

**Official Transcript of Proceedings**  
**NUCLEAR REGULATORY COMMISSION**

Title: Advisory Committee on Reactor Safeguards  
Digital Instrumentation and Controls

Docket Number: (n/a)

Location: teleconference

Date: Tuesday, September 8, 2020

Work Order No.: NRC-1077

Pages 1-135

**NEAL R. GROSS AND CO., INC.**  
**Court Reporters and Transcribers**  
**1323 Rhode Island Avenue, N.W.**  
**Washington, D.C. 20005**  
**(202) 234-4433**

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23

DISCLAIMER

UNITED STATES NUCLEAR REGULATORY COMMISSION'S  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

The contents of this transcript of the proceeding of the United States Nuclear Regulatory Commission Advisory Committee on Reactor Safeguards, as reported herein, is a record of the discussions recorded at the meeting.

This transcript has not been reviewed, corrected, and edited, and it may contain inaccuracies.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

+ + + + +

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

+ + + + +

DIGITAL INSTRUMENTATION AND CONTROLS SUBCOMMITTEE

+ + + + +

TUESDAY

SEPTEMBER 8, 2020

+ + + + +

The Subcommittee met via Video-  
Teleconference, at 9:30 a.m. EDT, Charles H. Brown,  
Jr., Chairman, presiding.

COMMITTEE MEMBERS:

CHARLES H. BROWN, JR., Chairman

JOY L. REMPE, Vice Chairman

WALTER L. KIRCHNER, Member-at-large

DENNIS BLEY, Member

JOSE MARCH-LEUBA, Member

DAVID A. PETTI, Member

MATTHEW W. SUNSERI, Member

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

ACRS CONSULTANT:

MYRON HECHT

DESIGNATED FEDERAL OFFICIAL:

CHRISTINA ANTONESCU

ALSO PRESENT:

ERIC BENNER, NRR

MARK BURZYNSKI, NewClear Day, Inc.

TEKIA GOVAN, NRR

DAWNMATHEWS KALATHIVEETIL, NRR

JERRY MAUCK, Public Participant

SCOTT MOORE, Executive Director, ACRS

WENDELL MORTON, NRR

WARREN ODESS-GILLETT, NEI

STEPHEN VAUGHN, NEI

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

C-O-N-T-E-N-T-S

Opening Remarks by Chairman

Charles Brown . . . . . 4

Introductory Remarks

Eric Benner . . . . . 8

Updated Draft Final BTP 7-19, Revision 8

Wendell Morton . . . . . 10

NEI Comments on Draft Final BTP 7-19, Revision 8 .

Stephen Vaughn, NEI . . . . . 104

Warren Odess-Gillett, Westinghouse . . . . . 118

Mark Burzynski, NewClear Day, Inc. . . . . 122

Closing Remarks by Chairman . . . . . 135

P-R-O-C-E-E-D-I-N-G-S

9:32 a.m.

CHAIRMAN BROWN: This is Charles Brown, the Chairman of the Digital I&C Subcommittee. It's a little bit after 9:30, so we will go ahead and start, and let Walt join us as he needs, as he can.

So anyway, this meeting will now come to order. This is a meeting of the Digital Instrumentation and Controls Subcommittee. I'm Charles Brown, Chairman of this Subcommittee meeting. ACRS members in attendance are Dennis Bley, Matt Sunseri, Jose is not here, Joy Rempe, Dave Petti, Walt Kirchner will join us, Myron Hecht, our consultant. And I think I've covered everyone on the Committee. if I've missed someone, please tell me.

Christina Antonescu of the ACRS staff is the designated federal official for this meeting.

Christina, can we make sure the court recorder is on, ready?

MS. ANTONESCU: Yes, the court reporter is one.

CHAIRMAN BROWN: Okay. The purpose of this meeting is for the staff to brief the Subcommittee on the updated Draft Final Branch Technical Position 7-19, Revision 8, the August 2020.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 Today we have members of the NRC staff and NEI to  
2 brief the Subcommittee.

3 The ACRS was established by statute and is  
4 governed by the Federal Advisory Committee Act, FACA.  
5 That means the Committee can only speak through its  
6 published letter reports. We hold meetings to gather  
7 information to support our deliberations. Interested  
8 parties who wish to provide comments can contact our  
9 office requesting time.

10 That said, we've set aside 10 minutes for  
11 comments from members of the public attending or  
12 listening to our meetings. Written comments are also  
13 welcome.

14 The meeting agenda for today's meeting was  
15 published on the NRC's public meeting notice website,  
16 as well as the ACRS meeting website. On the agenda  
17 for this meeting and on the ACRS meeting website are  
18 instructions as to how the public may participate. No  
19 request for making a statement to the Subcommittee has  
20 been received from the public.

21 Due to COVID-19 we are conducting today's  
22 meeting virtually. A transcript of the meeting is  
23 being kept and will be made available on our website.  
24 Therefore, we request that participants in this  
25 meeting first identify themselves and speak with

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 sufficient clarity and volume so that they can be  
2 readily heard.

3 All presenters please pause from time to  
4 time to allow members to ask questions. Please also  
5 indicate the slide number you are on when moving to  
6 the next slide.

7 We have a bridge line established for the  
8 public to listen to the meeting. The public line will  
9 be kept open in the listen-only mode until the time  
10 for public comment. To avoid audio interference I  
11 request all attendees to make sure they are muted when  
12 not speaking. Based on our experience from previous  
13 virtual meetings I would like to remind the speakers  
14 and presenters to speak slowly.

15 We will take a short break after each  
16 presentation to allow time for screen sharing as well  
17 as the Chairman's discretion during longer  
18 presentations.

19 We do have a short -- we will take a short  
20 break -- I just lost something. Where am I? We will  
21 take a short break after each presentation -- oh, I  
22 already did that one. We do have a backup call-in  
23 number should Skype go down and has been provided to  
24 the ACRS members. If we need to go to this backup  
25 number, the public line will be connected to the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 backup line.

2 Dennis, are you there?

3 MEMBER BLEY: Yes.

4 CHAIRMAN BROWN: Okay. If somehow I get  
5 disconnected, would you kind of keep things on track  
6 until I can get back in?

7 MEMBER BLEY: Certainly.

8 CHAIRMAN BROWN: Okay. Good. Thank you.

9 Lastly, please do not use any virtual  
10 meeting feature to conduct sidebar technical  
11 discussions. Rather, contact the DFO if you have any  
12 technical questions so we can bring those to the  
13 floor.

14 Just a schedule note: This meeting  
15 extends through lunch. We will be breaking for lunch  
16 at 1:00. The members have to attend another meeting  
17 from 1:00 to 2:00. I will remind you at that point we  
18 are going to recess. We will not log out of Skype.  
19 We will leave ourselves in the meeting and just open  
20 up -- for the members anyway we'll open up a second  
21 session, but we will reconvene at 2:00 for the post-  
22 lunch break finales. I will remind everybody of this  
23 when we get to that point.

24 We will now proceed with the meeting and  
25 we'll ask Mr. Dawnmathews Kalathiveetil to share his

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 screen with us while Eric Benner -- did I get that  
2 right, Dawnmathews?

3 MR. KALATHIVEETIL: Perfect.

4 CHAIRMAN BROWN: Okay. Thank you.

5 I will ask Eric Benner, the Director of  
6 the Division of Engineering and External Hazards in  
7 the Office of Nuclear Reactor Regulation for any  
8 introductory remarks before we begin today's  
9 presentations.

10 So, Eric, you're on.

11 MR. BENNER: Thank you, Member Brown. And  
12 I most want to thank the Committee for their  
13 flexibility, because as you all know we were  
14 previously scheduled to have this discussion earlier  
15 in the year. Because of a significant amount of  
16 feedback we got from stakeholders, we -- given the  
17 importance of this document for any significant  
18 licensing actions that the NRC would review, we felt  
19 it was important to faithfully review all that  
20 feedback and make changes as appropriate. So we asked  
21 for the briefing of the Subcommittee to be  
22 rescheduled. We appreciate that the Subcommittee was  
23 willing to entertain that rescheduling.

24 So we have a document that I think  
25 visually looks a lot different than the previous

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 document, and I think part of that was to honor an  
2 internal evaluation we had to reaffirm that this is  
3 guidance for the staff and how the staff will conduct  
4 their reviews and open the door to working with  
5 industry to create maybe some companion guidance for  
6 how licensees and applicants would put together their  
7 application.

8           So you're going to hear from NEI today.  
9 I think there are still some questions about exactly  
10 how the document -- this document would be used as  
11 opposed to what could potentially be contained in  
12 industry guidance, whether it's generated by industry  
13 or whether it be the NRC developing a regulatory guide  
14 for industry.

15           So I think we've been working hard in  
16 revising this document. We have not had a public  
17 interaction in the interim. This is our first public  
18 interaction since we've revised the document. So we  
19 do intend to have a separate public interaction to  
20 discuss these changes with stakeholders. We haven't  
21 aligned exactly on when that will be.

22           So today we are going to focus mainly on  
23 the changes we made. I think we are going to try to  
24 the extent we can address some of the stakeholder  
25 feedback that's going to be presented later, do that,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 but we're not at the -- ready to discuss at length how  
2 we are going to have that communication with  
3 stakeholders.

4 So with that I will turn it over to  
5 Wendell Morton, who will be leading the presentation  
6 for the staff.

7 MEMBER BLEY: Eric?

8 MR. BENNER: Yes?

9 MEMBER BLEY: This is Dennis Bley. The  
10 Committee's had this for a number of weeks to look at.  
11 When were the folks from the other stakeholders able  
12 to get copies of it? Have they had it long?

13 MR. BENNER: No, at the same time that we  
14 provided it to the Committee.

15 MEMBER BLEY: Oh, okay. So they've had a  
16 fair amount of time?

17 MR. BENNER: Yes, we made it public -- I  
18 mean, that's when we made it public, so that's when  
19 they had access to it.

20 MEMBER BLEY: Okay.

21 MR. MORTON: Okay. Thank you, Eric.  
22 Appreciate it.

23 Once again this is Wendell Morton. I am  
24 the team lead for the BTP-719, Revision No. 8 project,  
25 and today we'll be talking about a number of changes

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 we made inside there, but before we go any further I  
2 want to thank my fellow team members, Rossnyev  
3 Alvarado, David Ron, Dawnmathews, who is driving for  
4 me today. Thank you for that.

5 And also want to give a special  
6 appreciation for Tekia Govan, our PM, because without  
7 her we wouldn't have got this far. Instead, I want to  
8 thank her for her efforts involved in this project, as  
9 well as the rest of the staff that contributed to this  
10 effort, and all the industry stakeholders who provided  
11 a lot of great input that I think have gone -- to make  
12 a great difference in the improvement in this document  
13 overall.

14 As I said earlier we'll be discussing the  
15 latest change to the document, specifically changes  
16 between the June Subcommittee meeting for ACRS and the  
17 meeting we have today, and those changes obviously  
18 were made as a result of our public comment resolution  
19 and our own internal concurrence comments, as well as  
20 the feedback that was provided by the industry.

21 I want to note that the public comment  
22 file itself, which we'll be presenting in the November  
23 Full Committee meeting is still in the concurrence, so  
24 therefore there may be a few changes or refinements in  
25 the presentation, in the document as a result of

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 those. Just wanted to make a quick note of that.

2 And with that, Dawnmathews, can you go to  
3 slide No. 2? So today we'll be covering obviously  
4 some of the objectives we have, a summary of the key  
5 changes we've made, the key top layers within the  
6 document, covering some of the topics in the Draft  
7 BTP, the scope of the document, the editing and  
8 restructuring of the BTP, which I know a lot of folks  
9 are interested in, specifically with the D3  
10 assessment, with the command and controls guidance,  
11 and then one -- another particular especially for the  
12 justification document and the specific  
13 vulnerabilities. We're going to get into a number of  
14 those things in this presentation. And then lastly  
15 we'll discuss the status and the next steps going  
16 forward into the end of the year.

17 So if there no questions on that,  
18 Dawnmathews, please go to slide No. 3.

19 So obviously our objectives is to present  
20 the key changes made to the BTP and to obtain ACRS  
21 Subcommittee feedback on the current draft version.  
22 The Subcommittee did make a number of really good  
23 comments for our consumption from the previous  
24 meeting. And to the extent practicable we did  
25 incorporate those comments and we will have a few

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 slides, a slide or so devoted to that point that we  
2 will cover going forward into the meeting.

3 Please go to slide 4. So the summary of  
4 the key changes. The biggest thing we want to say  
5 here is that conceptually the BTP was revised and sort  
6 of refined so that it focused more on staff guidance.  
7 So a number of the sections within the BTP did see  
8 some refinements or changes to sort of align along  
9 those points.

10 Along those lines we did restructure  
11 conceptually what the D3 assessment actually was. So  
12 previously you might have seen that the graded  
13 approach was actually called a graded approach. And  
14 then you might have seen a D3 section. Then you might  
15 have seen another separate section for the qualitative  
16 assessment and then something separate for spurious  
17 operation.

18 In going through -- looking at the  
19 stakeholder feedback we received and going through our  
20 own internal discussions we decided that in order to  
21 simplify the document we really needed to warehouse  
22 all those different concepts under the same umbrella  
23 and just call it a D3 assessment. And we're going to  
24 get into that in more detail.

25 So obviously because some of the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 restructuring the numbering you're going to see inside  
2 the BTP has changed a bit as well in terms of the  
3 section numbers. And obviously along those lines some  
4 things have been edited and restructured. Much of the  
5 concepts are the same; it's just been moved around to  
6 different parts or it's been refined and provided more  
7 detail based on feedback we've gotten, especially from  
8 ACRS in a previous meeting.

9 We believe these other improvements  
10 include readability of the document obviously, the  
11 technical content and overall clarity of the positions  
12 contained within and its overall organization, but I  
13 do want to emphasize that many of these changes were  
14 the result of ensuring that the BTP itself remains  
15 directed to staff and staff reviewers only. So that's  
16 one of the primary drivers for a number of the changes  
17 you'll see in the document, especially from the June  
18 '20 meeting going forward. And we'll get into that  
19 later on in the presentation for that.

20 Dawn, if you'd go to slide No. 5, please?  
21 So here is just a summary of the major topic areas  
22 within the BTP. Obviously we made a number -- we made  
23 a few changes or refinements to the scope of the  
24 document in terms of what we consider latent defects.  
25 We made some changes to the overall graded approach

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 scheme. And it's now been revised, so it's no longer  
2 really called a graded approach, and we'll get into  
3 that later on. We've warehoused the D3 assessment a  
4 bit differently to make it more holistic so that other  
5 types of analyses for lower safety significant systems  
6 will be generally considered another type of D3  
7 assessment. We'll make that clear. We'll clarify  
8 that within this presentation as well.

9 Also, the different types of means to  
10 eliminate CCF consideration, diverse means, evaluation  
11 of event consequence and so on and so forth. These  
12 are the major topical layers we're going to cover. At  
13 our end of the BTP we'll cover how those changed post  
14 the June 2020 ACRS meeting.

15 So, Dawn, can you go to slide No. 6,  
16 please? So now we're going to get into the scope of  
17 the BTP itself. And we did receive a number of public  
18 comments along the lines in terms of scope. What  
19 types of failures are included within the scope of  
20 consideration for this analysis? And one of the major  
21 comments we had from ACRS is clarifying what the  
22 definition of latent defect was, and that's exactly  
23 what we did within the scope, clarifying that it  
24 includes active hardware, software and software-based  
25 logic when addressing the CCF. And that's really the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 whole scope and focus of the BTP. So we clarified the  
2 background section of the BTP to make that very clear,  
3 that that's the scope and overall goal of the analysis  
4 when you're looking at CCFs due to latent defects.

5 We clarified the design and analytical  
6 solutions in the BTP, essentially meaning that within  
7 the concept of D3 we tried to provide maximum  
8 flexibility for a staff reviewer when looking at an  
9 application to see what are the potential solution  
10 sets that an applicant or a licensee may provide to  
11 address CCF for systems of differing safety  
12 significance. And we'll get into that a little more  
13 later in the presentation.

14 As part of that we resolved a number of  
15 public comments regarding the scope. A number of the  
16 public comments were kind of going in different  
17 directions whereas one -- some commenters wanted the  
18 scope to remain what it previously was, which was  
19 focused strictly on software. Other commenters  
20 thought that the scope should expand to where we have  
21 currently decided to be. So within our discussion we  
22 decided that ensuring that we cover all the bases with  
23 CCF is more beneficial both towards our future state  
24 determinations as well as the technical adequacy of  
25 the content that's being provided within the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 applications and license amendment requests. And  
2 obviously we made some conforming changes within the  
3 entire document along those lines to ensure there's  
4 consistency in those considerations.

5 So if there's no other questions on that,  
6 Dawn, can you go to slide No. 7?

7 So editing and restructuring the BTP. As  
8 we stated earlier one of the main drivers of some of  
9 the changes the public and ACRS members may have seen  
10 from the June version of the document were in order to  
11 ensure that the staff -- this remains staff guidance  
12 essentially, that its main focus was that. So some  
13 content was either revised or moved due to that  
14 because it presented as industry-specific guidance,  
15 something that's more akin to a Reg Guide or an ISG,  
16 whereas a BTP is under a different consideration.  
17 It's under a different set of I would say controls and  
18 rules, and we tried to ensure that the changes made  
19 really focus that this guidance was directed towards  
20 staff.

21 So therefore we tried to walk the fine  
22 line between making sure that obviously our industry  
23 stakeholders do use this document in terms of guidance  
24 for addressing CCF, and we understand that, but we  
25 also had to walk the fine line between that and

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 ensuring that this remains staff guidance. We believe  
2 we have achieved a fairly good balance between those  
3 two considerations, but we're still open to hearing  
4 feedback on that point. But that's the real main  
5 driver for a lot of edits and restructure of the  
6 document itself.

7 CHAIRMAN BROWN: Eric?

8 MR. MORTON: Part of the --

9 CHAIRMAN BROWN: Oh, I'm sorry. I thought  
10 you were finished with the slide. Go ahead and finish  
11 with the slide.

