequate D3 assessment. So the
2 consolidation as part of the feedback we heard from
3 the ACRS and the general public made a lot of sense.
4 That's why you'll see a little bit of the different
5 configuration to this section then the previous
6 section.

7 And I do want to make it clear that for
8 non-safety-related SSCs that perform safety
9 significant functions, they are still in fact less
10 safety significant than safety-related functions that
11 perform safety significant functions. So I wanted to
12 make that clear, that we're not trying to jump the
13 queue in terms of importance here.

14 So if there's no other questions on this
15 slide --

16 MEMBER DIMITRIJEVIC: Well, I have a
17 question of these things, exactly what you just said.

18 MR. MORTON: Yes?

19 MEMBER DIMITRIJEVIC: What do you mean if
20 -- why would they have a low safety significance event
21 that performs safety significant function? How did
22 you conclude that?

23 MR. MORTON: Sorry, can you repeat your
24 question?

25 MEMBER DIMITRIJEVIC: Okay. You just said

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1 that SSCs which are non-safety-related but perform
2 safety significant functions, they will have lower
3 safety significance. That's what you just said,
4 right? That they just in category of low safety
5 significance, right?

6 MR. MORTON: Right. So what I was saying
7 --

8 MEMBER DIMITRIJEVIC: So my question is,
9 how did you conclude that non-safety-related SSCs
10 which perform safety significant function will have
11 lower safety significance?

12 MR. MORTON: Right. So, fundamentally,
13 what that statement was getting to was that the top
14 category bullet that you see there, that particular
15 bullet refers to those safety-related SSCs that
16 perform safety significant functions. Their
17 functionality is more critical than a non-safety-
18 related system, even if it performs a safety-related
19 function.

20 For example, those would be those types of
21 systems that would be within your protection system,
22 your HPSI, LPSI, RPSI, reactor trip functions are more
23 safety critical than a non-supported (phonetic)
24 function, even if it performs a safety significant
25 function. So we say that just to make it clear that

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1 we --

2 MEMBER DIMITRIJEVIC: Maybe this is
3 something particular for the I&C, but that's
4 absolutely not true for SSCs in the general. So if it
5 perform safety significant function, then it's safety
6 significant. Doesn't matter what is categorization
7 when it comes to the safety or not safety-related.

8 So grouping those two in the low safety
9 significant, I mean, I find that very strange, but it
10 could be really particular to I&C, definitely not
11 applicable to any other SSCs.

12 MEMBER BROWN: Can I make an observation?

13 MEMBER DIMITRIJEVIC: Yes.

14 MEMBER BROWN: And if I get this wrong,
15 Wendell, tell me. There are -- when you go through 7-
16 19, when you're evaluating CCS or other things that
17 could compromise systems, you're allowed to take
18 credit for non-safety systems that interact or can
19 perform safety significant functions.

20 And that's the way I looked at that last
21 line, after the and. So we do allow non-safety-
22 related systems to be backups and --

23 MR. MORTON: That's correct.

24 MEMBER BROWN: -- that's part of the SRM --

25 MR. MORTON: That's correct.

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1 MEMBER BROWN: -- from the Commission --

2 MR. MORTON: That's correct.

3 MEMBER BROWN: -- to perform safety
4 significant functions. So that's why grouping, in my
5 opinion, okay, only, I liked this restructuring of
6 these, because they don't make them seem
7 insignificant. They are kind of in that in-between
8 set of categories. So I mean --

9 MR. MORTON: That's correct.

10 MEMBER BROWN: -- that's my understanding
11 of the non-safety-related SSCs that do perform safety
12 significance, they're not primary, but there are
13 systems that are non-safety-related that do perform
14 safety significant functions. Your rod control system
15 --

16 MR. MORTON: That's correct.

17 MEMBER BROWN: -- performs, it's a non-
18 safety system, but it performs a safety significant
19 function, it drives the rods in if you want them to.

20 MR. MORTON: Correct.

21 MEMBER DIMITRIJEVIC: Okay.

22 (Simultaneous speaking.)

23 MEMBER DIMITRIJEVIC: My point, and I don't
24 want to go into particularity of the I&C structure, if
25 this is -- obviously, this is based on these four

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1 categories from 50.69 CFR.

2 If that thing -- these non-safety systems
3 which perform safety significant functions deserve a
4 special treatment, which is not really, not the same
5 treatment as safety-related systems that do not
6 perform safety significant functions, so the special
7 treatment for those systems which happen to be
8 categorized as non-safety but they perform safety
9 significant function separate from this category.

10 So I just want to point out, if this is
11 based on the 50.69, 10 CFR 50.69 categorization, then
12 it's not similar and it should not be grouped that
13 way. If you have a separate reason to group it like
14 that, then that should be well defined. That's my
15 point. Because there -- okay. That's the point I
16 want to make, all right?

17 MR. BENNER: And that's a very good point,
18 because that is some of the discussion we had at the
19 subcommittee, that the way we had structured this
20 before looked too much like 50.69 categorization and
21 that was causing confusion. So we have made this
22 change to partially break away, that it was not
23 intended to be a mirror of 50.69.

24 That being said, these descriptive terms,
25 we know still offer not as much clarity as we would

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1 like, which is why in the BTP proper, under each of
2 these categories, we have examples of what falls into
3 each of these categories.

4 And I think in looking at those examples,
5 it does become clear that the relative safety
6 significance of, even though we're saying that a non-
7 safety-related system performs a safety significant
8 function, as we alluded to here, yeah, rod control
9 falls into that category, because you would use it to
10 drive rods in, and that's a good thing and very good.
11 That is not as safety significant as having the
12 function of being able to scram to get the rods in.

13 So it is an imperfect science, I guess I
14 shouldn't even call it a science, but it's trying to
15 recognize that, particularly for, as we do digital I&C
16 systems to do all kinds of different things in the
17 plant, the level of rigor with which we need to assess
18 both the likelihood and the consequences of common-
19 cause failure is partially dependent upon the overall
20 safety significance of the system.

21 CHAIRMAN BLEY: This is Dennis Bley. And,
22 Eric, not so much to you guys, to Vesna and Charlie,
23 we've had years of bickering with these folks. They
24 used to lay it out just like 50.69, and they had a
25 piece of it that was, to me, very illogical.

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1 They -- functions that were risk
2 significant, but not safety-related, they treated as
3 a lower level than things that were risk significant
4 and safety-related, which made no sense to me.

5 They explained the way they grouped them,
6 and that kind of made sense and you didn't have things
7 that really fell in that other category. So this was
8 a way to get out of that logic conundrum they had
9 gotten themselves into. So I think it's pretty
10 reasonable for I&C, given the way they define all of
11 these. That's all I wanted to toss in.

12 MEMBER DIMITRIJEVIC: Thank you, Dennis.
13 I mean, the thing is, maybe the problem is how they
14 define safety significant function. If the rods drop
15 when you -- driving rod inverses (phonetic) dropping
16 them, it's a different function than that -- maybe
17 they could do -- find a definition of the safety
18 significant function, because as it says here, it
19 doesn't really makes sense, it rings the bell that
20 something is not using risk-informed insights.

21 CHAIRMAN BLEY: But as Eric said, they do
22 it through their examples, and I think that works. So
23 I think it's --

24 (Simultaneous speaking.)

25 MEMBER DIMITRIJEVIC: Okay.

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1 CHAIRMAN BLEY: -- or we'll never get
2 through.

3 MR. MORTON: Right. We provide examples,
4 or I guess, characteristics, to better refine these
5 terms, in the BTP itself, to address your question,
6 Member.

7 MEMBER BROWN: Okay. Can we go on now?

8 MR. MORTON: Yes.

9 (Simultaneous speaking.)

10 MR. MORTON: So this slide is just a basic
11 summary of how we define the D3 assessment, so it's
12 really setting the stage for we considered the D3
13 assessment, making sure we refine it from the previous
14 version of the document.

15 This information is essentially straight
16 out of the BTP itself, just to kind of given an idea
17 of what the D3 assessment is and how the safety
18 significant determination plays a part in how you
19 analyze a D3 assessment.

20 With regards to the previous slide, one of
21 the reasons for the grouping, beyond just the
22 characteristics of the individual SSCs is we grouped
23 them to better organize the technical rigor needed for
24 the analysis of the different SSCs.

25 As we've been talking about, different

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1 SSCs have different regulatory requirements on them
2 and, therefore, that sort of directs you to the type
3 of technical rigor necessary to address CCF for those
4 different types of SSCs that may be inside of an
5 application. Please go to slide number ten, Tekia.
6 Thank you.

7 So the various D3 assessment methods that
8 we have. And part of the effort for this particular
9 revision is to provide a lot of flexibility for both
10 the staff reviewer and an industry person that may be
11 using this document to address CCF in a number of
12 different ways. We didn't want to lock it down into
13 one particular method, we wanted to provide a lot of
14 flexibility to address that.

15 For example, we have had a number of
16 different license successes through different
17 applicants using these particular methods. For
18 example, the recently certified APR1400 design
19 essentially utilized all these categories to a certain
20 degree. There was a full-blown D3 assessment.
21 There's an automated diverse actuation system. They
22 even did a thermohydraulic analysis for the balance
23 plant-side (phonetic) would have a fully integrated
24 digital system attached to it.

25 And there's other examples out there of

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1 different licensees that used different types and
2 aspects of these methods, that have all varying forms
3 of success that the staff has certified or approved.

4 And part of the D3 assessment in these
5 various methods has been updated to reflect some of
6 these successes we've had with our different licensing
7 reviews, both in operating plant space and advanced
8 reactor space as well.

9 One of the things I do want to also kind
10 of reiterate, as far as the entire development process
11 for the D3 assessment is that the staff does not
12 prescribe specific design solutions for addressing
13 CCF.

14 Our goal is to provide various avenues to
15 do so, either something that's directly written within
16 the BTP or if a licensee or applicant has their own
17 particular unique solution, the staff is open to
18 examining that as well. So we don't prescribe design
19 solution.

20 There was one that we talked about with
21 industry a while ago, when we started, and engaged
22 them on the BTP and their concerns, there was one
23 concern by industry that the staff was requiring an
24 analog backup to be installed whenever you upgraded
25 your RPS or ESS system for modification.

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1 Definitely not true, the staff did not
2 require a specific design solution, we leave that up
3 to the applicant to determine that and we review it
4 with the BTP.

5 Just wanted to kind of clarify a couple of
6 those points to kind of highlight a lot of the lessons
7 learned have been put into the D3 assessment to refine
8 and improve it. Tekia, please go to slide number 11.

9 So the one aspect of those improvements,
10 and this is germane to the previous slide we had about
11 the safety significance determination, is that one
12 such ability provided within this revision is to allow
13 the use of a qualitative assessment to address CCF for
14 those digital I&C systems and lines of lower safety
15 significance.

16 We think this is a good refinement,
17 because it leverages a technically adequate method to
18 address CCF that's not specific to your RPS or ESS
19 systems, but potentially other systems of lower safety
20 significance.

21 So we wanted to leverage the technical
22 content that was already on the books for us and is
23 being used by industry right now as a means to address
24 CCF. So that was brought into the mix for this BTP.
25 If there's no questions on that, we'll go to slide 12.