12 MR. MORTON: Sure. And just as you see in  
13 the slide some of the refinements we made due to  
14 those, to industry comments and then our own internal  
15 discussions were really bringing a closer resolution  
16 to the different types of (audio interference). We've  
17 heard different comments about that, such as what are  
18 you doing when it comes to CCF versus single failures  
19 and they have propagating or cascading effects? So as  
20 part of the refinement to the document we clarified  
21 what failures of consideration are within the scope  
22 and what failures are not within the scope? And now  
23 if you can see our primary goal for the document is  
24 not considering single failures, single malfunctions  
25 or their effects. It is CCF due to latent defects is

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 the main scope.

2 And obviously one of the bigger changes --  
3 actually two of the bigger changes we've made is to  
4 incorporate the previous qualitative assessment  
5 section and the previous spurious operation guidance  
6 into the overall D3 assessment as considerations to  
7 do. And we'll get into that in more detail when we  
8 get to those individual sections.

9 Member Brown, you had a question?

10 CHAIRMAN BROWN: Yes, going back and  
11 reviewing four different versions of this from Rev. 7  
12 to the November Subcommittee meeting version to the  
13 June Subcommittee meeting version to the first  
14 version --

15 MR. MORTON: Yes, sir.

16 CHAIRMAN BROWN: -- of the one for this  
17 meeting, which was then revised to become the fifth  
18 version.

19 MR. MORTON: Yes.

20 CHAIRMAN BROWN: Or some -- I might be off  
21 by a version or two.

22 MR. MORTON: That's fine.

23 CHAIRMAN BROWN: Going from earlier  
24 versions, if you go back even to Rev. 5 vice Rev. 6 --

25 MR. MORTON: Yes.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 CHAIRMAN BROWN: -- there were numerous --  
2 numerous -- by numerous, that's my definition --

3 MR. MORTON: Yes.

4 CHAIRMAN BROWN: -- examples for the  
5 reviewer of some of the concepts --

6 MR. MORTON: Yes.

7 CHAIRMAN BROWN: -- relative to things  
8 such as manual actuation should be downstream of the  
9 last set of components that could actually be impacted  
10 by CCF.

11 MR. MORTON: Yes.

12 CHAIRMAN BROWN: The other one would be  
13 the 30-minute type stuff on manual operations relative  
14 to time of time available and time required. All of  
15 that was fundamentally -- virtually all examples for  
16 the reviewer have been deleted. You reference -- I'll  
17 finish.

18 MR. MORTON: Yes.

19 CHAIRMAN BROWN: You do reference  
20 documents such as Reg Guide 1.62 --

21 MR. MORTON: Yes.

22 CHAIRMAN BROWN: -- which is the Manual  
23 Operation Reg Guide. You do reference NUREG-6303,  
24 which goes through the diversity and  
25 defense-in-depth --

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 MR. MORTON: Yes.

2 CHAIRMAN BROWN: -- I think the six types  
3 that you refer to, and they cover -- and then you talk  
4 also from -- the time manual action is SRP Chapter 18,  
5 Appendix A.

6 MR. MORTON: Yes.

7 CHAIRMAN BROWN: Just one of my basic  
8 concerns -- I understand -- this is my opinion or  
9 my --

10 MR. MORTON: Yes.

11 CHAIRMAN BROWN: -- thought of why you did  
12 it. You eliminate duplication when you refer back to  
13 the other documents.

14 MR. MORTON: That's correct. Yes.

15 CHAIRMAN BROWN: That's both a good side  
16 and a bad side.

17 MR. MORTON: Yes.

18 CHAIRMAN BROWN: There's a downside to  
19 that. Based on all the interactions we've had, a lot  
20 of the interactions we've had in the past, you --  
21 staff -- the document doesn't much stand on its own.  
22 It really has got a lot of different tendrils back  
23 into a whole lot of other documents, which are fairly  
24 voluminous in some cases, for people to be familiar  
25 with. And in this day and age it would seem to me the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 experience level of the reviewers in many cases  
2 they've not done any of this before. They're not  
3 familiar with all the stuff that people have tossed  
4 around in terms of how we do things and the  
5 fundamental bases for things.

6 Did you all think at all about that in  
7 terms of how much you deleted?

8 MR. MORTON: Yes, so we actually had a lot  
9 of conversations about that, Member Brown, in terms of  
10 -- and actually I think you made the case for the last  
11 few sentences. You said in terms of why we did remove  
12 certain content.

13 No. 1, as you did say, there's tendrils,  
14 there's pointers to various different portions of  
15 other staff guidance, whether it's Reg Guide 1.162 or  
16 SRP Section 18 for a human factors aspect of it.

17 One of the things that you did say is that  
18 there's a voluminous amount of material in those two  
19 examples of guidance. And the amount of information  
20 that would actually make useful to put in the BTP  
21 would sort of defeat the purpose of even having those  
22 guidance, so it's better to have a reference to them  
23 rather than putting a small tidbit of information from  
24 them so that the user can understand that if you're  
25 looking at point 3 and point 4 of the SRM SECY 93087

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 ensuring how you meet that guidance.

2 Pointing to the Reg Guide 1.162 -- excuse  
3 me, 1.62 rather than having a small subset did reduce  
4 some of the duplication of information that can be  
5 readily found within the Reg Guide itself. Rather  
6 than having a specific subsection it only has a  
7 partial amount of the content. It really wouldn't do  
8 it justice for a staff reviewer looking at that. So  
9 you kind of actually made the case for why we've done  
10 that.

11 Also in consideration of readability and  
12 usability of the document for both staff and industry  
13 we're trying to keep the document to a -- let's just  
14 say reasonable length, but if we did incorporate a lot  
15 of those other pointers to information, it would make  
16 the document much more voluminous than it needs to be,  
17 as you stated earlier.

18 MR. BENNER: And, Member Brown, if I may  
19 add; this is Eric Benner, we -- there's a general  
20 attempt by staff to streamline some of this guidance  
21 and then use maybe other -- one is to make sure the  
22 guidance interfaces appropriately, and that's the use  
23 of pointers.

24 Regarding things like examples, we're  
25 considering things like using other tools like

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 Nucleapedia and figuring out the best way to keep  
2 capturing a lot of the knowledge management aspect.  
3 So we -- we're -- the door is still open on how we're  
4 going to do that. I will say that the people who are  
5 going to first use the BTP for the first reviews are  
6 going to be very familiar with all those supporting  
7 documents. So it's not like we're going to throw a  
8 new reviewer the BTP and say here, license on major  
9 modifications.

10 So there's acknowledgement that for the  
11 first ones we definitely need the experience people,  
12 the people who have been involved in the revision to  
13 the BTP. And then there's definite knowledge  
14 management work to do within the staff as we get  
15 through those first reviews to make sure that all the  
16 reviewers understand all the ins and outs of the BTP  
17 and the linkages to other guidance documents.

18 MEMBER BLEY: Eric, this is Dennis Bley.  
19 Just to follow up on Charlie's question, I'm kind of  
20 in the middle on this, and I think back to 10 or 12  
21 years ago when we ran into a case, a special one on  
22 manual human actions human actions where some of the  
23 people involved at this point weren't aware of some of  
24 the other work that had provided better guidance, if  
25 you will, or more thorough guidance in this area.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1           One thing that might help; have you guys  
2 thought about doing it, if instead of just the long  
3 list of references you put some kind of graphic map to  
4 put in here to help the newer reviewers see what these  
5 linkages are and real briefly what's in each place,  
6 where you get examples of one kind of problem or  
7 another?

8           CHAIRMAN BROWN: I'm going to -- I want to  
9 echo Dennis' comment a little bit. You do reference  
10 -- you don't depend on the list of references to get  
11 this. You do reference Reg Guide 1.62, 63.03 --

12           MR. BENNER: Yes.

13           CHAIRMAN BROWN: -- SRP Chapter 18,  
14 Appendix A in the text where you're discussing these  
15 particular forms. There's a few inconsistencies that  
16 you've now built in with this, because if you look at  
17 1.62, there's a specific sentence in 1.62 that says  
18 guidance provided in BTP 7-19 asserts that manual  
19 controls should be connected downstream of the plant's  
20 digital safety systems. In other words, it uses the  
21 basis for 1.62 as being in 7-19. So that's missing.  
22 I'm not falling over myself dying about that. It's  
23 just we built -- it's almost like 7-19 was the  
24 originator and then somehow it flowed into 1.62.

25           But Dennis is right from the standpoint

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 that if there is a way to clarify within the BTP the  
2 relevant other documents so that they don't have to  
3 worry about looking at that list in front,  
4 particularly if there's more than one that applied to  
5 a particular area.

6 I think -- Dennis, did I capture your  
7 thought?

8 (No audible response.)

9 CHAIRMAN BROWN: Are you there?

10 MEMBER BLEY: You had a different take on  
11 it, but yes, we're talking about the same thing.

12 CHAIRMAN BROWN: All right. Okay. So I  
13 didn't want to undercut because I -- you -- if you're  
14 familiar, if you're experienced and you've done a lot  
15 -- a number of these, then your brain is already  
16 thinking like that. I just -- it's the aspect of I  
17 know that there -- we all -- all organizations go  
18 through a case where you have to rebuild and you don't  
19 want to rebuild in entirety. You want to have a  
20 gradual turnover of knowledge, if you want to call it  
21 that. And that's difficult to do. I faced that for  
22 22 years in NR, in naval reactors.

23 So anyway, that's why I -- I just wanted  
24 to make sure I understood your thought process, if it  
25 was somewhat in line with mine. I do not have any

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 comments on that. I will have a couple of real basic  
2 comments to roast you all on at the end of the  
3 meeting, but I did not want to interfere with the  
4 process of getting through this, because I think  
5 there's a couple of points that are ripe for  
6 discussion at the end of the meeting, but I --  
7 literally I want to flow through what you all did.

8 I do want to give one positive comment;  
9 you think we never do that, but after the four -- I  
10 don't know how many rounds of versions on Rev. 8 have  
11 been now. I put aside all the rest of them in the  
12 beginning. Rev. 7, I put the first three versions of  
13 Rev. 8 -- and I took the August version. I just sat  
14 down and read it. Then I think Tekia and her staff  
15 did a very good job of reorganizing and bringing --  
16 instead of having various types of these issues  
17 scattered, they were consolidated into discrete  
18 sections. It read much smoother, much smoother than  
19 the Rev. 7. I went back and read that again, as  
20 painful as it was.

21 So that's a bit of a compliment. I  
22 shouldn't maybe do that because you won't like the end  
23 of the meeting comments.

24 MR. MORTON: We'll take what we can get,  
25 Member Brown.

1 CHAIRMAN BROWN: Pardon?

2 MR. MORTON: We'll take what we can get,  
3 Member Brown.

4 CHAIRMAN BROWN: Yes, I know, but I just  
5 -- at some point -- because this is a very, very  
6 difficult task, and I thought the reorganization and  
7 the reruns -- in spite of the pain and agony that  
8 you've had to go through, I think the end -- it did  
9 read much smoother. The various ways to deal with  
10 defense-in-depth and diversity were not scattered in  
11 terms of their context.

12 MR. MORTON: Yes.

13 CHAIRMAN BROWN: They were more compact in  
14 one or two particular sections. So that was a  
15 positive side. I'll let you get on with the rest of  
16 the slide here and then --

17 MR. MORTON: Yes.

18 CHAIRMAN BROWN: to the next -- reset of  
19 the slides. So thank you for your response.

20 MR. MORTON: Yes, no problem. And that  
21 was definitely one of our goals is to make sure the --  
22 all relevant information to a specific topic was  
23 contained where it should be to improve overall  
24 readability so you didn't have things scattered.  
25 Because we noticed that about Rev. 7 and previous

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 revs, that things are kind of all over the place. So  
2 making sure things were in their right silo for  
3 readability for both the staff review and for the  
4 folks in industry who may be using it was one of our  
5 goals.

6 I would also note that one nuance in terms  
7 of content, that we kind of noticed this with the  
8 manual operator action guidance, is that sometimes  
9 things change within the referred-upon guidance  
10 document. So sometimes when you have too much  
11 information quoted from a particular document,  
12 document changes, it also affects the BTP. And I  
13 think you just gave an example of that, Reg. Guide  
14 1.62. So that's another reason why we have had to  
15 reduce the amount of footprint of other documents from  
16 the guidance structure into the BTP because of that  
17 point.

18 CHAIRMAN BROWN: Well, I was just trying  
19 to make the point that the 1.62 kind of made 7-19 the  
20 basis for why the downstream. Now you all have  
21 reversed that. I don't have any problem with that.  
22 It's just now 1.62 makes an assertion that is no  
23 longer true because you don't even -- downstream is  
24 not even mentioned in the BTP.

25 MR. MORTON: Yes.

1 CHAIRMAN BROWN: It's strictly a reference  
2 to 1.62.

3 MR. MORTON: Yes.

4 CHAIRMAN BROWN: So I mean, it's going to  
5 be what it is.

6 The other -- I guess the other thing that  
7 I felt when I read through it, the reorganization and  
8 the deletion of certain types of information really  
9 put it more on a -- it's more ethereal and abstract in  
10 many cases. There's no direct connection to equipment  
11 in some ways, which when you remove examples of what  
12 is acceptable --

13 MR. MORTON: Yes.

14 CHAIRMAN BROWN: -- you lose context with  
15 the high-level thought process. That's all. It's  
16 just something we're going to have to deal with.

17 MR. MORTON: Okay.

18 CHAIRMAN BROWN: All right. Go ahead.  
19 I'm sorry. I just had to get my two cents worth in.

20 MR. MORTON: Not a problem, Member Brown.

21 If there's no other questions on this  
22 slide -- we'll get into the D3 assessment piece later  
23 on.

24 But if there's no questions, Dawnmathews,  
25 please go to slide No. 8.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1           And as discussed earlier, these are some  
2 of the major changes we've made based upon previous  
3 ACRS feedback. This is going back to the November  
4 Subcommittee meeting and the June Subcommittee  
5 meeting. I know Member Brown had a couple concerns in  
6 terms of removal of content. And as you stated  
7 earlier, a lot of that was driven by making sure that  
8 the document itself remain focused and directed  
9 towards staff with refinements and improvements in the  
10 content flow and structure of the document and in  
11 terms of the lead-in discussions we did with each  
12 major section of the BTP so that we actually provided  
13 a better lead-in for the content itself so that it was  
14 understandable to the reader, whomever that may be,  
15 what we're actually trying to accomplish with that  
16 particular section of guidance.

17           Another major point that we discussed in  
18 the previous meetings is just the basic understanding  
19 of the overall concept of defense-in-depth and the  
20 echelons of defense that comprise that. So we did  
21 have a larger section of that previously, but due to  
22 the changes we made it did get reduced down to more of  
23 a clarified and refined portion where we basically  
24 said the overall goal is to maintain defense-in-depth  
25 for the plant.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1           And there's the basic four echelons of  
2 defense-in-depth which we define within the BTP still,  
3 just maybe not in the level of detail that was  
4 previously. We really refined it towards what was  
5 necessary for our basic understanding of that, and we  
6 provided references to the NUREG-6303, which provides  
7 more granularity in those particular concepts.

8           So this kind of illustrates what we were  
9 talking about with the previous slide in terms of  
10 redefining the content without having extraneous  
11 detail that necessarily didn't actually add to it, but  
12 may have gotten in the way of getting -- making a  
13 crisp understanding of the reading when you get to  
14 that particular section.

15           And also when we say -- for the last  
16 bullet, refine the connectivity between the major  
17 sections, you have Sections 2, 3, 4, 5 and 6 now. And  
18 as Member Brown had referred to earlier, Rev. 7 was  
19 kind of all over the place when it came to sections.  
20 There were multiple different sections about spurious  
21 operation and things like that. So we made sure that  
22 if there are jump-off points or lead-in points or  
23 connections between some areas -- we tried to make  
24 them as clear as possible so that the reader  
25 understands where you should be going, whether the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 document to accomplish -- trying to accomplish,  
2 whether you're looking at a different aspect of a D3  
3 assessment, a particular methodology or if you're  
4 looking at how to -- what information you need to  
5 provide in the application. We tried to make sure  
6 that all those particular connections were clear and  
7 crisp so there was no ambiguity for -- which you need  
8 to do when you're reading through the documents.

9 CHAIRMAN BROWN: I will -- this is me  
10 again. I will be addressing your echelons issue as  
11 part of my discussion at the end of the meeting, just  
12 to give you a heads up.

13 The lead-in discussions were -- it was  
14 obvious you took into account the comments we made in  
15 the last couple of meetings, and I think that improved  
16 it. I hope you all thought it improved it. I thought  
17 it did.

18 MR. MORTON: We did. Actually we did.

19 CHAIRMAN BROWN: Your comment about  
20 spurious actuations and stuff, that was kind of  
21 sprinkled in a couple of the different areas. There's  
22 not a -- there is one area on spurious, but then it's  
23 -- the use of the word spurious is tossed in a few  
24 other places. I feel it's appropriate, so I didn't  
25 say anything about -- I wasn't going to say anything

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 about that other than making the observation that some  
2 of the comments we made back in 2011 when we reviewed  
3 Rev. 6 --

4 MR. MORTON: Yes.

5 CHAIRMAN BROWN: -- which were  
6 incorporated in responses from the EDO. Those are  
7 gone and you now are just referencing the base  
8 documents, 6303 and et cetera, or the other type  
9 documents for those issues. So that was a pretty big  
10 change. So you did lose the comments and stuff we --  
11 that you all added in response to our recommendations  
12 from 2011, if you can believe I actually found it. I  
13 was surprised as well.

14 All right. Go ahead. I'm sorry.

15 MR. MORTON: Yes, Member Brown, just to  
16 sort of touch on that point, we did take a hard look  
17 at those previous comments from the 2011 letter and we  
18 did look at -- we did take really hard into account  
19 all the feedback that we provided from the November  
20 Subcommittee meeting from last year in this meeting.  
21 There were some things we were able to maintain  
22 because they did align with the refinement of the  
23 document to make sure it's directed towards staff.