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1 And also for the spurious operation
2 guidance, also something that was talked about in the
3 previous revision, we took that previous information
4 and based upon feedback received from industry and
5 feedback from ACRS, as earlier I mentioned the letter
6 from 2011 from ACRS about this concept, we refined it
7 a little further and clarified not just the regulatory
8 basis for it, but also put a specific focus on it.

9 Because one of the things we heard from
10 industry as part of public comment and in terms of
11 interaction in public meetings is that there was
12 concern that it would be an unbounded type of
13 evaluation or that you wanted a separate evaluation,
14 when really, the guidance for spurious operation is
15 really saying, hey, spurious operation is a potential
16 outcome of a CCF, and for the staff to be cognizant
17 this is a potentiality of a CCF and to make sure the
18 design takes that into account as well.

19 This is consistent with what we did with
20 Rev 7, we just made it a little more clear,
21 specifically for the staff when you're looking at an
22 individual design for it.

23 And for example, talking about licensing
24 successes, the NuScale Chapter 7 review, APR1400
25 certification, both of these designs looked and

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1 analyzed, as part of their D3 assessments, spurious
2 operation of both safety and non-safety-related SSCs
3 to ensure that particular consequence was taken into
4 account when postulating the CCF.

5 So successfully performing this aspect of
6 an evaluation is something that has been done, and
7 those lessons learned have also been incorporated
8 within the BTP as well. If there's no questions on
9 that, we'll go to slide number 13.

10 And just some additional items in draft
11 Rev 8. We talk about positions for the SMR-SECY-93-
12 087, we made some additional requirements for that
13 position, also based upon a lot of public feedback and
14 interaction we had, including the public comments.

15 Justification for not correcting system
16 vulnerabilities, essentially providing alternative
17 method to address CCF if you did not use other
18 portions of the BTP. We made some additional
19 refinements to that section to provide some more
20 flexibility for an applicant to address CCF in a way
21 that may not necessarily be described in the BTP.

22 So these sections were also updated as
23 part of the BTP to refine it and provide more
24 flexibility for the folks reading it and the folks who
25 will use it. And if there's no question on that,

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1 we'll go to the next steps.

2 In terms of status and next steps, as I
3 said earlier, the document is still under concurrence
4 at this point, technically. The next step is we are
5 looking for the ACRS letter of recommendation, hoping
6 to get that.

7 And in terms of the next step after that,
8 the OMB review and publication of final BTP Revision,
9 we're predicting January 2020. Excuse me, 2021,
10 excuse me, we're in 2020 now. And if you could go to
11 slide 15?

12 That concludes my presentation. Does
13 anyone have any questions for the ACRS members?

14 MEMBER BROWN: Yes, but I'll let other
15 people speak first.

16 MR. MORTON: Okay.

17 MEMBER BROWN: Any other members have any
18 comments? Well, I guess not, so I guess I'll have to
19 stick my foot in the water here. The -- let me make
20 sure I get this clear.

21 After -- I went through your revision and
22 your corrections that you made subsequent to our last
23 meeting, and I guess the one area, not with specifics,
24 but it was a couple of the BTP sections, and I think
25 it was, if I get specific, it's where you talk about

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1 combining, I think you lead in with the new systems,
2 with the digital I&C systems, with their flexibility,
3 that your ability to integrate and the
4 interconnectivity can be much different from the
5 analog systems.

6 And as a result, verifying potential CCFs
7 are more challenging. And that was in background and
8 in Section B.2.1.

9 MR. MORTON: Yes, that is correct.

10 MEMBER BROWN: And this is not personal
11 comment, now, that I think they're more than just
12 challenging, okay? Because you've eliminated, by
13 combining them, you've literally eliminated two of the
14 major considerations in defense-in-depth, redundancy
15 and independence.

16 And you don't mention that, in terms of
17 the overall discussion, that whatever else you do, the
18 final determination should be that the reviewers,
19 after they look at it, should verify that those
20 redundant and independent architectures are
21 maintained. You don't want to lose that defense-in-
22 depth with whatever integration and connectivity that
23 they do.

24 So the document in those sections doesn't
25 really say anything of that last bit. And my personal

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1 opinion is that those couple of sections should, after
2 you go through all the other stuff, to make sure that
3 those particular defense-in-depth characteristics are
4 not lost sight of when combining.

5 I'm not telling you not to combine, some
6 things can be combined, probably. I say probably
7 because you know what I would do, probably not do that
8 ever. But not to be prescriptive about it, the
9 reviewers, one of their main jobs is to not lose those
10 two major and critical features of defense-in-depth.

11 So that's the first observation I would
12 make relative to the revised document. And that's on
13 the general combining.

14 The other part that gets missed in this,
15 and I guess I would try to describe existing plants a
16 little bit, and this is in the interconnections
17 relative to communications. If you look at the last
18 two design certifications we did, which were very --
19 hold on a minute, I had to cut off somebody, sorry.

20 MR. MORTON: I hope they don't mind.

21 MEMBER BROWN: No, I have to keep the phone
22 on because of my wife's circumstances, so I zero
23 everybody out, but I had to at least turn it off.

24 The outputs of all information out of the
25 RTS and the ESFAS were sent to what I would call the

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1 non-safety actuation systems for ESFAS, whether your
2 starting pumps are operating a valve or scrambling, or
3 not scrambling, but driving the rods somewhere or what
4 have you, and up to networks, were all done with one-
5 way communications. It's a defense-in-depth issue.

6 And then, when they went into networks, it
7 was one-way into those, and out of the networks, out
8 to the rest of the business world, it was one-way.
9 And that's a difference from today's, if you make
10 those two-ways, that's different from today's plants.
11 I mean, you effectively eliminate any defenses you
12 have if those are bidirectional software-based.

13 And I don't care what you call them, but
14 today's plants, it's all done through administrative
15 means. Somebody comes into the site, they have to
16 sign in if they're going to go fiddle with the I&C.
17 Once they get in, they got to sign into the plant.
18 Then, they got to go to the main control room. Then,
19 they have to get the keys, et cetera, et cetera. And
20 two people have to go down and fiddle with the stuff.

21 All that is a defense-in-depth, whether we
22 want to call it something else or not, but it's under
23 administrative control. The problem with the digital
24 microprocessor-based systems is that all this nifty
25 whipping data back and forth eliminates all of that

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1 defense-in-depth you have for that type of access.

2 That emphasis, both in the combining and
3 in your normal, even if you don't combine them, output
4 from the RTS and ESFAS systems up to the main control
5 rooms or out to the rest of the world does not
6 emphasize one-way communication devices -- it's
7 bidirectional. You don't have to say how you do it,
8 just as long as it's not software.

9 So those are the two weaknesses I see
10 right now, after I went through all your changes. I
11 was pretty pleased with most of the rest, I thought
12 you all did a good job of incorporating various
13 members' comments, not comments, excuse me,
14 observations in previous meetings, but those two still
15 kind of stuck out at the end.

16 So I plan on having a discussion with the
17 members on that and we'll determine which way we would
18 like to go, in terms of our response back on this
19 particular, to try to clean this last BTP up and get
20 the sucker out. Because like you, I think the
21 important thing now is to get it out, with whatever
22 imperfections it has.

23 So those are my two observations today.
24 You already had those in form of a comment that I gave
25 you previously.

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1 MR. MORTON: Yes.

2 MEMBER BROWN: And I noticed that you
3 really didn't do much with those. So that was it.
4 Any other members have any other comments before I go
5 to the phones?

6 MR. MORTON: Well, Member Brown, can I
7 respond to you --

8 MEMBER BROWN: Oh, yeah --

9 MR. MORTON: -- real quick?

10 MEMBER BROWN: -- absolutely.

11 MR. MORTON: Okay, cool, before we go to
12 the phones. We actually addressed that, in terms of
13 your second point, in terms of the one-way data
14 communications, we addressed that to a certain degree
15 with a paragraph we added about defense-in-depth in
16 terms of architectural defense-in-depth.

17 And we did add a few mentions about
18 control of access, in reference to SRP Chapter 13.6.6,
19 in Table 3 and Chart 7, because we recognized -- and
20 I'll just read it, and you can look at page three of
21 the BTP, we actually added a paragraph per some of
22 your previous comments to address that point, that
23 maintaining independence and redundancy, those aren't
24 the only aspects of defense-in-depth.

25 We also talked about other things that

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1 contributed to it, in terms of control of access to
2 physical, electronic, and software-based elements. We
3 provided the reference to the other section of the
4 SRP.

5 That's not necessarily something we get
6 into as per this particular document, we do have a
7 reference that points the reviewer in that direction,
8 because we do recognize what you just said. That is
9 something to consider when looking at a digital
10 design.

11 MEMBER BROWN: What page did you -- you
12 said page three?

13 MR. MORTON: Page three. If you go onto
14 page three of the BTP, it's like the last paragraph,
15 full paragraph.

16 MEMBER BROWN: Yeah, that's the one
17 outlined in red, where it says, an overall
18 architecture?

19 MR. MORTON: Yes.

20 MEMBER BROWN: And the only thing you said,
21 really, was measures to control access to physical,
22 electronic, and software-based elements that if
23 tampered with could have adverse plant consequences.

24 MR. MORTON: Correct.

25 MEMBER BROWN: I would -- okay, I saw that,

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1 it just was not quite as definitive, in terms of --
2 various people have various -- they think they're so
3 smart when they're doing these communications devices
4 and that whatever they do is never going to be
5 compromised by anybody. So the engineer software guys
6 just love this stuff.

7 MR. MORTON: Understood, understood.

8 MEMBER BROWN: And the difference between
9 bidirectional and one-way is pretty clear. And that
10 does -- it's not prescriptive, but it's pretty clear,
11 because there's no need to have somebody come in from
12 anyplace else, electronically, into those two systems,
13 other than going down to the cabinets and changing out
14 a programmable read-only memory or adding new software
15 into it under physical supervision.

16 There's just no reason. I mean, all
17 communications out of those, even to do triggering of
18 other devices in the plant, doesn't need to be
19 bidirectional, if it's a software-type signal to other
20 software-controlled systems.

21 MR. MORTON: Right.

22 MEMBER BROWN: And that was my point
23 relative to, particularly in the way you phrase this,
24 is that when you go from the higher safety
25 significance, whatever the terminology is, now, I

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1 liked it, to the lower significant safety systems or
2 lower significance systems, that's pretty clear.

3 And that took into account my thought
4 processes, but we didn't manage to get the one-way
5 directional stuff in there, just the general thought
6 process.

7 So I see, I read the red thing and I
8 looked through the preceding paragraph and there
9 weren't many changes there. But we did get at least
10 some of the architectural thought processes in.

11 MR. MORTON: Yes. And we understand and we
12 are, to a degree, limited in this document, because
13 that's not necessarily a D3 aspect per se. If you
14 look in other documents like ISE-4 and other guidance
15 documents that do a far better job of addressing those
16 points, more than we can do here.

17 But we did have that reference there. But
18 that was probably going in a direction that's a little
19 beyond what we can do in terms of the BTP itself,
20 because the subject matter is a little bit different.
21 But we did want to make that reference to your point,
22 but that's an important aspect to keep in mind. But
23 we understand.