24 There were other things a bit more  
25 challenging to maintain, so what we tried to do is

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 maintain the basic abstract content that was in there  
2 such as the definition of the defense-in-depth and  
3 some of the basic concepts of it without getting into  
4 a lot of the extra detail that really exists within  
5 for example NUREG-6303. And that's kind of the basic  
6 way we went about it is for documents that we do  
7 reference, we get into more of the basic aspects of it  
8 as it pertains to addressing CCF due to latent  
9 defects. And any other further discussions we simply  
10 provide the pointer that you can get that in a better  
11 source, in extra source material itself.

12 CHAIRMAN BROWN: Okay. Well, I'm going to  
13 give you a heads up for the end then because in both  
14 the November meeting --

15 MR. MORTON: Yes.

16 CHAIRMAN BROWN: -- and the June meeting  
17 I brought up the issue of architecture as being kind  
18 of the overall framework for defense-in-depth.

19 MR. MORTON: Yes.

20 CHAIRMAN BROWN: And the word architecture  
21 is not even mentioned in the new BTP other than maybe  
22 it's for a control system architecture. That was  
23 about the only one, one listing of it.

24 And I think the biggest point that I think  
25 we missed in this version of the BTP is -- and you do

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 list what you call from 6303 the normal echelons of  
2 defense: reactor control, reactor trip, SFAS and the  
3 monitoring and indication systems as individual  
4 echelons of defense. That's in the background.

5 MR. MORTON: Yes.

6 CHAIRMAN BROWN: But the basic overall  
7 thought process of how you develop a defense-in-depth,  
8 this reminds me of my first introductions to how the  
9 staff was reviewing the I&C systems, trip systems and  
10 SFAS systems for new -- some of the new applications  
11 where it was piecemealed. They were fundamentally  
12 taking IEEE standards and Reg Guides, reviewing the  
13 positions and saying if you meet the position, then  
14 everything is fine, but you didn't know what the CAR  
15 (phonetic) looked like.

16 MR. MORTON: Okay.

17 CHAIRMAN BROWN: And you will find me  
18 addressing this in exquisite excruciating painful  
19 detail at the end of the meeting, because I think we  
20 lost a -- we didn't lose. We haven't really stressed  
21 how architecture and echelons of defense go together  
22 as a starting point. And so I'll bring that up at the  
23 end, but I'm a firm believer in the echelons of  
24 defense approach, the separation of church and state,  
25 the independence of the major safety systems, and both

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 of those issues are just like a stake in my heart if  
2 they're not addressed properly. So -- or in my own  
3 mind properly.

4 MR. MORTON: So, Member Brown, if I  
5 understand your comment, then you don't believe that  
6 there is enough emphasis on the defense-in-depth  
7 concept with --

8 (Simultaneous speaking.)

9 CHAIRMAN BROWN: The basic concept -- it  
10 ought to be up in the background. And I'll give you  
11 all kinds of words on it at the end, and then you'll  
12 obviously be able to do with it what you want.

13 MR. MORTON: Okay.

14 CHAIRMAN BROWN: But I think that really  
15 helps put in perspective what are we trying to  
16 accomplish? What is the reviewer trying to maintain  
17 and make sure he has? And I think that's lost right  
18 now. Some of it got lost when we eliminated some of  
19 the -- what I would call the little fine points, but  
20 they weren't in part of the big picture. They were  
21 little tidbits. And those of us who have been  
22 involved in it for decades understand what the tidbits  
23 meant, but now we -- I think you've done a good job  
24 with the rest of the document, but that background on  
25 what we're trying to accomplish is -- can stand some

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 real basic improvement which I'll provide some detail  
2 on at the end.

3 MR. MORTON: Okay. We appreciate the  
4 comment then. Thank you.

5 CHAIRMAN BROWN: Okay. Thank you.

6 MEMBER KIRCHNER: Charlie, this is Walt  
7 Kirchner.

8 CHAIRMAN BROWN: Yes.

9 MEMBER KIRCHNER: Could I just -- I just  
10 observed something, and that is with regard to this  
11 defense-in-depth concept the late Ms. Drouin had done,  
12 from the staff, quite a bit of work in this area in  
13 documenting it in a -- I think it was a Knowledge  
14 Management Report where she laid out seven principles  
15 of defense-in-depth. And I'm just curious as whether  
16 the staff working on this referred to that work that  
17 was done by their colleagues.

18 MR. MORTON: I'm sorry. I didn't catch  
19 who you were referring to. I guess I might got a  
20 little bit of static. I didn't catch who you were  
21 referring to on the staff.

22 MEMBER KIRCHNER: She passed away last  
23 year. Dennis probably can help me. Drouin I think is  
24 -- was her name.

25 MEMBER REMPE: It was Mary Drouin.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1           MEMBER KIRCHNER:    Yes.    And she put  
2           together a defense-in-depth package as part of the  
3           knowledge management effort and laid out --

4                               (Simultaneous speaking.)

5           MEMBER BLEY:       -- Knowledge Management  
6           NUREG.

7           CHAIRMAN BROWN:   What was that, Dennis?

8           MEMBER BLEY:       It was a Knowledge  
9           Management NUREG.   It was one of the first ones of  
10          those to get published.

11          MEMBER KIRCHNER:   Yes, that's it.  Thank  
12          you, Dennis.  Yes.

13          MR. MORTON:       Yes.

14          MEMBER KIRCHNER:   And it had a nice  
15          structure for what was meant by defense-in-depth and  
16          laid out -- and I'm just curious to the extent that  
17          that's used across the staff as a -- kind of an  
18          accepted way of approaching defense-in-depth, or does  
19          each branch of the staff come up with its own  
20          definition of what defense-in-depth means?

21          MR. MORTON:       I wouldn't say that we come  
22          up with different definitions of defense-in-depth.  We  
23          generally focus on -- within NUREG-6303 and NUREG-  
24          7007.

25                               What I can tell you is we can take an

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 action to follow up on that point to see what she had  
2 -- what she put together for that and --

3 (Simultaneous speaking.)

4 MEMBER KIRCHNER: Well, Charlie's  
5 observations just made me think of that and that might  
6 be a useful introductory passage, something that  
7 Charlie was -- Member Brown was pointing out. Thank  
8 you.

9 CHAIRMAN BROWN: Walt, that was my  
10 intention with what I have put together for discussion  
11 at the end after you all have completed it.  
12 Unfortunately I didn't get it -- I'll have to read it  
13 to you and then let you throw darts at it. I just  
14 finished drafting it at 1:00 this morning, so --

15 MR. MORTON: Oh, well, we appreciate the  
16 defense-in-depth data. Thank you.

17 CHAIRMAN BROWN: So I mean but that is the  
18 point. The real point to this whole BTP is defense-  
19 in-depth, period.

20 MR. MORTON: Yes.

21 CHAIRMAN BROWN: I mean put aside all the  
22 discussion of latent and this -- non-latent and this,  
23 that and everything else.

24 MR. MORTON: Yes.

25 CHAIRMAN BROWN: It's really defense-in-

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 depth against -- on an overall basis and how do we  
2 structure that? And that's the point I'm trying to  
3 get. And how that gets integrated with the Knowledge  
4 Management NUREG, it's another story, but it just --  
5 I think that point doesn't get carried out as well in  
6 the background as it should, particularly with digital  
7 I&C systems, which are so focused and their backbone  
8 is literally the architecture within which they  
9 reside. So -- and the principles within -- with how  
10 they reside within that.

11 MR. MORTON: Yes.

12 CHAIRMAN BROWN: As well as communications  
13 and control of access, which you've heard me say  
14 before.

15 MR. MORTON: Yes.

16 CHAIRMAN BROWN: So anyway, we digress.  
17 Walt, did you have anything else?

18 MEMBER KIRCHNER: No, thank you, Charlie.

19 CHAIRMAN BROWN: Okay. Thank you.

20 MEMBER BLEY: The reference for the  
21 document Walt was talking about is NUREG-KM-0009.

22 MR. MORTON: NUREG-KM-0009. Okay.

23 Okay. Thank you for that reference and  
24 for that comment, but just a couple points just as a  
25 follow up: This is a Branch Technical Position, not

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 necessarily a Design Guide, so there's a level of  
2 detail that we're not necessarily able to get into in  
3 terms of covering all the bases in terms of the  
4 architectural aspects, but I understand. Charlie's  
5 point taken in that regard.

6 MEMBER BLEY; I'll just make -- I don't --  
7 the architecture thought process that I'm talking  
8 about is not detail detail.

9 MR. MORTON: Yes.

10 MEMBER BLEY: It's an overarching  
11 architecture concept, not design detail.

12 MR. MORTON: Okay. Understood.

13 MEMBER BLEY: So I agree with you this is  
14 -- we're not doing design details in this document.

15 MR. MORTON: Yes.

16 MEMBER BLEY: But the defense-in-depth,  
17 when you look at -- if you don't know what the  
18 architecture looks like, you might -- you're dealing  
19 with it piecemeal. How do I deal with this component  
20 or this --

21 MR. MORTON: Yes.

22 MEMBER BLEY: -- or the software or what  
23 have you? That is a piece part. And maybe it doesn't  
24 even matter if your architecture is constructed right.

25 MR. MORTON: Okay.

1                   MEMBER BLEY: That's all. It's a high-  
2 level architecture, not down in the nitty-gritty as  
3 you will see when I read it to you.

4                   MR. MORTON: All right. Sounds good. So  
5 we'll -- I guess we can get to those comments after we  
6 get through the presentation then.

7                   MEMBER BLEY: Okay. And I will provide my  
8 comments to you subsequent to the meeting. Christiana  
9 will send them to you.

10                  MR. MORTON: All right. We appreciate  
11 that. Thank you, Member Bley.

12                  MEMBER BLEY: Okay?

13                  MR. MORTON: With that said if there's no  
14 other questions on slide 8, Dawnmathews, please go to  
15 slide No. 9.

16                         So as we've been kind of alluding to  
17 earlier, here is the basic description of the D3  
18 assessment. And sort of tapping off the last slide's  
19 conversation, we do give a general overview of the  
20 defense-in-depth concept in the background section,  
21 and overall the goal would be to maintain defense-in-  
22 depth with whatever modified system you're installing  
23 into the plant or modifying itself. But we do cover  
24 the entire concept of D3, which is defense-in-depth  
25 and diversity, as a concept to ensure that looking at

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 CCF is potentially concurrent with other events in  
2 your safety analysis, ensuring you have the proper  
3 design aspects in place or analytical solutions in  
4 place. And obviously this is consistent with what's  
5 in the SRM, the SECY 93087. So this is just a basic  
6 description of what's inside this.

7           Although we do focus on defense-in-depth  
8 as the overall concept, we do have to make a note that  
9 the document really focuses overall on defense-in-  
10 depth and diversity where it is required or whether it  
11 could be used as a tool to ensure you have adequate  
12 defense-in-depth. Obviously will get into that later  
13 in the rest of the slide presentation.

14           So, Dawn, please go to slide No. 10. So  
15 the D3 assessment, the process itself. This is where  
16 we're going to kind of get into how the document has  
17 conceptually changed in order to make it a bit more  
18 readable and more coherent.

19           So previously we had a section called  
20 Section -- we still have Section 2. It was previously  
21 called the graded approach. After our own internal  
22 discussions and after some of the public feedback we  
23 got from the comments we decided that rather than  
24 having it sort of be like a separate concept outside  
25 the D3 assessment it really simply becomes a process

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 within a D3 assessment itself.

2 Rather than calling it a graded approach  
3 we're simply saying it's a safety significance  
4 determination essentially within the D3 assessment,  
5 which basically in effect will get you to the same  
6 place. We're just sort of warehousing it a bit  
7 differently to make it a more organized and coherent  
8 approach, essentially where you have a D3 assessment,  
9 you have different analytical solutions that you may  
10 take for systems of differing safety significance.  
11 And you determine that by the safety significance  
12 determination within Section 2 to the current draft  
13 version right now.

14 So that effectively means that rather than  
15 having specific categories like we had previously,  
16 which is A1, B1, et cetera, et cetera, those are  
17 generally being removed in favor of focusing on the  
18 actual characteristics of the system itself and then  
19 determining what level of analysis is appropriate for  
20 that particular system's characteristics and safety  
21 significance to the plant itself.

22 So what you'll see inside the document now  
23 is table 2-1, which had those determination sort of  
24 characteristics have been removed and the  
25 categorizations have been moved, but the basic

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 functions and characteristics for those systems to  
2 make a significance determination is still there and  
3 they incorporate the public comments and feedback we  
4 received from the various stakeholders and also  
5 incorporate what we had from our own internal  
6 discussions as well. And we wanted to make that very  
7 clear.

8 The general approach is very similar.  
9 We've just -- we're warehousing it a bit differently  
10 to make it overall part of the D3 assessment. So it's  
11 not like a separate process, sort of the way it was  
12 depicted in the previous version that you saw at the  
13 June ACRS meeting.

14 One of the things we did was we also  
15 refined some of the guidance when it comes to applying  
16 potential risk insights to inform your significance  
17 determination within the D3 assessment so that if you  
18 had a particular SSC that you thought might be highly  
19 safety significant or lower safety significant, then  
20 the risk insights could be used as a means to sort of  
21 tip the scale one way or another depending upon how a  
22 particular application decides to warehouse that  
23 system.

24 And we want to be clear: The approach  
25 we're talking about here is how -- for the staff

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 reviewer to look at how a licensee or applicant is  
2 presenting a particular SSC for addressing CCF due to  
3 latent defects in the analysis or design solutions  
4 they choose to address CCF for that particular SSC in  
5 the application. Risk insights can be used to inform  
6 that decision or to put sort of the -- or to make the  
7 decision or bring more clarification to the decision  
8 itself.

9 And lastly, what we want to really  
10 emphasize here is that the applicants do not need to  
11 base their D3 assessment on the safety significant  
12 systems. They can simply include everything in an  
13 overall D3 assessment for like a high safety  
14 significant system. You don't have to do that if you  
15 don't want to. This is something that we're providing  
16 the flexibility for applicants or licensees to use if  
17 they so choose to, but you don't necessarily have to.  
18 We want to make that point clear, and I think we made  
19 that point in the June meeting as well.

20 And also just want to be clear that the  
21 risk insights piece, user risk insights is not a  
22 requirement. It's not mandatory. They're only there  
23 if available and if the licensee or applicant chooses  
24 to use them for a determination, for the safety  
25 significance determination.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 MR. HECHT: This is Myron Hecht. Can I  
2 ask a question?

3 MR. MORTON: Yes, sir. Please.

4 MR. HECHT: Thank you. Given that you  
5 have removed the categories does this open the door  
6 for less uniformity and interpretation among different  
7 reviewers? In other words, if they -- a reviewer used  
8 to look at a system as A1 or A2, does this now open  
9 the door to say, well, what I used to think was A2 I'm  
10 now going to think of as A1, or a reviewer -- a then  
11 reviewer said it's O2 and that it -- that needs to be  
12 A2 and another reviewer says it's now A1?

13 MR. MORTON: That's a great question, and  
14 thank you for asking that.

15 So one of the things that we talked about  
16 earlier is where we're actually making sure that the  
17 staff -- that guidance is aligned to be staff  
18 guidance. That's sort of one of the things that was  
19 sort of hit by that consideration. So then rather  
20 than focusing on categories, designate A1, for  
21 example, the A1 concept is still there, just not  
22 called A1. It's referred to as highly safety  
23 significant systems, safety-related systems that  
24 perform safety significant functions.

25 So rather than focusing on the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 categorization, we simply focused on well, what is the  
2 particular SSC doing? What is the safety significance  
3 and how is its potential failure or spurious operation  
4 going to affect plant safety? So it's part of our  
5 refinement to go to make sure that everything remained  
6 within the auspices of staff guidance. That was one  
7 of the things that was sort of affected by that.

8 MEMBER BLEY: Can you hear me? I've had  
9 trouble getting attention. This is Dennis Bley.

10 MR. MORTON: Yes.

11 MEMBER BLEY: Okay. I still have a  
12 problem with your logic.

13 MR. MORTON: Yes.

14 MEMBER BLEY: You're now in the Safety  
15 Significant Section 2.1.

16 MR. MORTON: Yes.

17 MEMBER BLEY: A Category B, bravo, low  
18 safety significance, non-safety-related SSCs that  
19 perform safety significant functions. And your first  
20 bullet under there says these perform design functions  
21 that are significant contributors to plant safety.

22 MR. MORTON: Yes.

23 MEMBER BLEY: It's your logic to then call  
24 them low safety significance. I don't understand this  
25 category.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 MR. MORTON: Well, just to be clear -- so  
2 for that category we're -- because they were talking  
3 about non-safety-related SSCs, we necessarily can't  
4 call them safety significant per se, but in some non-  
5 safety-related systems they can for example directly  
6 affect reactivity or power level.

7 So, insofar as they are not safety  
8 significant, they're not safety-related, but their  
9 potential failure can affect plant safety because  
10 systems such as feedwater, reactor recirc, or your  
11 non-safety-related rod control systems, these systems'  
12 failure or malfunction can directly affect reactivity  
13 and therefore affect safety. So they're safety  
14 significant functions or contributors even though  
15 they're not safety-related. Therefore the designator  
16 low safety significant.

17 MEMBER BLEY: I don't get it. I think  
18 we've tied ourselves in logical knots to try to imply  
19 there's something more meaningful that's safety-  
20 related than there is. If these things really affect  
21 safety, then they either should be safety-related or  
22 we ought to get rid of that arbitrary designation.  
23 And they are important to safety, but you're treating  
24 them as if they're not. And so I -- it just a logical  
25 hole.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 MR. MORTON: We understand the comment.  
2 We'll take that into consideration.

3 MEMBER BLEY: And the only reason we treat  
4 them differently is because they don't have that  
5 label, and that makes no sense at all to me in terms  
6 of engineering and safety thinking.

7 MR. MORTON: Well, I would say that we  
8 treat them differently because they are under  
9 different regulatory requirements. For example, if  
10 you're looking at that particular system which would  
11 have been called a B1 category previously, those are  
12 non-safety-related systems that perform safety  
13 significant functions. Obviously those sorts of  
14 systems would not be Class 1E. Those systems would  
15 not necessarily have independence or single failure  
16 requirements on them. Some of them may have a  
17 diversity requirement upon them depending upon which  
18 GDC is applied to it.