24 MEMBER BROWN: Okay. Anybody else have a
25 response? Okay. Is the public line open yet?

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1 MS. ANTONESCU: Thomas --

2 OPERATOR: Public line is open --

3 MEMBER BROWN: Thomas, yeah, Thomas --

4 OPERATOR: -- for comments.

5 MEMBER BROWN: -- I'm sorry. Is it open,
6 I didn't hear you?

7 OPERATOR: Yes.

8 MEMBER BROWN: Okay. Is there anybody on
9 the public line that would like to make a comment?

10 MR. SCAROLA: Excuse me, this is Ken
11 Scarola. Are you accepting comments from the public?

12 MEMBER BROWN: Yes. Ken, are you there?

13 MR. SCAROLA: Hello? Yeah, I'm trying to
14 make a comment, but I don't know if I'm piped in yet.

15 MEMBER BROWN: Yeah, Ken, we can hear you.

16 OPERATOR: Yeah, we can hear you, Ken.

17 MEMBER BROWN: But you hear us?

18 MS. ANTONESCU: We can hear you.

19 MEMBER BROWN: Ken?

20 MR. MOORE: Steve Vaughn, can you hear us?

21 MEMBER BROWN: Steve, can you hear us?

22 MR. VAUGHN: Yeah, we can hear you.

23 MR. MOORE: Okay, because we can hear you
24 talking.

25 MEMBER BROWN: Okay. Steve, you're on the

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1 line, right? Excuse me?

2 MS. ANTONESCU: Thomas, can you cut off
3 the line, please?

4 MEMBER BROWN: What happened here? I'm not
5 a computer weenie on this part of it, who's --

6 MS. ANTONESCU: I think they were using
7 the bridge line, they didn't feel they were on and
8 they were talking among each other.

9 MEMBER BROWN: Yeah --

10 MR. MOORE: Right.

11 MEMBER BROWN: -- I got that. Thomas, is
12 there a way to get the bridge line straightened out?

13 CHAIRMAN BLEY: Yeah, they could not hear
14 us, apparently.

15 MEMBER BROWN: Yeah, that's what I got out
16 of that, all of them, nobody could hear us.

17 MS. ANTONESCU: We still have Steve Vaughn
18 from NEI. Steve, if you can connect on the MS invite
19 that I sent you, maybe that's a better way, since we
20 don't know yet about the bridge line, if we can open
21 it.

22 MEMBER BROWN: Is Steve still on? Okay,
23 he's not on. So --

24 MR. SCAROLA: Charlie, this is Ken Scarola,
25 are you taking comments from the public?

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1 MEMBER BROWN: Who's speaking?

2 MR. MOORE: It's Ken Scarola, I think.

3 MEMBER BROWN: He can't hear us --

4 MR. SCAROLA: Hello?

5 MEMBER BROWN: Ken, can you hear me?

6 MR. VAUGHN: Hey, real quick, this is Steve
7 Vaughn from NEI. So everyone can hear the discussion,
8 public stakeholder line discussion, they're trying to
9 figure out how to tie us back into the meeting.

10 OPERATOR: They have to unmute themself
11 with *6.

12 MR. SCAROLA: Okay.

13 MR. VAUGHN: So we'll just wait until they
14 tie us back, and then they'll open for public
15 comments.

16 OPERATOR: With *6.

17 MS. ANTONESCU: I don't think they can
18 hear us either, I'm going to give Steve Vaughn a call
19 again and let him know. *6, correct?

20 OPERATOR: That's correct.

21 MS. ANTONESCU: Okay.

22 MEMBER BROWN: Who just said that? Is that
23 Thomas?

24 OPERATOR: That is Thomas.

25 MEMBER BROWN: Okay, thank you, Thomas.

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1 OPERATOR: Okay.

2 CHAIRMAN SUNSERI: Thomas, this is Matt.
3 Can we have a staff member just call in on the public
4 line and tell them --

5 OPERATOR: For the members on the public
6 line, you need to press *6.

7 CHAIRMAN SUNSERI: So this is Matt. What's
8 going on? What are we doing?

9 MEMBER BROWN: Yeah, you've got me, Matt,
10 I don't know.

11 OPERATOR: Matt, this is Thomas, can you
12 hear me?

13 CHAIRMAN SUNSERI: Yes, I can hear you,
14 Thomas.

15 MR. SCAROLA: Yes, Ken Scarola is on the
16 public line.

17 MEMBER BROWN: Can you hear us?

18 OPERATOR: If you would like to make a
19 comment --

20 CHAIRMAN SUNSERI: So, Thomas, can we -- I
21 mean, we need somebody from our staff to call in on
22 the public line and talk to those people and tell them
23 we can hear them, but they can't hear us.

24 MS. ANTONESCU: I've already done that on
25 a separate line, but the *6 isn't working either,

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1 they've already tried it.

2 MEMBER BROWN: Well, but we can hear them,
3 so if you tell them to just go ahead and announce
4 their names and give their comments, we'll hear it.

5 CHAIRMAN SUNSERI: Yes.

6 MS. ANTONESCU: But they won't be able to
7 hear you back.

8 MR. MOORE: For members on the public line,
9 this is Scott Moore, I'm the executive director. The
10 members and the committee can hear you, but you cannot
11 hear them. So if you want to make a statement,
12 announce your name and then, go ahead and make your
13 statement, they can hear you.

14 MR. VAUGHN: All right. Thank you, Scott.
15 This is Steve Vaughan with the Nuclear Energy
16 Institute. Can you hear me?