19 So therefore, the first thing that really  
20 calls out the differences between the systems is if  
21 regulatory structure that applies to them or not.  
22 Some systems such as your highly safety significant  
23 system, like your protection system would be affected  
24 by a different set of GDCs than those that are non-  
25 safety-related and so on and so forth. So that's the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 first driver for --

2 (Simultaneous speaking.)

3 MEMBER BLEY: -- to respond to this, but  
4 the logical hole you fall into just doesn't work for  
5 me.

6 MR. MORTON: Understood. We can take that  
7 comment into consideration as we move forward looking  
8 -- continuing in our efforts to refine the document.  
9 But there is a licensing aspect to -- there is a  
10 difference in the treatment. It's not arbitrary. It  
11 is really principally driven by the difference in  
12 requirements on the different systems that we're going  
13 to -- that a licensee reviewer will be looking at when  
14 they do a safety significance determination. Not the  
15 staff. It would be the licensee performing that  
16 action. And then based upon their licensing basis  
17 they would make the safety significance determination.

18 MEMBER BLEY: Putting it --

19 MR. MORTON: We're simply using the -- I'm  
20 sorry. Go ahead.

21 MEMBER BLEY: Putting it in those terms  
22 that this is a legal -- this is a legalistic  
23 classification rather than an engineering and safety  
24 classification would really help and it would point  
25 out some interesting problems with the way we build

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 these structures.

2 MR. MORTON: We can take -- certainly take  
3 a look at improving maybe the lead-in for that if  
4 that's not clear because there's aspects of both.  
5 They're not quite -- the legalistic and the  
6 engineering aspects are not quite the same, but we can  
7 take a look to see if that needs to be clarified  
8 within that section for that point. So thank you for  
9 that comment.

10 And if we have no other comments, we can  
11 move onto slide No. 11, Dawnmathews.

12 And also I want to make a note that with  
13 regard to slide 10 -- if you can go back to that real  
14 quick, Dawnmathews? Slide No. 10.

15 For those individual categories we still  
16 have the opportunity to potentially adjust the names  
17 of those categories as well. That's not something  
18 necessarily set in stone at this time, as Eric sort of  
19 alluded to earlier. We're still -- there's still  
20 flexibility there. Those categories are not  
21 necessarily clear. Just wanted to make that point.

22 And now you can -- I'll speak about slide  
23 No. 11. And so now going back into the D3 assessment  
24 process, continue to clarify the flexibility for SSCs  
25 in cases where D3 assessment is not necessary. So

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 this is sort of referring to that fourth category or  
2 another type of category where it's the lowest safety  
3 significant systems only.

4 So if a system has -- its failure has no  
5 effect on the plant safety functions at all and a  
6 failure wouldn't place the plant in a condition that  
7 cannot be reasonably mitigated would place a plant in  
8 -- will be placed in an un-analyzed condition. There  
9 is a potential there for systems such as that where  
10 you may not need to provide a D3 assessment insofar as  
11 NUREG-6303 thermal-hydraulic analysis or even a  
12 qualitative assessment.

13 A simple failure analysis like an FMEA or  
14 a FTA or something may be acceptable depending upon  
15 whether the application contains a system -- it makes  
16 the case that the system has such little safety  
17 significance that a basic evaluation of the failure  
18 effects and consequences of the failure of an SSC may  
19 be sufficient without going into any other details for  
20 that.

21 So we did place guidance and flexibility  
22 within the safety significance determination for when  
23 an applicant provides that to the staff for review.  
24 There may be systems of such low consequences in terms  
25 of the effects on the plant that a D3 assessment may

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 not be necessary. So we clarified that point also  
2 within the BTP for this latest draft as well.

3 So if there's no questions, Dawnmathews,  
4 please go to slide 12.

5 So other aspects of improvements we made  
6 for the D3 assessment. So as I alluded to earlier,  
7 the previous draft that you saw in June sort of had  
8 different silos for different types of analysis that  
9 weren't necessarily considered D3. And as we went  
10 through the document and had our own internal  
11 discussions and we looked at our public comments  
12 received, it was decided that maybe there are certain  
13 things we need to bring into the overall D3 umbrella.

14 So the first thing we just talked about  
15 was the safety significant determination which we made  
16 a part of the D3 assessment process itself.

17 The next piece that we made a part of the  
18 D3 assessment process overall is the qualitative  
19 assessment methodology. And for those of you  
20 unfamiliar, the qualitative assessment is defined in  
21 RIS 2002-22, Supplement 1, and it is a methodology to  
22 address CCF in systems of lower safety significance.

23 We decided that rather than having that be  
24 as a separate process we simply said, no, this is kind  
25 of a less-rigorous form of a D3, because ultimately

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 you're addressing CCF in a slightly rigorous way for  
2 lower safety significant systems. And that seemed to  
3 be appropriate. So we brought that into the D3  
4 umbrella. So now the qualitative assessment for  
5 purposes of this BTP is considered a form of less-  
6 rigorous D3 assessment. So I just want to really make  
7 that clear.

8           Secondly, for spurious operation, for  
9 those of you have seen the previous drafts, we had  
10 that -- the staff had spurious operation as a separate  
11 section within the PTP. I think the previous section  
12 was Section 5. It was for spurious operation. We had  
13 a separate set of background and discussion and then  
14 acceptance criteria.

15           And so similarly to the other improvements  
16 and refinements we've made, we reconsidered how we had  
17 to structure the document based on the public  
18 feedback, and ACRS feedback as well, as well as our  
19 own internal discussions, and we decided that spurious  
20 operation is something the staff finds is necessary to  
21 address when you're looking at CCF due to latent  
22 defects. So we're only concerned spurious operations  
23 as they are originating from latent defect CCFs. If  
24 the general design solutions end up being sort of the  
25 same thing, then it makes sense to have the spurious

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 operation guides incorporated within the D3 assessment  
2 itself as another consideration. And that's what  
3 we've done.

4 So the basic discussion for spurious  
5 operation is within Section 3 of the document now and  
6 the acceptance criteria for the relevant sections  
7 within different methodologies incorporate pointers  
8 about spurious operation consideration as well. So  
9 that section, Section 5 no longer exists. It's been  
10 integrated within the D3 assessment section, Section  
11 3 of the document.

12 So those are some of the bigger changes we  
13 made within the document since the June 2020 ACRS  
14 Subcommittee meeting.

15 These changes brought more flexibility for  
16 the D3 assessment because it makes the assessment  
17 clear that there are different levels of technical  
18 rigor and different types of analysis that you can use  
19 as a licensee or applicant to address CCF and it makes  
20 it clear as well as to the staff that there are  
21 different means by which a licensee can provide a  
22 less-technically rigorous methodology to address a  
23 less-safety -- lower safety significant system. So it  
24 brings more alignment and flexibility for the method,  
25 for the D3 assessment itself and it provides better

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 synergy with the safety significant determination that  
2 we now incorporated within the D3 assessment itself.

3 As we talked about in the previous slide  
4 you have your basic four categories that we're calling  
5 -- we have the higher safety significant and the lower  
6 safety significant. And these changes align with that  
7 concept with the safety significance determinations.

8 MEMBER BLEY: If I may interrupt again --

9 MR. MORTON: Yes, sir.

10 MEMBER BLEY: -- since I made my last  
11 comment I'd like to say this reorganization really is  
12 a nice logical one and I think it makes a lot of  
13 sense. Thank you.

14 MR. MORTON: Thanks for the comment.  
15 Appreciate that. That was sort of the goal is that  
16 treating them separately in retrospect was not the  
17 optimal approach to go about the D3 assessment. And  
18 so bringing everything under the one umbrella makes it  
19 much more clear and makes a much more crisp document  
20 for whomever is reading the document for their  
21 particular purposes.

22 So are there any other questions on this  
23 slide?

24 CHAIRMAN BROWN: Yes, I have one question  
25 on this --

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 MR. MORTON: Yes, sir.

2 CHAIRMAN BROWN: -- on the qualitative  
3 assessment.

4 MR. MORTON: Yes.

5 CHAIRMAN BROWN: And I may have this  
6 backwards, so I'm open to correction on this. This is  
7 not an opinion.

8 You've got high safety significant safety-  
9 related SSCs.

10 MR. MORTON: Yes.

11 CHAIRMAN BROWN: Low safety significance  
12 non-safety-related SSCs that perform safety  
13 significant functions.

14 MR. MORTON: Yes.

15 CHAIRMAN BROWN: C is low safety  
16 significant safety-related SSCs --

17 MR. MORTON: Yes.

18 CHAIRMAN BROWN: -- that do not perform  
19 safety-related functions.

20 MR. MORTON: Yes.

21 CHAIRMAN BROWN: And then the lowest of  
22 the low is the low safety significance non-safety-  
23 related SSCs --

24 MR. MORTON: Yes.

25 CHAIRMAN BROWN: -- that do not perform

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 safety significant functions. For the qualitative  
2 assessment --

3 MR. MORTON: Yes.

4 CHAIRMAN BROWN: -- somehow it got wrapped  
5 into my brain --

6 MR. MORTON: Yes.

7 CHAIRMAN BROWN: -- that it only applied  
8 to the lowest of the low. That would have been --

9 MR. MORTON: Yes.

10 CHAIRMAN BROWN: -- the low safety  
11 significance non-safety-related SSCs that do not  
12 perform safety significant functions.

13 MR. MORTON: Yes.

14 CHAIRMAN BROWN: Is that -- that's the way  
15 I read the document, yet in the discussion part of  
16 this; and I'm trying to find it again, that may be  
17 based on the discussion you just had --

18 MR. MORTON: Yes.

19 CHAIRMAN BROWN: -- was that the RIS 2002  
20 Supplement -- or 22 Supplement 1, Qualitative  
21 assessment, would -- there's three categories of low  
22 safety significance.

23 MR. MORTON: Yes.

24 CHAIRMAN BROWN: B, C and D.

25 MR. MORTON: Yes.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 CHAIRMAN BROWN: I interpreted that -- all  
2 your write-up in here, it would only apply to D. Is  
3 that correct or wrong?

4 MR. MORTON: That would be incorrect.

5 CHAIRMAN BROWN: Okay. So it's all three  
6 of the low safety significance categories, just not A?

7 MR. MORTON: That's correct. So if you --

8 CHAIRMAN BROWN: All right.

9 MR. MORTON: Okay.

10 CHAIRMAN BROWN: Go ahead. Go ahead.  
11 Finish off and maybe you'll refresh my brain for a  
12 second.

13 MR. MORTON: Oh, so the quick refresher on  
14 the RIS. So the RIS -- Supplement 1 to RIS 2002-22 is  
15 guidance for lower safety significant systems,  
16 essentially everything outside the logic portions of  
17 -- basically it's everything except outside RPS and  
18 DSF, direct safety functions.

19 CHAIRMAN BROWN: Okay.

20 MR. MORTON: So that means your safety-  
21 related safety chillers, your feedwater systems,  
22 reactor recirc, non-safety-related rod control. It  
23 could even be either RPS inverters depending upon how  
24 you categorize your system, but it is for lower safety  
25 significant functions, not just for the lowest of the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 low. So it's for -- as you correctly point, it's for  
2 those three categories outside of the high safety  
3 significant category that we have. So it's for those  
4 lower three categories --

5 CHAIRMAN BROWN: Okay.

6 MR. MORTON: -- not just for the lowest  
7 safety significant category.

8 CHAIRMAN BROWN: Okay. That's one of the  
9 problems with being more generic in all these  
10 discussions.

11 MR. MORTON: Yes.

12 CHAIRMAN BROWN: Without talking about RTS  
13 and SFAS explicitly we start muddying the waters a  
14 little bit. But I got it now. Okay?

15 MR. MORTON: Okay.

16 CHAIRMAN BROWN: Is there a point -- is  
17 there a place where that's very, very clear in the  
18 document?

19 MR. MORTON: The qualitative assessment  
20 section, which I think is 3.1.4; staff, please correct  
21 me if I'm wrong --

22 CHAIRMAN BROWN: Which you refer to.

23 MR. MORTON: Yes, it should -- we do have  
24 the lead-in paragraphs -- at least we thought we were  
25 being clear that it applies to lower safety

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 significant systems.

2 CHAIRMAN BROWN: You're right.

3 MR. MORTON: Yes.

4 CHAIRMAN BROWN: You're right. I just  
5 found the page. It talks only for low safety  
6 significant systems. It doesn't say the other non-  
7 safety -- et cetera, et cetera.

8 MR. MORTON: Yes, I see that.

9 CHAIRMAN BROWN: So, all right. I got it.  
10 It's very clear in 3.1.4. Thank you.

11 MR. MORTON: Okay. No problem. So  
12 there's no other questions?

13 Dawnmathews, please go to slide No. 13,  
14 please.

15 And in this slide we basically summarize  
16 the D3 assessment, the framework itself. So we gave  
17 you the description of the D3 assessment. We've kind  
18 of talked about how other things have been  
19 consolidated into the D3 assessment overall umbrella.  
20 And you kind of see it kind to fruition here in this  
21 slide with the basic framework. And I know there's  
22 kind of a lot on the slide, so I won't necessarily go  
23 through each and every bullet. But suffice it to say  
24 you have a number of different means to attack CCF due  
25 to latent defects within the BTP. And the staff

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 wanted to make it very clear for our reviewers and for  
2 stakeholder. The intention was to provide a lot of  
3 flexibility to attack CCF due to latent defects.

4 There's obviously the individual design  
5 solutions. We have specific diversity testing,  
6 defensive measures that are approved. And we got --  
7 qualitative assessment is one means to eliminate  
8 further consideration of CCF. Then you look at the  
9 ability to prevent or mitigate the effects of the  
10 postulated CCF. And then you get into the diverse  
11 means that can be used from a safety-related functions  
12 so it's not disabled.

13 Then you get into the potential to cope  
14 with the CCF by simply demonstrating through analysis  
15 that A, we're simply postulating the CCF. We didn't  
16 necessarily do a specific design solution for it, but  
17 we verified through our analysis that, hey, we can  
18 accept the consequences of the CCF, the plant can  
19 still operate safely in its presence.

20 And you can use, for the fourth bullet,  
21 any combination of the above, or a different solution  
22 set that could be proposed by a licensee or applicant.  
23 You are not bound to do the D3 assessment framework as  
24 defined in the BTP. Just want to be very clear, it is  
25 not a requirement. This is guidance for the staff.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 It can be used by stakeholders. Stakeholder,  
2 licensees, applicants can use a completely different  
3 solution to address CCF due to latent defects if you  
4 so choose. It is your purview to do that. Just want  
5 to make that clear. You can have the ability to do an  
6 alternative approach for that. But this is just the  
7 basic D3 assessment framework within the document  
8 right now.

9 It hasn't necessarily changed. We just  
10 refined it to include a few more things to make the D3  
11 umbrella more complete.

12 I don't hear any questions, so,  
13 Dawnmathews please go to slide No. 14.

14 As I alluded to earlier, means to  
15 eliminate CCF from further consideration. Has not  
16 necessarily changed a lot since the last meeting we've  
17 had in terms of the basic content. The biggest change  
18 we'll get into that later on is really the inclusion  
19 of the quench survivability, but this is sort of a  
20 refresher for folks of what this particular section --  
21 sub-section provides under the D3 assessment.

22 Here is where we would get more into  
23 conversations that Member Brown is referring to in  
24 terms of specific architectural solutions that may be  
25 involved, whether you're providing specific sort of

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 extensive testing to eliminate latent defects or  
2 you're providing diversity within the architecture  
3 within divisions of our protections, for example, or  
4 you have different design solutions entirely, or  
5 you're potentially using a qualitative assessment for  
6 you lower safety significant systems. This is where  
7 you get into the potential flexibilities for that.

8           So this particular section received some  
9 refinements due to public comments, especially for the  
10 testing portion. We did align the aspect to go with  
11 the actual 7432 2016 framework. We don't necessarily  
12 quote it per se. We did make some minor changes to  
13 align with the greater efforts going on within the BTP  
14 itself.

15           So if there's no questions, Dawnmathews,  
16 please go to slide No. 15.

17           And here is another concept that we had  
18 that we had from the June meeting. It largely remains  
19 unchanged. It's providing licensees and applicants  
20 the flexibility to propose their specific design  
21 measures. It was defined as the particular design  
22 attributes. We wanted to provide flexibility and keep  
23 the door open for the circumstance where a licensee or  
24 applicant provides a specific innovative design  
25 solution that we haven't necessarily endorsed, but we

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 are not opposed to actually reviewing it within the  
2 application itself.

3 So this is the general point here. There  
4 are different types of examples of design measures,  
5 but we just simply classify them as another type of  
6 design attribute for proposed system architecture or  
7 system -- or SSC. So this is mainly to provide  
8 flexibility for different design solutions to actually  
9 address CCF due to latent defects.

10 So, Dawnmathews, please go to slide No.  
11 16. And now you get into the other part of the D3  
12 assessment framework which is providing flexibility to  
13 mitigate the consequences or the effects of the CCF.  
14 And we clarify the guidance in a number of places due  
15 to the public comments we received. And we got some  
16 great insights from the public comments as well as  
17 from ACRS.

18 Clarify the different types of -- meet  
19 diversities that can be credited whether it's existing  
20 systems or manual controls, or some combination  
21 thereof.

22 And we also clarified within the document  
23 the concept of -- because there's obviously been a bit  
24 of I would say concern between point 3 and point 4 of  
25 the SRP and how you are crediting different controls

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 to meet either of those particular provisions, because  
2 they do incorporate the ability to credit manual  
3 controls to meet either one of those. So we clarified  
4 the appropriateness of how to do that properly within  
5 your applications as well.

6 MEMBER KIRCHNER: So when you -- Wendell,  
7 this is Walt Kirchner. When you use manual operations  
8 as a means to mitigate, do you also then open the door  
9 to look at human error? If you credit a manual  
10 operation, there's the chance that there could be an  
11 error in the operation.

12 MR. MORTON: And you're saying error in  
13 terms of the plant procedure that may do it or just  
14 the aspect of the operator making a mistake when  
15 they're trying to mitigate a particular circumstance  
16 diversely?

17 MEMBER KIRCHNER: Both.

18 MR. MORTON: Both? We don't necessarily  
19 get into that.

20 MEMBER KIRCHNER: Either/or. I mean if  
21 you have -- if you're relying on a manual operation to  
22 mitigate CCF, then it opens the door also to the  
23 possibility of that manual operation including an  
24 error.

25 CHAIRMAN BROWN: Turning the wrong switch.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 MEMBER KIRCHNER: Yes, or --

2 CHAIRMAN BROWN: If your adjacent -- it's  
3 happened before.

4 MR. MORTON: Well, I would say to that --  
5 there's a couple things: No. 1, we don't necessarily  
6 get into that level of detail here in the BTP. That's  
7 one of the things that would be covered within the  
8 evaluation analysis in Chapter 18 of the SRP, that the  
9 manual actions have to be both feasible and reliable.  
10 And much of that's going to be controlled by the plant  
11 procedures when this information is developed.

12 It's not necessarily something that we  
13 would get into in terms of an error in the  
14 implementation of the manual actions. That would be  
15 something handled mostly by plant procedure. The  
16 guidance for that for the staff reviewer and for  
17 licensees and applicants would be in Chapter 18. We  
18 simply ensure that you follow the appropriate guidance  
19 when you're actually trying to address those three  
20 positions. So we understand the point, but that's  
21 something that would need to be evaluated within your  
22 HFE evaluation under Chapter 18 of the SRP.

23 MEMBER KIRCHNER: Well, I'll just refer  
24 you back to that knowledge management document. One  
25 of the points that Mary made in that -- she had seven

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 points on looking at licensing basis changes and  
2 preserving defense-in-depth. And I think it was the  
3 sixth one, provide sufficient defense against human  
4 errors.

5 MR. MORTON: Yes.

6 MEMBER KIRCHNER: And so if you're  
7 crediting this to mitigate CCF, you --

8 MR. MORTON: Yes.

9 MEMBER KIRCHNER: That's why I raised the  
10 point that you also have to consider human error.

11 MR. MORTON: Right. And that is correct,  
12 but we wouldn't necessarily -- we are presuming that  
13 when you're crediting your manual actions, you're  
14 crediting the operator manual actions that it needs to  
15 be performed in a feasible and reliable manner, which  
16 we put -- which we have within the acceptance criteria  
17 for that particular sub-section within the SRP, the  
18 reliability piece being what you're referring to, but  
19 that really needs to really be evaluated through the  
20 much more detailed guidance which would be in Chapter  
21 18 of the SRP.

22 That's obviously a concern that the person  
23 who is implementing the diverse manual controls  
24 implements them correctly, but the nuts and bolts of  
25 getting them implemented correctly would be in Chapter

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 18 of the SRP.

2 CHAIRMAN BROWN: Just as an amplification  
3 for Walt's comment, Chapter 18, Appendix A of the SRP  
4 does require you to analyze action sequences for the  
5 potential -- of a potential operator error in  
6 performing that manual action. So it's -- you got to  
7 search around for it, but it is in there.

8 I'm just providing that to you for  
9 information, Walt.

10 MEMBER KIRCHNER: No. Thanks, Charlie.  
11 I was just thinking that if you -- if the staff did an  
12 evaluation and they did credit a manual operation to  
13 mitigate CCF, some notation of something I think would  
14 be part of the review I guess that would flag this as  
15 something that would have to be looked at in Chapter  
16 18.

17 CHAIRMAN BROWN: And it does. It talks  
18 about one of the things leading to the possibility of  
19 the operator error is the time required versus the  
20 time available --

21 MEMBER KIRCHNER: Right.

22 CHAIRMAN BROWN: -- and what's a  
23 reasonable time to do that. And they do talk about  
24 the old 30-minute concept that if you depend on  
25 somebody to do something within a minute-and-a-half,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 there's a higher likelihood that you might make the  
2 wrong decision as opposed to if you have a little bit  
3 longer to think about it. So they do cover it.  
4 That's all I'm -- I'm just pointing out it is done.  
5 It's just it's not in the BTP itself. That's all.

6 MR. MORTON: Yes, one of the nuts and  
7 bolts ways this would take place if you have an  
8 application from a licensee and they decide to credit  
9 certain manual controls, operator actions as their  
10 diverse means, then they would necessarily have to  
11 have an evaluation or an analysis aligned with the  
12 guidance in Chapter 18 of the SRP.

13 At that point not only would you be  
14 involving the I&C staff, obviously because this is a  
15 D3 assessment, wouldn't you be bringing in our friends  
16 in HFE, our staff members in HFE to review that part  
17 of the application as well? So it would be both. But  
18 they couldn't fully credit any manual operator actions  
19 until they've actually been approved to so, and that  
20 would bring in both the Chapter 18 analysis and our  
21 friends in HFE to review it to ensure that this is an  
22 approved means to do it and therefore they could  
23 credit it as part of their -- of a diverse action  
24 under the BTP.

25 MEMBER MARCH-LEUBA: This is Jose March-

1 Leuba. I'm back online. What I think Walt was trying  
2 to get at is that those operator actions feed in  
3 Chapter 19 on the PRA so that they create new  
4 sequences or whatever (audio interference) holds that  
5 can change the PRA outputs. So is there a link that  
6 says whenever you rely on operators doing something --  
7 recognizing the problem and doing something about it,  
8 that should feed into the PRA and create -- the PRA  
9 expert should tell you how likely is that to happen.

10 MR. MORTON: I apologize. Was that a --  
11 so is it a question or a statement? I just want to be  
12 clear.

13 MEMBER MARCH-LEUBA: It was more of a  
14 statement. Do you agree? But now comes the question:  
15 Do you agree with my statement?

16 MR. MORTON: I would say that as part of  
17 the application, depending upon what they're doing,  
18 the PRA analysis will be included. We don't get into  
19 that level of detail because it's a bit of a different  
20 animal that we're dealing with.

21 If that's something that the licensee or  
22 applicant would necessarily feed into as they're going  
23 through meeting the SRP section, then that would kind  
24 of naturally take place, but not necessarily --  
25 wouldn't necessarily be the scope of work we're having

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 here. We're only concerned with is it -- if they do  
2 credit certain diverse means to accomplish the safety  
3 function, specifically if it's an operator action,  
4 that they have applied the proper evaluation and  
5 content within the application for that purpose. That  
6 would necessarily bring in obviously Chapter 18, but  
7 if there's a nexus between Chapter 19 in that regard,  
8 that would be part of the overall application as well.

9 MEMBER MARCH-LEUBA: Yes, see my point is  
10 we are doing risk-informed everything.

11 MR. MORTON: Yes.

12 MEMBER MARCH-LEUBA: If you -- the risk is  
13 not properly calculated because we forget to introduce  
14 these steps, then we're not doing it right.

15 MR. MORTON: Yes.

16 MEMBER MARCH-LEUBA: Clearly if you rely  
17 on the operator recognizing the problem during a  
18 stressful time in the control room and doing the right  
19 thing, which I give them credit to -- I mean, they'll  
20 do the right thing -- you should evaluate if it's a 10  
21 to the minus-4 (audio interference) because the life  
22 for the Chapter 19 guys is very difficult, because  
23 they have not know everything. Okay? And it would be  
24 easy if we had times that gives them homework. Hey,  
25 I found a sequence for you. Make sure you evaluate

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 it. That's my opinion. And there's no question  
2 (audio interference).

3 MR. MORTON: Understood. Thank you for  
4 that feedback.

5 So if there's no other questions on this  
6 slide, Dawnmathews, you can go to slide 17.

7 So here we have another aspect of the D3  
8 assessment umbrella which is coding with the  
9 consequence to the CCF. And this is pretty  
10 straightforward. This is a licensee or applicant  
11 providing analysis or an evaluation that demonstrates  
12 that regardless of whatever design features and/or  
13 defensive measures and/or assessments you perform, we  
14 can simply demonstrate that the plant's basic  
15 architecture and systems can withstand a CCF  
16 concurrent with an event in Chapter 15. So we're  
17 basically saying its consequences remain acceptable.  
18 We can basically stand -- we can withstand it. We  
19 don't need to do any further analysis. Just saying  
20 you can cope with the consequences of that.

21 We did make a few minor tweaks and  
22 corrections inside this particular section based upon  
23 our own internal discussions and public comments, but  
24 this is pretty straightforward. This is a coping  
25 analysis essentially that demonstrates that you can

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 cope with the consequences of a CCF.

2 Dawnmathews, please go to slide No. 18.  
3 And now for this slide we have the newest member of  
4 the D3 umbrella, which is the assessment -- is the  
5 qualitative assessment guidance itself. And we've  
6 talked about this sort of at length already so I won't  
7 necessarily go into a lot of detail, but basically the  
8 qualitative assessment concept is for those lower  
9 safety significant systems. Reaching a sufficiently  
10 low determination is tantamount to saying that the  
11 potential for a CCF due to latent defects is at the  
12 level of other CCFs not analyzed your licensing basis.  
13 It effectively constitutes saying you can remove it  
14 from further consideration for lower safety  
15 significant systems only, not for high safety  
16 significant systems like RPS and ESF. It's just for  
17 the lower safety significant stuff.

18 Based on the public comments we received  
19 and some of the feedback we had from ACRS we did  
20 refine the lead-in information for the qualitative  
21 assessment. We did refine the approach inside to make  
22 it clear that for purposes of this BTP not only doing  
23 the qualitative assessment, but you need some sort of  
24 supporting failure or consequence analysis that  
25 demonstrates that if you did have a failure to the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 proposed system, that its consequences at least are  
2 addressed to some degree. It's not the same thing as  
3 a coping analysis per se, but your basic rudimentary  
4 FME or FTE or something to that extent that shows  
5 that, hey, you've also did the potential failure  
6 effects on the plant and the particular SSC as well.

7           And as we said earlier, this was  
8 integrated into Section 3 of the BTP, which is the D3  
9 section. It was previously I believe Section 4 in the  
10 June draft, but because of our internal discussions  
11 and public comment feedback we received it was decided  
12 to integrate this into the D3 assessment as a less-  
13 rigorous form of a D3 analysis. And this is something  
14 that we got flexibility from by reading SECY 1890,  
15 which said for lower safety significant systems you  
16 don't necessarily have to do a super rigorous D3  
17 assessment of that. So that gave us sort of the basis  
18 for saying, oh, hey, why don't we just integrate this  
19 into the D3 assessment and make it a less-rigorous  
20 form of it?

21           And so if there's no other questions,  
22 Dawnmathews, please go to slide 19.

23           Okay. So with the D3 assessment, Spurious  
24 Operation guidance, we kind of got into this a lot  
25 already, so I won't necessarily belabor a lot of the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 details of this. But spurious operation is one  
2 potential consequence of a CCF due to latent defects  
3 as well as a loss of function. Because it's a  
4 parallel consideration for the potential consequences  
5 of a CCF it was decided that rather than having a  
6 separate section for spurious operation within the  
7 BTP, why not just integrate it within the D3  
8 assessment itself as simply another technical  
9 consideration that should be looked at by the staff  
10 reviewer and by default something that should be  
11 considered by the applicant or licensee when they  
12 provide something to the staff for review

13 So no longer separate define -- it's going  
14 to be integrated within the D3 assessment itself. So  
15 we clarified what the expectations were for the  
16 spurious operation when you're performing a D3  
17 assessment regardless of the level of technical rigor  
18 for it.

19 Obviously there's been a lot of interest  
20 in this particular aspect of the BTP based upon  
21 previously public meetings we've had, previous staff  
22 comments we've gotten internally on the subject  
23 matter, as well as previous industry formal comments,  
24 and as well previous meetings we've had with the ACRS.  
25 There's been a lot of interest on that. And we've to

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 the best of our ability within the confines of making  
2 sure this is staff guidance we incorporated all of  
3 that feedback. But obviously there's always room for  
4 improvement for things of that nature because it has  
5 been sort of a highly energized discussion we've had  
6 with that. But it was decided overall to integrate it  
7 within the D3 assessment to make its own  
8 consideration.

9 The designs and analytical solutions end  
10 up being parallel if not the same for the  
11 consideration of loss of function, so why not take  
12 advantage of that integrated within the D3 assessment  
13 itself? And that's what the staff has done.

14 So I'm hearing no questions on that, so,  
15 Dawnmathews, please go to slide No. 20.

16 So right here we have the manual action  
17 means to address position 4. So just as a quick  
18 aside --

19 CHAIRMAN BROWN: Wendell?

20 MR. MORTON: Yes, sir?

21 CHAIRMAN BROWN: Something has just been  
22 grinding away since we -- can we backtrack to slide 17  
23 for a second?

24 MR. MORTON: Dawnmathews, please go to  
25 slide 17. Okay.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1                   MEMBER BROWN: The document talks about  
2 coping when vulnerabilities to CCF are not addressed.  
3 In other words, something is found. I didn't see a  
4 lot that gives a lot of -- maybe I just didn't  
5 understand how somebody could demonstrate -- is it  
6 strictly an analysis thing to say, hey, look, the CCF  
7 occurred, but we don't violate SAFDLs or temperatures,  
8 or et cetera? Is that the thrust?

9                   MR. MORTON: If I understand your  
10 question, Member Brown, so when we're looking at this  
11 particular subsection, we have this sort of "or"  
12 statement. We're only saying this from the  
13 circumstance that you've got a potential vulnerability  
14 that was not addressed for some reason. You didn't  
15 specifically put a particular design attribute; you  
16 don't have station diversity, whatever that may happen  
17 to be. Or you tell them to do testing. You simply  
18 have a residual CCF vulnerability that has not been  
19 addressed in one form or fashion.

20                   All this section is really saying is that,  
21 within the concept of D3 assessment and best estimate  
22 methodology, you simply can demonstrate that, within  
23 the acceptance criteria that you have for your  
24 particular design, the consequence would remain  
25 acceptable if you're postulating a CCF for that

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 system. You demonstrate through analysis only.

2 MEMBER BROWN: In other words, if the  
3 system fails, it doesn't do what it's supposed to do,  
4 the plant is okay?

5 MR. MORTON: Yes, that's correct.

6 MEMBER BROWN: Or the core is okay?

7 MR. MORTON: Yes. Or, as we say, the  
8 consequences remain acceptable, whatever that happens  
9 to be for the particular plant.

10 MEMBER BROWN: Okay. Yes, I understand,  
11 you know, talking about SAFDLs.

12 MR. MORTON: Yes.

13 MEMBER BROWN: I can't even remember what  
14 the acronym means, except people throw it around like  
15 candy at a child's party all the time.

16 (Laughter.)

17 MEMBER BROWN: Peak central temperatures,  
18 overpowers, if you can accept the peaks that come,  
19 then it would be said, "That's okay." That's what you  
20 mean?

21 MR. MORTON: That's correct, yes.

22 MEMBER BROWN: Okay. I just wanted to  
23 make sure. That's what I got out of it. I just  
24 wanted to make sure I understand that, and I just  
25 couldn't frame it as we went through that slide.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 Okay. Thank you.

2 MR. MORTON: Okay. Thank you.

3 And we tried to make that clear within the  
4 lead-in subsection for that, which I think is 3.1.3,  
5 off the top of my head. Staff, please correct me, if  
6 I'm wrong on that.

7 Oh, 3.3? Thank you. I appreciate it.

8 So, it's 3.3 of the BTP, is that  
9 subsection for the coping analysis for CCF.

10 MEMBER BROWN: Yes, I remember your  
11 talking about it. I'm just trying to frame it in the  
12 most simplistic terms I can.

13 MR. MORTON: Understood. Thank you,  
14 Member Brown. I appreciate it.

15 MEMBER BROWN: Yes. Go on. Thank you.

16 MR. MORTON: All right. So, I think we  
17 were on slide No. 20, Dawnmathews. Thank you. You're  
18 already ahead of me. I appreciate that.

19 Really, I would say the biggest  
20 consideration that we have here is there were public  
21 comments requesting clarification on the potential for  
22 crediting controls either for point 4 to point 3, or  
23 vice versa, of crediting manual operator actions  
24 credited for point 3 to point 4. Those particular  
25 positions do have different legal requirements on

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1       them.

2                   And to clarify within the guidance what  
3       you could do in terms of crediting manual controls for  
4       either position and juxtaposing those two, if an  
5       application shows up at the staff's doorstep where a  
6       licensee is choosing to credit, for example, the  
7       manual system controls for position 3 to meet point 4,  
8       position 4, we clarified those aspects within the BTP.  
9       Also, that's the biggest improvement that was made or  
10      clarification that we attempted to make within that  
11      section, because position 4 is a unique animal  
12      compared to the other three positions in the  
13      SECY-93-087.

14                   MEMBER BROWN:     Yes, I have another  
15      question on this.

16                   MR. MORTON:    Yes?

17                   MEMBER BROWN:    Make sure I get this  
18      phrased properly. I have a different thought. I  
19      mean, my thought process on manual controls that  
20      control critical safety functions. A large number of  
21      the systems put into place are being utilized today.  
22      They use touch screens. Touch screens are not as  
23      positive as switches.

24                   Is there any basis for not addressing the  
25      functionality of touch screens in terms of the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 operation actually happened? I say that based on a  
2 comment that I received from a friend who almost -- he  
3 had a brand-new car. He was trying to change the  
4 station on his radio. As opposed to his old car which  
5 you punched the little button and it changed, this was  
6 a touch screen that he had to scroll and touch. He  
7 took his eyes off the road and almost killed himself.

8 MR. MORTON: Aw, okay.

9 MEMBER BROWN: I'm always paranoid about  
10 touch screens where you've got to create, you've got  
11 to control something. You have to touch it, go to a  
12 menu, select the next thing, and then, punch something  
13 else that says, "Go." As opposed to, if you've got a  
14 critical safety function, you want to turn one switch  
15 and it actuates. So, that concept is not, the  
16 timeliness or the ability for positive control is not  
17 identified anywhere in here.

18 I understand position 4. I read that and  
19 I don't disagree with it. Okay? It's just here is an  
20 application of technology where you don't want to  
21 address detailed technology, but you want positive  
22 controls for critical safety functions.