17 MS. ANTONESCU: Yes, we can hear you.

18 MR. MOORE: Yes, I can, and I'm moderating
19 both lines.

20 MR. VAUGHN: Okay, thank you. Yes. So for
21 the other public stakeholders that want to make
22 comments, when I'm done, just press *6 and we'll kind
23 of go in order as best we can. But again, thank you,
24 my name is Steven Vaughn with the Nuclear Energy
25 Institute.

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1 And first off, I'd like to just say that
2 I appreciate the opportunity to allow NEI and its
3 members to participate in the three subcommittee
4 meetings on BTP 7-19. It felt like those public
5 discussions were great, we learned a lot. We were
6 able to discuss technical comments and regulatory
7 comments.

8 And I think the staff did incorporate a
9 lot of those and we very much appreciate that. And we
10 think the document has improved over the, let's see,
11 it's been a year, year and a half, has shown lots of
12 improvement. There's still a couple items that we
13 don't agree on completely, and that's okay.

14 NEI did submit a comment letter in, let's
15 see, mid-September, this month, to support a public
16 meeting on this topic on September 24. So again
17 another opportunity to have the industry and NEI
18 provide their perspectives.

19 So one thing I would note that was I think
20 a new comment, or new addition to the BTP, was the
21 concept of active hardware components.

22 So just one thing, I know we're getting
23 towards the end of the line here, where we really need
24 this BTP to hit the streets so people can use it, I
25 understand that is a concern and we're all about

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1 getting this document issued as soon as possible, but
2 if there's an opportunity to clarify what is meant by
3 an active hardware component, it could provide a
4 little more clarity to folks who are going to submit
5 license amendment requests to understand what the
6 scope of what they need to do in addressing common-
7 cause failures in I&C systems.

8 So I just -- one last comment, but again,
9 appreciate the opportunity to participate over the
10 last year and a half. We look forward to seeing the
11 document being issued as soon as possible. Thanks.

12 MEMBER BROWN: Thank you, Steve, if you can
13 hear me.

14 MR. SCAROLA: This is, yeah, this is Ken
15 Scarola from Nuclear Automation Engineering. I have
16 three comments, I hope you can --

17 MR. MOORE: We can hear you, Ken.

18 MR. SCAROLA: -- have the time for all
19 three of them. Can everybody hear me okay?

20 MR. MOORE: Yes.

21 CHAIRMAN SUNSERI: Yes, we can.

22 MR. SCAROLA: Okay. So my first comment
23 pertains to beyond-design-basis events versus design-
24 basis events.

25 As stated in the BTP, CCFs due to design

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1 defects are beyond-design-basis events and they can be
2 analyzed using best estimate methods. I completely
3 agree with that.

4 And Section B.1.1 says best estimate
5 methods include acceptance criteria that are less
6 conservative than the acceptance criteria for design-
7 basis events in the Final Safety Analysis Report. I
8 also agree with that.

9 However, within the BTP, there are no
10 actual acceptance criteria defined for D3 assessments,
11 with the exception of the acceptance criteria for CCFs
12 that are not mitigated. But those acceptance criteria
13 are not less conservative, they are the same
14 conservative, they are equally conservative to those
15 that are in the FSAR and they should not apply to
16 beyond-design-basis events.

17 Paragraphs B.3.b and B.5.c say the D3
18 analysis must demonstrate that the effects of
19 unmitigated or unassessed CCFs are bounded by the FSAR
20 criteria. But that should not be the case, because
21 that's the same conservatism, that's not less
22 conservatism, which is stated in Section B.1.1.

23 So the bottom line is the acceptance
24 criteria for beyond-design-basis events should be less
25 conservative than for design-basis events and the CCFs

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1 due to a design defect are beyond-design-basis events.

2 So right now this BTP is significantly
3 more conservative than its prior versions, which
4 allowed relaxed acceptance criteria for beyond-design-
5 basis events, and the BTP is actually inconsistent
6 within itself. So that's my first comment.

7 My second comment pertains to malfunctions
8 related to hardware failures. And the guidance
9 references various things, like NUREG-0800 and the
10 single failure criteria to handle these things.

11 But in highly integrated digital systems,
12 CCFs due to hardware malfunctions are much more likely
13 than CCFs due to design defects. And hardware
14 malfunctions are design-basis events, not beyond-
15 design-basis events.

16 Therefore, they need to be analyzed very
17 conservatively and they should not be analyzed with
18 relaxed acceptance criteria. And this is because they
19 are much more likely to occur within the lifetime of
20 the plant.

21 And in highly integrated systems, as
22 Charlie has identified, we tend to connect an awful
23 lot of things together. And a hardware malfunction,
24 a single hardware malfunction, can adversely affect
25 many, many things concurrently if the systems are not

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1 properly designed to prevent that.

2 Therefore, I understand that the intent of
3 this BTP is to focus on design defects, I'm simply
4 pointing out that there is no sufficient guidance
5 today to address CCFs due to hardware malfunctions in
6 highly integrated digital systems. And the staff
7 should be moving ahead with this additional guidance
8 as soon as possible.

9 My third comment. Section B.1.1 says that
10 LOOP does not need to be considered with other events
11 if LOOP is the initiating event. LOOP, I mean loss of
12 offsite power.

13 It's equally important that the D3
14 assessment does not need to consider the case where
15 the initiating event is not loss of offsite power, for
16 example, large break LOCA, but then there is
17 subsequently a loss of offsite power.

18 This does need to be accounted for within
19 the design-basis events in the FSAR. But it is an
20 untenable beyond-design-basis event condition for a
21 concurrent CCF. We just can't handle it. So it's
22 equally important that the BTP identifies the case
23 where the LOOP occurs first and when the LOOP occurs
24 second, and we cannot handle this concurrent with any
25 other event.

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1 And I can tell you, having been involved
2 with the design analysis for several AWLRs and for
3 operating plants that have digital protection systems,
4 none of these could mitigate a scenario with an
5 accident concurrent with a loss of offsite power. We
6 just can't do it. So I would hope that we can clarify
7 that point.

8 Those are my three comments. Thank you.

9 MR. MOORE: Thank you. The committee heard
10 all of those comments. Is there anybody else on the
11 public line that would like to make any comments?
12 Thank you. That concludes the public comment period.
13 Thomas, you can close the public line.

14 CHAIRMAN SUNSERI: Thank you, Scott.

15 MR. MOORE: Sure.

16 MEMBER BROWN: Yeah, thank you, Scott, for
17 being the intermediary there. Much appreciated.

18 Where are we? We finished the public
19 comment, we've gone around the table, or the internet.
20 I presume we'll get those captured in the transcript,
21 I couldn't write fast enough, and they'll be available
22 for the staff to handle those? Did you all get them,
23 Eric, or will be available to get them?

24 CHAIRMAN SUNSERI: It will be on the
25 transcript, Charlie.

1 MEMBER BROWN: Is Eric still there? And/or
2 Wendell?

3 MR. MORTON: Member Brown, this is Wendell.
4 Yes, we did get them.

5 MEMBER BROWN: Okay. I couldn't write fast
6 enough. So I'm not sure when we'll have the
7 transcript, but those can be tossed into your hopper
8 for consideration at some point.

9 MR. MORTON: Okay.

10 MEMBER BROWN: With that in mind, am I
11 missing something? But it appears that we have
12 completed this subcommittee meeting. And unless there
13 are any other comments, one more shot? Hearing none,
14 we will close the meeting. Matt, I presume we will be
15 heading into the next section. I'll turn it back over
16 to you.

17 CHAIRMAN SUNSERI: Okay, Charlie, thanks.
18 Do you have a draft report prepared on this?

19 MEMBER BROWN: Yes, it's in the system, in
20 there. I've got a few, as I go through it, I'll read
21 the whole thing, but based on some of the stuff I was
22 looking at last night and this morning, I will be
23 taking at least one of the recommendations and
24 discussion out, but we can do that easily at line-by-
25 line.

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1 CHAIRMAN SUNSERI: So are you prepared to
2 do a read-in to the record of your letter now, the
3 letter report?

4 MEMBER BROWN: Absolutely. I've got a hard
5 copy printout of my own.

6 CHAIRMAN SUNSERI: We'll see if Sandra is
7 on.

8 MEMBER BROWN: Can we take a five-minute
9 break for some of the old guys?

10 CHAIRMAN SUNSERI: Yeah, we can do a five-
11 minute break while we transition and get the letter
12 up. But I'd like to read it in before the next
13 session starts.

14 MEMBER BROWN: That should be easy.

15 CHAIRMAN SUNSERI: Okay.

16 MEMBER BROWN: It's only about 250 lines
17 long, it's not hard.

18 CHAIRMAN SUNSERI: Okay. So we're going to
19 break until 3:15, and we'll resume with the read-in of
20 the draft letter, 3:15. Thank you.

21 (Whereupon, the above-entitled matter went
22 off the record at 3:11 p.m.)
23
24
25

Draft

Branch Technical Position 7-19, Revision 8

Advisory Committee on Reactor Safeguards
Full Committee Meeting
NRC Staff Presentation
November 4, 2020

Agenda

- Objectives
- Topics within the draft BTP 7-19
- Summary of key changes
- Scope of the draft BTP 7-19
- Refinements based on ACRS feedback
- Safety significance
- D3 Assessment
- Additional Items in the draft BTP 7-19
- Status and next steps

Objectives

- Present key changes made in the draft BTP 7-19, Rev. 8, in response to comments provided by external stakeholders and the ACRS subcommittee.
- Obtain ACRS recommendation letter.

Topics in BTP 7-19, Revision 8

- Scope of the BTP
- Safety Significance Determination
- Defense-in-Depth and Diversity (D3) Assessment
- Means to Eliminate CCF from Further Consideration
- Diverse Means to Mitigate CCF
- Evaluation of Event Consequences for Coping with CCF
- Qualitative Assessment
- Spurious Operation Manual Action Means to Address Position 4 in SRM-SECY-93-087
- Justification for Not Correcting Specific Vulnerabilities

Summary of Key Changes

- Emphasized that guidance is directed to staff reviewers
- Added guidance and technical refinements for:
 - Failure types considered in BTP 7-19
 - Latent design defect
 - Safety significance determination scheme
 - Qualitative assessment guidance
 - Spurious operation guidance
- Consolidated technical guidance and acceptance criteria to perform the D3 Assessment.
- Performed other improvements for readability and organization.

Scope of draft BTP 7-19, Revision 8

Clarified and improved guidance to NRC staff for the evaluation of defense-in-depth and diversity (D3) for proposed digital I&C systems in accordance with the high level principles provided by the Commission in the SRM to SECY 93-087.



Refinements based on ACRS Feedback

- Improved discussion on DI&C architectural considerations while maintaining defense-in-depth.
- Improved lead-in discussions in each section of the BTP.
- Added discussion clarifying echelons of defense and overall defense-in-depth concept.
- Refined the ‘connectivity’ between major sections to improve logic flow and readability.

Safety Significance Determination

- High Safety Significance: Safety-related SSCs that Perform Safety-Significant Functions.
- Lower Safety Significance: Safety-Related SSCs that **Do Not** Perform Safety-Significant Functions and Non-safety-related SSCs that **Do** Perform Safety-Significant Functions.
- Lowest Safety Significance: Non-safety-related SSCs that **Do Not** Perform Safety-Significant Functions.