23 MR. MORTON: Right.

24 MEMBER BROWN: That got lost when I was  
25 reading this.

1 MR. MORTON: So, I would caution ACRS  
2 members that, because it's not -- and I think you just  
3 alluded to it, Member Brown -- it's not a design  
4 document per se, so there's kind of a limited level of  
5 detail and sort of assurance that we can put inside  
6 the BTP, because we're basically limited to what the  
7 positions themselves actually are calling for. And  
8 then --

9 MEMBER BROWN: Okay. Hold on. Hold on.  
10 I understand that. I apologize for the interruption,  
11 but I did it anyway.

12 You don't have to give it -- all we're  
13 talking about is positive actuation. We're not  
14 talking about -- it's just the positive actuation for  
15 critical functions. The other ones -- I don't know  
16 how you phrase it. I'm not trying to dictate, but  
17 maybe sometimes you should dictate. So, I question  
18 this idea of the world is open and the sky is the  
19 limit all the time. There are some things you want  
20 done positively and you don't want to sell out and it  
21 shouldn't be reevaluated and you shouldn't be given an  
22 option.

23 I have a fundamental disagreement --  
24 you've probably heard me say this in multiple  
25 meetings.

1 MR. MORTON: Mm-hmm.

2 MEMBER BROWN: There are a few areas that  
3 you do not want out -- I'll give you one which I'll  
4 address later. The way this reads, bidirectional  
5 software communications anywhere in the plant and  
6 external to the plant are perfectly satisfactory  
7 software-controlled as long as you do a D3 analysis  
8 which everybody decides is okay. That's insane. But  
9 I just thought I'd give you a nice positive -- I'll  
10 look at actuating critical safety functions  
11 positively.

12 And that's one of the things we did at NR.  
13 All of our control panels, all critical safety or  
14 actuation functions were done with switches. We  
15 allowed data to be gotten, recording pressures,  
16 temperatures, going to search what alarms came up, you  
17 know, as a result of an event, via touch screen and  
18 scrolling, but we did not allow critical control  
19 functions to be done with touch screens and menus.  
20 Now that was when I left. Based on the review of the  
21 Ford, it looked like they were still doing that.

22 So, I hadn't figured out how I was going  
23 to address that later.

24 MEMBER BLEY: Lest this appear to be a  
25 Committee position -- and I would agree with Charlie,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 it ought to be a Committee position on --

2 MEMBER BROWN: Oh, yes, this is (audio  
3 interference) --

4 MEMBER BLEY: -- the bidirectional aspects  
5 of software and having a hard interface. But there's  
6 been a lot of work on these new control panels and a  
7 lot of experimentation. And I think for scram they  
8 still have a switch on the 07. But, for some of the  
9 others, I don't think the radio example in the car is  
10 really quite applicable. And operators have found  
11 these things very intuitive once they've had the bugs  
12 worked out for a long time. So, there aren't many out  
13 in the plants, but I'm not sure I would go as far as  
14 Charlie said on anything on night call or critical  
15 safety function -- I'm not sure what your list is,  
16 Charlie -- needs to be a switch.

17 MEMBER BROWN: Well, a scram switch,  
18 actuated safeguard systems when you've got to start  
19 pumps. If I've got to scroll down and select a pump,  
20 that's a bad idea.

21 MEMBER BLEY: Think of the controls on  
22 these new panels with touch screens for starting  
23 pumps, operating valves, that sort of thing, much more  
24 intuitive and the results are showing them more  
25 reliable, too, in terms of human dependence. So, I

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 think there's a gray area in here that I'd be hard-  
2 pressed to try to urge a fixed rule.

3 MEMBER BROWN: Well, you can see we have  
4 unanimity, Morton -- or Wendell. Excuse me.

5 (Laughter.)

6 MR. MORTON: No problem. No problem at  
7 all.

8 I would say that, with regard to your  
9 initial concern, in some of the conversations we had  
10 earlier in the presentation today, there's a level of  
11 detail that we're not going to necessarily get into in  
12 the BTP for 7-19 because it's much better explained in  
13 other portions of the SRP.

14 And the efficacy of the manual controls  
15 and displays is not something we necessarily are going  
16 to be getting into in BTP 7-19. That's why we  
17 provided the pointer to SRP Section 18, because that  
18 has the relevant detail that you need to really get  
19 into those kinds of considerations as well.

20 MEMBER BROWN: But this is your D3  
21 assessment?

22 MR. MORTON: This is correct, and --

23 MEMBER BROWN: Because there's nothing  
24 that provides any nuances of various types of control  
25 to the reviewers.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 MR. MORTON: This is correct, and a nuance  
2 should be left to the evaluators in this space when  
3 they are also reviewing that aspect of the  
4 application. We define the critical safety functions  
5 in Section B1.2 of the BTP. Those are the functions  
6 by which point 4 is referring to in terms of you need  
7 to have controls that are independent and diverse from  
8 the computer system that makes it susceptible to the  
9 particular CCF of concern or a computer system.  
10 That's a main design requirement we put on the manual  
11 controls and displays as pertains to point 4.

12 MEMBER BROWN: You say where? Where was  
13 that? Diverse and independent?

14 MR. MORTON: Yes, B1.2 is where we define  
15 the critical safety functions is where we define the  
16 critical safety functions.

17 MEMBER BROWN: B1? Where? B1.1?

18 MR. MORTON: Yes, Bravo 1.2

19 MEMBER BLEY: It's the fourth page of  
20 Section B, Charlie, and it comes right after the four  
21 technical positions.

22 MR. MORTON: Right, right. Right, right.

23 MEMBER BROWN: You said it was B1.2,  
24 right, "Critical Safety Functions"?

25 MR. MORTON: Mm-hmm. So, we define those

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 functions that are referred to in position 4 of the  
2 SRP, are defined in that subsection in the BTP. And  
3 for those particular controls, there's a requirement  
4 that they be independent and diverse from the computer  
5 system in question under positions 1 and 3. That's in  
6 the SRM itself. That's the main design requirement we  
7 put on there. The individual details about --

8 MEMBER BROWN: But that's not in 1.2. The  
9 independent and diverse is not in here.

10 MR. MORTON: That's correct. We just  
11 simply defined the critical safety functions, what  
12 they are. For purposes of the BTP, we just simply  
13 define what they are.

14 MEMBER BROWN: Well, somebody has to go  
15 off and look at 93-087?

16 MEMBER BLEY: No, Charlie, the independent  
17 and diverse is stated right in position 4.

18 MR. MORTON: Right.

19 MEMBER BLEY: Two pages earlier.

20 MR. MORTON: So, in the BTP, we define, we  
21 actually define what position 4 is in --

22 MEMBER BROWN: Okay. I found it. Never  
23 mind.

24 MR. MORTON: Yes.

25 MEMBER BROWN: As long as it's in here,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 that's okay.

2 MR. MORTON: Yes. It's also in this  
3 particular subsection of guidance 4, position 4, in  
4 the BTP, so for your reference. So, we tell you that,  
5 for those particular functions --

6 MEMBER BROWN: That's in 1.1, though.

7 MR. MORTON: Yes, yes.

8 MEMBER BROWN: Only where point 4 is I  
9 didn't see the diverse. That's where I got lost in  
10 terms of --

11 MR. MORTON: Yes, we changed some terms  
12 for consistency with the SRM, but the requirement for  
13 position 4 is that those displays and controls to  
14 operate the critical safety functions have to be  
15 independent and diverse. That's a requirement from  
16 the position 4 of the SRM itself. The individual  
17 efficacy of the controls and displays is that the  
18 applicant may credit if something would be handled  
19 under the more detailed HV evaluation. It's not  
20 something we would get into in a significant for the  
21 BTP. So, I just wanted to make that -- there's a  
22 distinction there I just want to be clear on.

23 MEMBER BROWN: Okay. Go on.

24 MR. MORTON: Okay.

25 MEMBER BROWN: I'm good. I've been

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 suitably chastised.

2 (Laughter.)

3 MR. MORTON: So, if there's no other  
4 questions, Dawnmathews, if we can go to slide 21?

5 So, for this particular subsection, I  
6 believe it was Section 8.5 or 8.6 previously. Now  
7 it's Section B.6.5, due to the changes we made in  
8 integrating different sections.

9 We did get a number of public comments on  
10 this particular subsection asking for additional  
11 flexibilities under the BTP for addressing the  
12 potential effects of a CCF that haven't necessarily  
13 been addressed through the other methodologies stated  
14 earlier in the BTP. And that's essentially what the  
15 staff provided, and the ability to use alternative  
16 methods when certain CCF vulnerabilities were not  
17 specifically addressed through specific design  
18 measures or things of that nature. So, we did  
19 improve, make some refinements and improvements in  
20 this subsection based upon our internal discussions as  
21 well as industry and stakeholder comments.

22 So, I'm hearing no questions on this  
23 particular topic. So, Dawnmathews, please go to slide  
24 No. 22.

25 Okay. So, status and next steps.

1 Technically, both the Draft Rev. 8 and the public  
2 comment file are attached to, are in the final  
3 concurrence review. We're still continuing to make  
4 refinements and tweaks based on the feedback that we  
5 received, including the feedback we received today at  
6 today's ACRS meeting, as well as the previous ACRS  
7 member feedback we received back in November of last  
8 year and in June of this year. We do have another  
9 ACRS full Committee meeting potentially scheduled for,  
10 I believe, early November, later this year. And  
11 really, the final milestone we're looking at prior to  
12 issuance, targeting January-February of 2021, is OMB  
13 review and publication, potentially targeted for  
14 January-February of 2021.

15 So, those are just kind of the major  
16 milestones that we have left going forward with the  
17 BTP into fall. So, with that said, that essentially  
18 completes our presentation. Are there any questions  
19 from the members?

20 MEMBER BROWN: Yes, I have one, as kind of  
21 a closure item. We do have the full Committee meeting  
22 coming up in November --

23 MR. MORTON: Yes.

24 MEMBER BROWN: -- which I'll, obviously,  
25 be tasked with preparing a report for the Committee,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 full Committee's agreement.

2           There has been a lot of variability in  
3 this document over the last year. Are you comfortable  
4 with where your concurrence process is, that you're  
5 not going to have any more hiccups, the way we did a  
6 few months ago in terms of people saying, "Gee, you've  
7 got to redo all this."? I don't know how much legal  
8 was involved. It's obvious you all took our comments  
9 from the November and the June meeting into  
10 consideration in terms of your reorganization,  
11 consolidations, and stuff, which I think was positive.

12           My concern, is there some other  
13 outstanding issues that you all have in the background  
14 that we're not aware of that are going to drastically  
15 change the picture of what this looks like before the  
16 full Committee meeting?

17           MR. MORTON: Member Brown, right now,  
18 we're very confident within the content of the  
19 document as it stands. In terms of any major  
20 significant issues, the ones that we had received  
21 previously, the document that you received publicly is  
22 the document that we believe resolved any remaining  
23 residual significant issues that had come up since the  
24 June meeting.

25           This is a version that has had internal

1 staff review, including the legal review as well. So,  
2 it generally represents our legal positions on these  
3 matters.

4 MEMBER BROWN: Okay. So that you have got  
5 the NLO on this then?

6 MR. MORTON: That's correct, yes.

7 MEMBER BROWN: Whatever it's called?

8 MR. MORTON: That's correct, yes.

9 MEMBER BROWN: So, basically, we should be  
10 expecting to review this document and any responses to  
11 questions during this meeting during the full  
12 Committee meeting? Whatever questions, you know,  
13 whatever issues or whatever questions we raise in this  
14 meeting, you would address those at the full Committee  
15 meeting?

16 MR. MORTON: That's true. And I also want  
17 to just tweak what I just said a little bit. So, we  
18 did have a legal review, but it's the working -- I  
19 would say this is still a working file in progress.  
20 We did receive NLO on it, to your question. But we  
21 will be saying the document's still technically in  
22 concurrence. So, there may be changes and tweaks into  
23 the document going forward.

24 MEMBER BROWN: The basic format, layout,  
25 rearrangement of sections, deletion or inclusion of

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 additional stuff, other than if you do it based on  
2 some of our comments, you don't see that as being a  
3 major issue then?

4 MR. MORTON: That is correct. We don't  
5 foresee any significant reorganizations like you've  
6 seen from the June to August version of the document,  
7 that's correct.

8 MEMBER BROWN: So, when we get a document  
9 for the full Committee meeting a couple of weeks  
10 before, or whatever the requirement is, you should be  
11 able to highlight the stuff you've got? I don't mean  
12 redline/strikeouts, but at least highlight where  
13 changes were made and what those changes were?

14 MR. MORTON: That's correct, yes.

15 MEMBER BROWN: Before the meeting, a  
16 couple of weeks before the meeting?

17 MR. MORTON: Yes, that's correct.

18 MEMBER BROWN: Okay.

19 MEMBER BLEY: Hey, Charlie, can I sneak  
20 something in? It's Dennis.

21 MEMBER BROWN: Yes, go ahead, Dennis.

22 MEMBER BLEY: In the introduction, you  
23 guys mentioned that, you know, you've really focused  
24 this on being a document for the staff, as a Standard  
25 Review Plan is supposed to be. The hit I got was

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 you're not planning on doing a Reg Guide, but you  
2 think industry might be putting together some form of  
3 guidance? Is that what you're expecting? And they'll  
4 be on, so we can hear from them later.

5 MR. MORTON: Member Bley, can you say that  
6 one more time? I didn't quite hear your question.

7 MEMBER BLEY: Okay. My understanding from  
8 your initial comments was that you will not be, or you  
9 don't plan to do a Reg Guide for applicants, but you  
10 think industry might be putting together some kind of  
11 guidance for applicants. Is that correct?

12 MR. MORTON: Yes, we can let industry  
13 speak to that point. I believe they'll be on later on  
14 after the staff is done.

15 In terms of the Reg --

16 MR. BENNER: This is Eric Benner. I don't  
17 think the door is closed to either option. We just,  
18 like I alluded to, we've been so busy focused on this  
19 document, that we haven't had the  
20 interaction/communication with stakeholders to discuss  
21 what form should the guidance, companion guidance for  
22 industry, take. So, I mean, I think we need to have  
23 -- I mean, some of it, we're going to hear some  
24 thoughts from the industry today, but we need to have  
25 that communication with stakeholders, particularly the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 industry, to see what's the best way to fill in that  
2 hole.

3 MEMBER BLEY: Okay. Thanks.

4 MEMBER BROWN: Okay.

5 MS. ANTONESCU: Good morning.

6 MEMBER BROWN: Yes?

7 MS. ANTONESCU: This is Christina.

8 My understanding was that the staff  
9 received a full NLO for the BTP, but working level NLO  
10 for the resolution of the public comments.

11 MEMBER BROWN: Okay. Is that correct,  
12 Eric?

13 MR. MOORE: Excuse me. This is Scott  
14 Moore.

15 OGC has asked that we not discuss the  
16 legal review as part of the presentations.

17 MEMBER BROWN: Okay.

18 MR. MOORE: I think it's a fair question.  
19 Certainly, it's absolutely a fair question to ask is  
20 it going to change between now and when the Committee  
21 reviews documents at the full Committee stage. But  
22 OGC's preference is that the staff not discuss OGC's  
23 comments back to the Committee as part of the  
24 presentation.

25 Thank you.

1 MEMBER BROWN: Okay. Thank you, Scott.  
2 I don't have any problem with that. It was just I  
3 know there's been a lot of gyrations. I just want to  
4 make sure we get a consistent document this time.

5 MR. MOORE: Yes, sir.

6 MEMBER BROWN: Okay. Wendell and Eric, I  
7 told you I would provide some feedback, and we'll do  
8 this before we take a break. This will only take  
9 about five minutes, and then, we'll do the NEI stuff  
10 after we take a break. And these are just my thoughts  
11 relative to the background, and it's kind of the  
12 fundamental issue of how do you craft defense in  
13 depth, the most important, one of the most important  
14 protections we have in these systems.

15 So, my comment, which I will send copies  
16 to you via Christina, which you then can do with what  
17 you decide to do with prior to the full Committee  
18 meeting. But just to get it on the record, the way I  
19 read this was, No. 1, in the background, fundamentals:

20 (a) The approach -- and don't take this  
21 first part negatively; this is just my view of how we  
22 do things a lot of the times. The approach taken by  
23 the BTP is piecemeal in that it addresses the review  
24 of defense in depth and diversity for digital I&C,  
25 safety and non-safety systems, by evaluating the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 pieces that make up the systems without knowing the  
2 overall I&C reactor trip and engineered safeguards  
3 architectures for the specific application.

4           If you look at applications we reviewed in  
5 the past few years, the architectures that meet five  
6 fundamental principles for the structure of these  
7 systems, the I&C system designs, provide the basic  
8 framework for identifying the need for, and type of,  
9 D3 required. In fact, an architecture for each of  
10 these two primary high-significance safety systems,  
11 RTS and SFAS, that meets the fundamental principles,  
12 starts off with at least five or six layers of defense  
13 in depth and two or three layers of diversity,  
14 depending on how you want to aggregate them.

15           The first level is the use of redundant  
16 divisions. Once you go from one division to four or  
17 three or two, you have created a level of defense in  
18 depth.

19           The second is the use of separate  
20 detectors and A-to-D converters for each detector's  
21 signals. That's a second level of defense.

22           The third is the use of asynchronous  
23 clocks. In other words, the divisions are not  
24 synchronized for cycle planning and processing. And  
25 detectors never put out the same signal. Trying to

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 get them to measure the same pressure for one pressure  
2 input just doesn't, typically, does not happen. And  
3 this works whether you have deterministic or  
4 interrupt-driven processing systems.

5 The fourth level is the use of hardware-  
6 based monitors, watchdog timers, independent of the  
7 processors on at least the software-based coincidence  
8 voting units. In other words, you have a monitor,  
9 regardless of -- but it's independent, to ensure that  
10 corrupt data from one division does not lock up all  
11 voting units.

12 The application of timers or monitors on  
13 even the data processing and computational processors  
14 provides a fifth level of defense in depth.

15 The use of manual reactor trip and  
16 safeguards actuation switches downstream of the CCF-  
17 vulnerable units provides a sixth level.

18 And the use of non-software-configured  
19 one-way data communications provides a seventh level  
20 in terms of access to the plant from external sources.

21 There are also three levels of diversity  
22 through the use of hardware manual switches,  
23 processor-independent hardware watchdog timers, and  
24 the use of non-software unidirectional data.

25 I'm not going to read the rest. I've

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 provided the rest that you ought to incorporate into  
2 the background the concept of what defense in depth  
3 means relative to architectures and using the words  
4 that I've provided.

5           The other comment (b) is that the  
6 background addresses combining reactor trip systems  
7 and SFAS systems into combined a single DI&C  
8 protection system. It is, then -- and this is a  
9 little bit pejorative -- but, then, states in the most  
10 ho-hum manner that this makes identification and  
11 evaluation of potential consequences of a postulated  
12 CCF more challenging. I had a difficult vision of how  
13 in any manner we can condone or accept combining these  
14 systems into a combined system using the same  
15 processors.

16           NUREG-6303 actually identifies, as you  
17 said before, echelons of defense, the normal reactor  
18 controls, reactor trip, SFAS, and the reactor  
19 monitoring identification systems as individual  
20 echelons of defense.

21           These two paragraphs, the background or  
22 the other background paragraph I talked about and this  
23 other one, are obviously contradictory.

24           The section or the appropriate sections  
25 should be revised to verify independence between the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 high-significance safety systems is maintained.

2 And then, there are some similar comments  
3 down relative to those two things under the Branch  
4 Technical Position, which I'll just pass on to you  
5 without reading.

6 Anyway, I'll pass those on to you. Those  
7 were my thoughts. They're obviously not Committee  
8 thoughts, not Committee agreements. But I will be  
9 advocating that we provide some recommendations on  
10 that via the full Committee meeting. And if my  
11 colleagues disagree, I guess we will accept that. But  
12 I will pass them on to you for your consideration  
13 prior to the full Committee meeting in November.

14 So, is that okay?

15 MR. MORTON: Yes, sir, that's fine. Thank  
16 you, Member Brown.

17 MEMBER BROWN: Okay. And at this point,  
18 I think it's 11:30. We were scheduled for a break a  
19 few minutes ago. We're going to take it now. We  
20 will, then, come back and wrap up with the NEI  
21 comments.

22 So, as of -- what time is it? -- it's  
23 11:35. We'll come back at --

24 MS. ANTONESCU: Charlie, according to the  
25 schedule, the NEI comments on the Draft BTP is at two

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 o'clock. So, we will have to find out if they're  
2 ready.

3 MEMBER BROWN: Oh, could we avail them --  
4 are they here, NEI?

5 MR. VAUGHN: Chairman Brown, this is Steve  
6 Vaughn with NEI. I'm online. So are Warren Odess-  
7 Gillett and Mark Burzynski. So, we'll be ready in  
8 five minutes, if that's how you want to proceed.

9 MEMBER BROWN: Okay. We'll do this at,  
10 make it 11 -- 15 plus 36 is what, 51. Let's make it  
11 11:55. Is that acceptable? We'll reconvene at 11:55.  
12 So, we're recessed right now.

13 Thank you.

14 (Whereupon, the above-entitled matter went  
15 off the record at 11:36 a.m. and resumed at 11:55  
16 a.m.)

17 MEMBER BROWN: This is Charlie Brown. I'm  
18 back.

19 Let me do a roll call of the members  
20 again, if I can find them all.

21 Dennis?

22 MEMBER BLEY: I'm here.

23 MEMBER BROWN: Walt?

24 MEMBER KIRCHNER: Here.

25 MEMBER BROWN: Dave?

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 MEMBER PETTI: Here.

2 MEMBER BROWN: Joy?

3 VICE CHAIR REMPE: Here.

4 MEMBER BROWN: Matt?

5 MEMBER SUNSERI: Here.

6 MEMBER MARCH-LEUBA: And Jose March-Leuba  
7 is here.

8 MEMBER BROWN: Oh, Jose is here. Okay,  
9 Jose.

10 MEMBER MARCH-LEUBA: Sorry I wasn't at the  
11 start.

12 MEMBER BROWN: Okay. It's all right. It  
13 was exciting.

14 And I think I've got everybody.

15 MR. HECHT: Myron is also here.

16 MEMBER BROWN: Oh, Myron. I'm sorry. I  
17 apologize for that.

18 With that in mind, I think I will turn  
19 this over to Steve Vaughn from NEI.

20 Are you ready?

21 MR. VAUGHN: Yes. Yes, we are ready.

22 MEMBER BROWN: I lost the slides. Oh,  
23 there they are again.

24 MR. VAUGHN: Yes. And I had to shut down  
25 to unmute myself.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 MEMBER BROWN: Okay. All right. I'll  
2 mute myself.

3 And this is Steve Vaughn from NEI. He  
4 will doing responses from his other two compatriots.  
5 I think it's Warren Odess-Gillett, right, and Mark  
6 Burzynski?

7 MR. VAUGHN: Correct.

8 MEMBER BROWN: Okay. I will turn it over  
9 to you, Steve.

10 MR. VAUGHN: All right. Thank you,  
11 Chairman Brown and ACRS Members. We appreciate the  
12 opportunity to present NEI perspectives.

13 Just again, my name is Steve Vaughn. I'm  
14 a Senior Project Manager at the Nuclear Energy  
15 Institute. I help coordinate a lot of the digital I&C  
16 efforts ongoing.

17 And with me here in the virtual setting I  
18 have Warren Odess-Gillett. He works at Westinghouse,  
19 but he's also a part-time NEI loanee, and he will be  
20 presenting some of the slide material.

21 And also, Mark Burzynski, representing  
22 NewClear Day, Incorporated, will address some of the  
23 slides as well.

24 Next, moving on, the first slide here is  
25 on Section 2. We should have renamed this "Digital

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 I&C Characteristics," not "Categorization."

2 Just for everyone's edification, based on  
3 what Wendell went through this morning, I probably  
4 would have adjusted some of these slides after hearing  
5 it, but we developed these last week. So, there will  
6 be some tweaks here.

7 But, at a high level -- I just don't want  
8 to lose the forest to the trees here -- NEI does like,  
9 is all for having a graded approach to the digital I&C  
10 system and components, maybe not categorization, but,  
11 you know, creating the approach that you put it into,  
12 based on the safety. So, we completely agree with  
13 that, and we have been since the first proposal, I  
14 think back in the November full Committee meeting.  
15 So, we're all for it. We just have some comments here  
16 to help clarify some of the guidance.

17 So, the first one here, use of risk  
18 insights from site-specific PRAs, that language did  
19 change a little bit from the last revision, the May  
20 version. And the one thing we saw that was slightly  
21 different is it noted that, if you do use risk  
22 insights, you're basically demonstrating that a  
23 structure, system, or component is less safety  
24 significant than the criteria.

25 And our comment here is that these risks,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 many different risk insights, it's really independent  
2 of these deterministic criteria. They could have  
3 offered something that's less safety significant, but  
4 the flip side is also the potential where, when you do  
5 get risk insights, you could increase the level of  
6 safety significance when comparing to these criteria.

7           And when Member Bley noted the logic under  
8 B, where it was low safety significance, but it was  
9 non-safety-related, but safety significant, it kind of  
10 created a logic on an issue that kind of illustrates  
11 this point where you could have something that is non-  
12 safety-related, but when you go through the switching  
13 exercise using the site-specific PRA, you might come  
14 to a determination that it has higher safety  
15 significance than one might think when you see the  
16 label "non-safety-related." So, that was just one  
17 thing we wanted to point out.

18           The second piece, you know, based on how  
19 the NRC provides the guidance to ensure that this is  
20 directed to the audiences, for the staff, we do know,  
21 it makes sense now why you revised the language there  
22 about the risk insights should be an input into the  
23 decisionmaking process. And that's what a utility  
24 would use when they're making this determination, not  
25 necessarily what the staff would do. So, it makes

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 sense why you took it out.

2 But I just wanted to note that, when an  
3 applicant is going to apply for a digital modification  
4 under this BTP 7-19, they're going to take risk  
5 insights from the PRA and they're going to look at  
6 these deterministic criteria and make an integrated  
7 decision.

8 All right. So, moving on to the actual  
9 criteria themselves, we did focus in on just the alpha  
10 category, which is previously A1. It wasn't clear,  
11 though, and we suspect that you don't need all the  
12 criterion. So, it's not an "and" between each of  
13 them. But we went kind of back and forth; we weren't  
14 really sure. It's just an offer to maybe clarify the  
15 criterion as one of the four or a subset of those, but  
16 basically you don't need all the criterion to be met  
17 in order for it to fall within that definition,  
18 whether it's Alpha above or Charlie below.

19 MR. ODESS-GILLETT: Steve, this is Warren.  
20 Do you mind if I clarify a little bit?

21 MR. VAUGHN: Sure.

22 MR. ODESS-GILLETT: Okay. So, what we're  
23 really concerned about is that, if you use like the  
24 first one, A, as a standalone criteria for Category A,  
25 it's a significant contributor to plant safety. You

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1       couldn't really use that as a standalone.  So, the  
2       industry assumes that you have to meet all four to be  
3       into this Category A, and that's what we would prefer,  
4       but it's not clearly stated that you need all four.

5                   MR. VAUGHN:  Yes.  Thanks, Warren.

6                   That is a good segue into the second  
7       bullet, because the first criterion uses the phrase  
8       "significant contributors to plant safety," and we're  
9       trying to think about how one would -- how a digital  
10      I&C system or a component would meet that, you know,  
11      whether it's a significant contributor to plant safety  
12      or not.  You know, most of the focus is on insights  
13      from the site-specific PRAs, and we've, obviously,  
14      taken some engineering deterministic insights.  Like  
15      Warren said, that, in and of itself, it's just really  
16      hard to make that determination.  That's just a  
17      challenging criterion to figure out whether you meet  
18      it or not.  And maybe it's meant to be ambiguous, and  
19      that's okay.  It's just, you know, to consistent  
20      outcomes, it might be challenging.

21                   And similar with the GDC 22, that's the  
22      fourth criterion that was added, I think in the May  
23      version.  It wasn't in back in January.  Again, GDCs,  
24      by design, are very high-level.  So, we would just  
25      challenge you to see whether that criterion is met and

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 whether it's you just need that in that category  
2 because the assessment moved away from that term. But  
3 it just makes it challenging to figure out what box  
4 you're in.

5 And so, the second and third criterion we  
6 thought were pretty straightforward, and we think the  
7 second and third should be able to address all the  
8 different examples, potential examples, out there.  
9 So, our recommendation would be just to focus on the  
10 second and the third criterion.

11 All right. We're going to move on to the  
12 next slide, unless there are any questions.

13 MEMBER BROWN: Just stay there for a  
14 minute.

15 MR. VAUGHN: Okay.

16 MEMBER BROWN: I mean, I just opened the  
17 document and read all four of them. I guess I didn't  
18 think of it when I read -- this is Charlie Brown. I  
19 guess I didn't -- and somebody else can help me, if  
20 they so desire, Dennis, et cetera -- but I just read  
21 those as things to consider. And whether three or  
22 four or one or two applied, you had to make an  
23 independent judgment whether they fell into the high  
24 safety significance, but those were things to think  
25 about. So, I'm not so sure -- I didn't read it the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 same way you did, that two of them should be deleted.  
2 That's my only thought. I don't know whether anybody  
3 else has the same thought process or not, but that was  
4 mine.

5 I'm just feeding that back to you for my  
6 thought process on the thing. I'm not suggesting a  
7 resolution one way or the other. Just an observation  
8 as to how I viewed it when I read them. Okay?

9 MR. VAUGHN: Thank you, Member Brown.

10 MEMBER BLEY: This is Dennis Bley.

11 I'm with Charlie on how he read them. But  
12 if somebody who has to use them has trouble sorting  
13 them out, maybe that's an indication the staff needs  
14 to make them a little more clear. But they weren't  
15 unclear to me.

16 MEMBER BROWN: I agree with you, Dennis.  
17 A discussion sounds like it would be required.

18 MR. VAUGHN: Okay. And just to reiterate,  
19 the first and fourth criterion, that was NEI's  
20 recommendation, just to remove those and just keep the  
21 second and third criterion, which strings a little bit  
22 over there, once getting back to the January version.  
23 At least those two, if you met one of those two, it  
24 would make sense to frame it under high safety  
25 significance, notwithstanding any insights you get

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 from your site-specific PRA. But it's the first and  
2 the fourth we're challenging to see whether they were  
3 met or not because there's a lot of ambiguity there.

4 And what Warren's comment was is -- I  
5 think when you do read it, it makes sense. Any one of  
6 the four could put you into this category, for lack of  
7 a better word. But because the first and the fourth  
8 criterion were so open, it was just challenging to  
9 make a determination. And that might be by design,  
10 but, just to comment, we noted that it could --  
11 there's a lot of subjectivity.

12 MEMBER BROWN: Okay. Do you want to move  
13 on, unless somebody's got another comment?

14 MR. VAUGHN: Okay. Why don't we move on  
15 to the next slide? It's "Defensive Measures," Section  
16 3.1.3.

17 And again, this is a key section of  
18 BTP 7-19. And so, we're very happy that it has been  
19 added. It's been there for, I want to say, since the  
20 November revision.

21 So, we're probably going to send the staff  
22 some wording changes because previous versions, you  
23 know, that was NRC-endorsed methodology. And  
24 currently, this says industry-endorsed defensive  
25 measures. And we just want to make sure that it isn't

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 limiting.

2 If we can step back for a second, the  
3 whole purpose of this section is to allow NEI and  
4 industry to develop their own guidance on how to  
5 address software common cause failure. And given that  
6 there's two other ways to eliminate the CCF from  
7 further consideration -- it was either diversity or  
8 testing -- so, there are only two options.

9 So, this section really does allow for the  
10 opportunity for NEI and the industry to develop their  
11 own set of guidance that will be endorsed by the NRC  
12 and try the third option. So, again, we're happy that  
13 it's there. We just might suggest some wording  
14 changes to ensure that it really does align with the  
15 first this bullet here. We have already a draft  
16 version of NEI 20-07. And we did send that to the  
17 NRC, I think, August 31st. So, they've only had it  
18 for a week or so.

19 But, in the coming weeks when the staff  
20 does have a chance to read through it, gather some  
21 feedback, we look forward to an public opportunity to  
22 get that feedback and get probably a handful of public  
23 meetings in '20-21, as we change that guidance based  
24 on staff feedback and from other stakeholders.

25 So, again, this section is really

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 important to us. And so, anything that we do provide  
2 is just to ensure that the link is clear between  
3 Section 3.1.3 and what we developed as NEI 20-07.

4 MEMBER BROWN: Doesn't the last paragraph  
5 of 3.1.3 -- this is Charlie Brown again -- doesn't the  
6 last paragraph pretty much say you guys, industry, can  
7 pretty much propose what they want on a case-by-case  
8 basis? And then, NRC will address it.

9 MR. VAUGHN: Yes, it does, and it may be  
10 in a sense the nomenclature. But what NEI 20-07, what  
11 it doesn't do, it's not just a list of defensive  
12 measures that are approved for use because they're  
13 occasion-specific. Again, 20-07 starts very high  
14 level, the first principles, and then, it gets in safe  
15 design directives, and then defensive measures, and  
16 uses the term "design attributes" that you can use in  
17 designs to help meet the safe design objectives; and  
18 therefore, meet these first principles, which are,  
19 then, again, tied to regulations. That's what 20-07  
20 is. It's not just a list of defensive measures. It's  
21 to make sure the wording in this section lines up well  
22 with 20-07's.

23 And in the previous version, they  
24 mentioned NRC methodology. Methodology is general  
25 enough where it would apply to 20-07, because that's

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 really what it is. It's not just a list of defensive  
2 measures. So, I could be reading too much into it,  
3 but I'm heavily involved with the document and this  
4 section. So, I just want to make sure everything's  
5 clear to all stakeholders.

6 MEMBER BROWN: Okay. Thank you.

7 MR. VAUGHN: You're welcome.

8 MEMBER BLEY: I'm sorry, I got dumped off  
9 the line for a few minutes and missed part of your  
10 discussion on this one. Are you guys, have you made  
11 any plans for developing guidance at this point, the  
12 industry?

13 MR. VAUGHN: Yes. Yes, Member Bley, I  
14 want to say it's been a little over a year we've laid  
15 out a proof of concept, and just eight days ago, we  
16 sent a draft version of NEI 20-07 to the NRC, and it's  
17 publicly available in ADAMS right now.

18 And we look, probably in the next month or  
19 two, when the staff has a chance to review it and  
20 they've got us some feedback, we look forward to a  
21 meeting to discuss technical and regulatory content of  
22 that. So, the short answer is yes, and we probably  
23 will have a public meeting before the end of 2020.

24 MEMBER BROWN: We lost the slide, by the  
25 way.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 MEMBER BLEY: Yes, it did go away.

2 Thank you for that response.

3 Charlie?

4 MEMBER BROWN: Yes?

5 MEMBER BLEY: When is our full Committee  
6 meeting scheduled?

7 MEMBER BROWN: November. That's correct,  
8 isn't it, Christina?

9 (No response.)

10 MEMBER BLEY: So, we will not have the  
11 industry proposed guidance -- well, we might see a  
12 draft of it before then.

13 MEMBER BROWN: Yes, he just said they --  
14 I think it's 20-07. And it's the 20-07 document  
15 you're talking about?

16 MEMBER BLEY: Yes, I think that's what he  
17 said, but they're going to revise it again in the next  
18 few weeks. So, we probably won't get to see that  
19 revision.

20 MS. ANTONESCU: Yes, we will have a copy,  
21 a draft copy, for you.

22 MR. VAUGHN: It's available in ADAMS right  
23 now. I don't have the number handy, but I can send it  
24 to you. Maybe you can share it with the ACRS, and  
25 anyone from the NRC will be able to share it with you

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 as well. It's publicly available.

2 MEMBER BROWN: Yes, Christina, if it's in  
3 ADAMS, she'll get a copy for us.

4 MR. VAUGHN: Okay. Great.

5 MEMBER BROWN: Thank you.

6 MR. VAUGHN: All right. If there are no  
7 other questions on this slide, I'm going to turn it  
8 over to Warren Odess-Gillett, and he's going to get  
9 into slide 4.