D3 Assessment

- A D3 assessment is a systematic approach an applicant uses to analyze the proposed design of a DI&C system for CCFs that can occur concurrently within a redundant design, such as within two or more independent divisions.
- A safety significance determination (i.e. graded) approach could be used to select methods to perform a D3 assessment, including any categorization of proposed DI&C SSCs based on the safety significance of the functions performed by the proposed DI&C SSCs.

D3 Assessment – Methods

- Identified means to eliminate CCF from further consideration using design attributes: diversity, testing, or qualitative assessment;
or
- Identified means to prevent or mitigate the effects of CCFs;
or
- Identified strategy to cope with CCFs by evaluating if the consequences due to CCF remain within acceptable limits;
or
- A combination of the above or a different proposed solution by the licensee/applicant (alternative methods).

D3 Assessment – Qualitative Assessment

- Considered a less technically-rigorous type of a D3 assessment for purpose of this BTP.
 - Qualitative assessment can only be used for low safety significance systems
 - CCF removed from further consideration if found “sufficiently low”
- Defined what constitutes a Qualitative Assessment.
 - Using factors in the aggregate to demonstrate likelihood of failure (i.e. CCF due to latent defect) remains acceptable
 - Supporting failure and consequence analysis (e.g. FMEA, FTAs, etc.)
- Provided staff guidance and acceptance criteria.

D3 Assessment – Spurious Operation

- Provided background information in Section 3 to consider spurious operation while evaluating a D3 assessment.
- Clarified regulatory basis of spurious operation.
 - Spurious operations as a result of CCFs originating from latent design defects are within the scope of this BTP
- Focused the staff guidance on integrated systems.
- Integrated acceptance criteria into relevant subsections within the review guidance of the D3 assessment.

Additional Items in Draft Revision 8

- Manual Action Means to Address Position 4 in SRM-SECY-93-087.
 - Clarified staff guidance on the use of displays and manual controls to monitor, control and actuate critical safety functions from the main control room
- Justification for Not Correcting Specific Vulnerabilities.
 - highlighted the possible use of alternative methods to not address specific CCF vulnerabilities
 - Emphasized that justifications would be reviewed on a case-by-case basis only

Status and Next Steps

- ACRS letter of recommendation
- OMB review and publication of final BTP 7-19, Rev. 8 by January 2021

Questions



Acronyms

ACRS	Advisory Committee on Reactor Safeguards
BTP	Branch Technical Position
CCF	Common Cause Failure
D3	Defense-in-Depth and Diversity
DI&C	Digital Instrumentation and Control
OMB	Office of Management and Budget
SECY	NRC Office of the Secretary to the Commission
SRM	Staff Requirements Memorandum
SSC	Structures, Systems, and Components

Background Information

SRM to SECY-93-087

1. The applicant shall assess the defense-in-depth and diversity of the proposed instrumentation and control system to demonstrate that vulnerabilities to common-mode failures have adequately been addressed.
2. In performing the assessment, the vendor or applicant shall analyze each postulated common-mode failure for each event that is evaluated in the accident analysis section of the safety analysis report (SAR) using best-estimate methods. The vendor or applicant shall demonstrate adequate diversity within the design for each of these events.
3. If a postulated common-mode failure could disable a safety function, then a diverse means with a documented basis that the diverse means is unlikely to be subject to the same common-mode failure, shall be required to perform either the same function or a different function. The diverse or different function may be performed by a nonsafety system if the system is of sufficient quality to perform the necessary function under the associated event conditions.
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. The displays and controls shall be independent and diverse from the safety computer system identified in Items 1 and 3 above.

SECY-18-0090 – Five Guiding Principles

1. Applicants and licensees for Production and Utilization Facilities under 10 CFR Part 50, “Domestic Licensing of Production and Utilization Facilities” or under 10 CFR Part 52, “Licensees, Certifications and Approvals for Nuclear Power Plants” should continue to assess and address CCFs due to software for DI&C systems and components.
2. A defense-in-depth and diversity analysis for reactor trip systems and engineered safety features should continue to be performed to demonstrate that vulnerabilities to a CCF have been identified and adequately addressed. In performing this analysis, the vendor, applicant, or licensee should analyze each postulated CCF for each event evaluated in the accident analysis section of the safety analysis report. This defense-in-depth and diversity analysis can be either a best estimate analysis or a design-basis analysis.
3. This analyses should also be commensurate with the safety significance of the system. An analysis may not be necessary for some low-significance I&C systems whose failure would not adversely affect a safety function or place a plant in a condition that cannot be reasonably mitigated.

Five Guiding Principles continued

4. If a postulated CCF could disable a safety function, then a diverse means, with a documented basis that the diverse means is unlikely to be subject to the same CCF, should perform either the same function or a different function. The diverse or different function may be performed by either a safety or a non-safety system if the system is of sufficient quality to perform the necessary function under the associated event conditions in a reliable manner. Use of either automatic or manual actuation within an acceptable time frame is an acceptable means of diverse actuation. If the defense-in-depth and diversity analysis demonstrates that a CCF, when evaluated in the accident analysis section of the safety analysis report, can be reasonably mitigated through other means (such as with current systems), a diverse means that performs the same or a different function may not be needed.
5. The level of technical justification needed to demonstrate that defensive measures (i.e., prevention and mitigation measures) are adequate to address potential CCFs should be commensurate with the safety significance of the DI&C system. For the systems of higher safety significance, any defensive measures credited need technical justification that demonstrates that an effective alternative to internal diversity and testability has been implemented.