10 MR. ODESS-GILLETT: Steve, do you have  
11 another document open that's preventing you from  
12 sharing the presentation?

13 MR. VAUGHN: Thank you. No. So, you  
14 didn't see that before?

15 MR. ODESS-GILLETT: No, it just appeared  
16 now.

17 MR. VAUGHN: How about now?

18 MR. ODESS-GILLETT: Yes, that's fine.  
19 That's good.

20 MR. VAUGHN: Okay. Yes, it just stopped  
21 and I didn't realize that.

22 MR. ODESS-GILLETT: No worries. All  
23 right. So, this has to do with the title and scope of  
24 the document. The title of this draft is "CCF Due to  
25 Latent Defects in Digital Safety Systems," just

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1       extenuating the word "safety" here.

2                   And the scope of this draft states that  
3       the guidance of this BTP is intended for staff reviews  
4       of I&C safety systems. However, even though the scope  
5       seems to, and the title seems to, limit the review to  
6       safety systems, the task still contains review  
7       guidance for non-safety-related systems.

8                   And NEI and its members would like to see  
9       the non-safety-related guidance moved elsewhere from  
10      the BTP, to be consistent with the title and the scope  
11      of the document, if we had our druthers.

12                  We agree that non-safety-related  
13      discussion should be limited to any interconnectivity  
14      or dependency of the safety system with a non-safety  
15      system. But we know in the past addressing CCF for  
16      non-safety-related systems has not always been  
17      consistent in Part 52 reviews, where we've seen the  
18      reviews range from a probabilistic approach, as in the  
19      ESBWR, to actual transient analysis computations, as  
20      was demonstrated for the APR1400.

21                  We know that RIS 2002-22, Supplement 1,  
22      has good regulatory guidance to industry on how to  
23      address this issue for non-safety-related systems for  
24      the operating fleet. And if the staff wants to  
25      migrate the RIS into staff guidance, it's desired by

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 industry that this would be in another document, not  
2 part of the SRP, and limit this SRP to its significant  
3 title and scope, which is review of safety-related  
4 systems.

5 MEMBER BLEY: Since this is staff  
6 guidance, I'm curious as to why you're concerned about  
7 the last comments you made.

8 MR. ODESS-GILLETT: It makes the BTP 7-19  
9 a more complicated document by now -- we already have  
10 a graded approach. Industry is really happy with the  
11 graded approach to addressing CCF via the RIS for the  
12 operating fleet.

13 And so, we just fine that, if the title  
14 and scope -- either the title and scope need to  
15 change, or the content needs to change. And if the  
16 industry had its druthers, we'd like to keep this  
17 content consistent with the title and scope and have  
18 the non-safety-related stuff in another section of the  
19 SRP than this, just to simplify the document.

20 MEMBER BLEY: Okay. Go ahead.

21 MR. ODESS-GILLETT: Okay. Now I guess we  
22 go to slide 5.

23 All right. So here, as Wendell had  
24 mentioned, they had defined in the background section  
25 that this was to focus on latent defects. And we

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 understand that, really, these latent defects are  
2 related to the design. Because latent defects are  
3 associated with manufacturing, which this BTP is not  
4 addressing those potentialities. So, the BTP scope,  
5 since it is focusing on the design aspects of the  
6 safety systems when addressing CCF, we'd like to see  
7 the word "design" be used as a qualifier when  
8 referring to "latent defects."

9           And then, also, the draft uses the term  
10 "active components" without defining the term. So,  
11 industry is struggling to understand what the  
12 differentiation between an active hardware component  
13 is and a component that has software-based logic  
14 because they're used both in the same sentence, and  
15 they are somehow differentiated between the two.

16           And similar to our comment to the last  
17 ACRS Subcommittee meeting, how the industry addresses  
18 particularly a hardware CCF, again, is still not clear  
19 to us, even with this added term of "active  
20 component," because we're not really sure what it  
21 means. I mean, the industry is clear that it needs to  
22 address CCF for what we would call programmable  
23 hardware components, but we would like to know what  
24 the definition of an "active component" is and why  
25 that is different from a component that is software-

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 logic-based.

2 MEMBER BROWN: And an inactive component  
3 is a resistor.

4 MR. ODESS-GILLETT: Okay.

5 MEMBER BROWN: An active component is a  
6 solid-state device that can do something.

7 MEMBER BLEY: I think we ought to let the  
8 staff speak to this one.

9 (Laughter.)

10 MEMBER BROWN: Well, I just thought I'd  
11 throw this out. It's kind of an interesting thought.  
12 Capacitors, resistors, et cetera, inductors, those are  
13 passive components. Anything else is -- a vacuum tube  
14 is an active component. But that's all right. You  
15 all can work that out on your own. I just thought I'd  
16 throw that, like that little puppy in the rice bowl;  
17 that's all.

18 (Laughter.)

19 MEMBER BROWN: You can go on.

20 I agree with you, Dennis.

21 MR. ODESS-GILLETT: Okay. Steve, I think  
22 we can go to slide 6 and hand it off to Mark.

23 MR. BURZYNSKI: Okay. Can you hear me?

24 MR. ODESS-GILLETT: Yes.

25 Mark, did we lose you?

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 MR. BURZYNSKI: No, I'm here.

2 MEMBER BROWN: Yes, go ahead. We can hear  
3 you.

4 MR. BURZYNSKI: Okay. So, the point with  
5 the slide 6 is that the example that's provided in the  
6 document that addresses partial actuation of an  
7 emergency core cooling system, mentioned as a single  
8 division coincident with false indications stemming  
9 from a postulated CCF, is a confusing example. We  
10 find that it's inconsistent with the evaluation  
11 guidance in NUREG/CR-6303. Specifically, Section 3.6  
12 would require you to postulate concurrent failures in  
13 all the same blocks in all redundant divisions, which  
14 would preclude the partial actuation example of a  
15 single ECCS division.

16 The second evaluation guidance in Section  
17 3.8 specifies that downstream blocks are assumed to  
18 function correctly in response to the incorrect or  
19 correct inputs they receive, which would preclude the  
20 false indications. A spurious actuation would  
21 indicate that it actuated. A failure to actuate would  
22 indicate no actuation. But you wouldn't mix the two.  
23 So, we just want to point that out, that this  
24 introduces confusion with respect to what is expected  
25 for spurious actuation or that it's inconsistent with

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 the other guidance that's mentioned regarding CCS  
2 evaluation.

3 Next slide.

4 Okay. On slide 7 --

5 MEMBER BROWN: Your slides disappeared  
6 again.

7 MR. BURZYNSKI: -- is where we find  
8 inconsistencies within the document. We note in  
9 several cases that the use of best estimate  
10 methodology is allowed for evaluation of consequences,  
11 but we do note that in several places it specifically  
12 says, "bounded by acceptance criteria defined in the  
13 FSAR," without mention of best estimate or realistic  
14 assumptions. So, that creates some confusion as to  
15 whether a different set of rules applies to these  
16 cases here.

17 We also note that the discussion of  
18 independent and diverse with respect to manual  
19 controls is confusing. This is similar to some of the  
20 discussion that occurred earlier regarding the use of  
21 Reg Guide 1.62 and how we've reconciled these  
22 documents. We think it would be useful to add a  
23 clarification that the independent statement does not  
24 require additional isolation on a hard-wired manual  
25 control that is connected downstream of the digital

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 part of the system in the same safety division.

2 And the last item on this slide, it's an  
3 inconsistency between ability to credit ATWS  
4 mitigation equipment and the specification here  
5 requiring independent sensors and actuators. We make  
6 note of the fact that the ATWS rule does not require  
7 independent sensors or actuators for the equipment it  
8 required to be installed. So, there's an  
9 inconsistency.

10 We also note that 10 CFR 50.62 was removed  
11 as a reference in the regulatory basis section, and we  
12 think it should be added back.

13 Thank you.

14 MR. ODESS-GILLETT: All right. So, I'm  
15 going to address this one. This is Warren Odess-  
16 Gillett.

17 I think this is just an editorial thing,  
18 but it has some technical significance. So, that's  
19 just why we're bringing it up.

20 The first paragraph of page 29 allows for  
21 diverse controls that are credited to mitigate a CCF  
22 vulnerability with a safety system; in other words,  
23 position 3 controls. They can also be credited as  
24 position 4 controls as long as they're in the control  
25 room.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1           Steve, I think we lost the slides again.  
2 Thank you.

3           However, the wording in the next paragraph  
4 seems to contradict that statement by stating that  
5 position 4 controls, and displays for that matter,  
6 must be diverse from those credited for position 3.  
7 And as we know, position 3 need to be diverse and  
8 independent from the system that's vulnerable to a  
9 CCF. So, we believe this was not the intent. And so,  
10 we're bringing this syntactical situation to the  
11 attention of the staff.

12           MR. VAUGHN: All right. Thank you,  
13 Warren. This is Steve Vaughn, NEI.

14           That is the last slide with any salient  
15 content. Before any closing remarks, any questions on  
16 the material we presented thus far?

17           Okay. Hearing none, again, we appreciate  
18 the opportunity to share our thoughts. This is the  
19 third Subcommittee meeting on this topic. So, that's  
20 a reflection of how much engagement has been involved  
21 over the past year-plus. And again, we're happy that  
22 we're a stakeholder and to be able to participate in  
23 the discussion. And we're getting close to resolving  
24 most of the content issues, and I think BTP 7-19 is on  
25 schedule to be issued, hopefully, by the end of this

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 calendar year. So, again, we appreciate the  
2 opportunity to try our perspectives. We appreciate  
3 it.

4 And I will turn it back over to you,  
5 Chairman Brown.

6 MEMBER BROWN: Okay. Thank you.

7 Hopefully, I don't get this out of  
8 sequence, but before we go to public content, I was  
9 going to see if any of the members and our consultant  
10 have any additional comments. Do you want me to walk  
11 through?

12 Dennis, do you have anything else?

13 MEMBER BLEY: Thanks, Charlie.

14 I like some of the rearrangement they did  
15 in this one. I remain concerned about the full  
16 material that was in the A1, A2, all that, in the way  
17 it's presented.

18 So, just to close for me on this, given  
19 the way those four categories are described in Section  
20 2.1, under "Acceptance Criteria for Safety-  
21 Significance Determination," high safety significance,  
22 one, makes sense to me. The second one is really  
23 functionally important to safety. The third one is  
24 really definitionally important to safety. And the  
25 fourth one is really not important to safety. So,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 that's the only thing. Everything else I think looks  
2 pretty clean.

3 I would like to have a chance to look over  
4 these NEI slides. They raised a lot of particular  
5 issues, but I couldn't quite decide on as they went  
6 through them, and I just need to see them again. So,  
7 we'll get a copy of them when this is over.

8 MEMBER BROWN: Okay. Thank you, Dennis.  
9 Jose?

10 MEMBER MARCH-LEUBA: Yes, I'm here. No,  
11 I have no further comment. Thank you.

12 MEMBER BROWN: Okay. Dave?

13 MEMBER PETTI: No comments.

14 MEMBER BROWN: Okay. Matt? Or Joy?  
15 Excuse me. I don't want to go out of alphabetical  
16 order here. Joy, do you have any additional comments?

17 VICE CHAIR REMPE: Hi, Charlie. No. I  
18 appreciate the opportunity to get an update from the  
19 staff and NEI's continued participation, but I don't  
20 have any additional comments.

21 MEMBER BROWN: Okay. Thank you.

22 Matt?

23 MEMBER SUNSERI: I thought the  
24 presentations were good, informative. I don't have  
25 any additional comments. Thank you.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1                   MEMBER BROWN:   Okay.   Myron?   Or Walt?  
2   Excuse me.   Walt Kirchner?

3                   MEMBER KIRCHNER:   Yes.   Thanks, Charlie.

4                   I echo Dennis' comments on the boxology.  
5   Just an observation, it's not just this I&C matter,  
6   but across the Agency it seems to me that there's not  
7   a lot of consistency on how one approaches these  
8   safety-significant determinations. I would point out,  
9   for example, that even within the BTP, it is somewhat  
10   inconsistent with the definition of safety-related  
11   that's used in 10 CFR 50 and 52. And so, it's just a  
12   general issue.

13                   And I already made my comments about the  
14   defense in depth topic as well. It's a similar thing.  
15   It seems to be a lot of variability across the Agency  
16   in how we do this boxology.

17                   And second, a minor point, I always like  
18   your kind of holistic approach, Charlie, starting with  
19   the architecture. So, on the NEI slides, there was  
20   one bullet pointing out that design and latent defects  
21   would not include fabrication issues. It would seem  
22   to me, if you start with architecture, this BTP would  
23   work for both design CCF issues, as well fabricated  
24   CCF issues.

25                   That's it.

1                   MEMBER BROWN: Okay. Thank you very much,  
2                   Walt.

3                   Myron?

4                   MR. HECHT: I guess the observation I  
5                   wanted to make was not specific to BTP 7-19, but to  
6                   the philosophy of trying to remove replicated material  
7                   from reference documents. And Charlie already pointed  
8                   out that there was a circular reference problem  
9                   between 9-62 and 7-19. At least in the past, I guess  
10                  the overall problem is that (audio interference) --  
11                  how shall I say it? -- non-replicated approach, and  
12                  you start relying more on dependencies, particularly  
13                  the source document, the reference document, as it  
14                  changes, it has to be aware of the documents that are  
15                  dependent on it. And that introduces additional  
16                  complexity that might be caught and problems that  
17                  might not be caught for several years, unless a  
18                  dramatic effort is made to ensuring that particularly  
19                  the referenced documents on which other documents are  
20                  dependent are always checked for all of the  
21                  dependencies that they have.

22                  MEMBER BROWN: Okay. Thank you.

23                  That kind of restated the point that we  
24                  made earlier, and I agree with that. It's a balance.

25                  I've already made my comments once. I

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 will provide them to Christina, as opposed to mouse-  
2 milking them anymore.

3 Let's see, I think I've covered everyone.  
4 Did I miss anybody from the Committee or consultants?  
5 No, I don't think so.

6 Christina, is the public line open?

7 MS. ANTONESCU: Thomas, can you please  
8 open the public line?

9 MR. DASHIELL: The public line is open for  
10 public comments.

11 MEMBER BROWN: Thank you, Thomas.

12 Is there anyone on the public line that  
13 would like to make a comment?

14 (No response.)

15 MEMBER BROWN: Is there anybody on the  
16 public line at all who could just say "Hi" to let us  
17 know that it's, in fact, open?

18 MR. MAUCK: I'd like to make one or two  
19 comments. This is Jerry Mauck.

20 MEMBER BROWN: From?

21 MR. MAUCK: From ER Resources, formerly  
22 NRC.

23 The verbiage on the ATWS rule is totally  
24 against what we wrote in the ATWS rule back in the  
25 1980s. We took many man-years to ever get the ATWS

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 rule published. And the use of BTP 7-19 to rewrite  
2 part of 10 CFR 50.62 is not acceptable and that should  
3 be removed, or you're going to run into a major  
4 conflict.

5 And the other comment is that citing these  
6 non-safety systems, such as the recirculation  
7 feedwater, as a problem and the defense in depth, has  
8 anyone at the NRC staff gone through this using a  
9 diverse digital (audio interference) once in the  
10 protection system to see if this causes problems?  
11 Because I don't think it will because the reactor  
12 protection system protects against those systems  
13 having a common cause software failure.

14 And it would be a problem if you used the  
15 same digital platform in these critical non-safety  
16 systems to do in the protection system. But if you do  
17 that, it's already covered by BTP 7-19. You'd have to  
18 include them as failing along with the protection  
19 system. So, my question is, has anyone on the staff  
20 gone through the concern (audio interference) to see  
21 if there really is one?

22 CHAIRMAN BROWN: Okay. Could you give me  
23 your name again, Jerry?

24 MR. MAUCK: Yes. Jerry Mauck, M-A-U-C-K.

25 CHAIRMAN BROWN: M-A -- say that again?

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 MR. MAUCK: M-A-U-C-K.

2 CHAIRMAN BROWN: Okay. Jerry, right?

3 MR. MAUCK: Right.

4 CHAIRMAN BROWN: Okay. Thank you.

5 Is there anyone else on the public line  
6 that would like to make a comment?

7 Hearing none, Thomas, Christina, you all  
8 can close the public line.

9 MR. DASHIELL: The public line is closed.

10 CHAIRMAN BROWN: Okay. Are there any  
11 other comments that anybody thought of in the interim  
12 here before I adjourn the meeting?

13 Hearing none, we will adjourn the meeting  
14 at this time. Thank you all for your participation,  
15 and we look forward to wrapping this up in the full  
16 Committee meeting in November.

17 Eric, do you have anything else final to  
18 say?

19 MR. BENNER: Just that you have given us  
20 a lot to think about, and I think -- I know it was  
21 good feedback, particularly on the terminology of  
22 "high safety significance." You know, there's a  
23 number of things that I think we can, irrespective of  
24 what comes in the letter, I think you've given us some  
25 good things to digest that we can clarify. So, we

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 will, in whatever product we provide to you for the  
2 full Committee meeting, we'll explain the changes, and  
3 particularly those changes that we make that we hope  
4 will be responsive to some of the feedback we heard  
5 here today.

6 CHAIRMAN BROWN: Okay. I have one final  
7 -- obviously, you didn't care for my architecture  
8 stuff. So, you'll only look at the other things. I'm  
9 just pulling your leg a little bit.

10 (Laughter.)

11 CHAIRMAN BROWN: We've got to have some  
12 humor somewhere in here.

13 MR. BENNER: Yes.

14 CHAIRMAN BROWN: I wanted to thank Tekia  
15 and her colleagues and staff. I thought they did a  
16 very good job. This was a much better document, a  
17 smoother-reading document than the ones I have seen in  
18 the past. So, we wanted to make sure management  
19 understood that they had some good response from the  
20 folks you had working on it, as well as Tekia with her  
21 management of getting it done. Okay? So, hopefully,  
22 you will pass that on.

23 I don't know that she's on the line. I  
24 know she had other meetings.

25 MS. GOVAN: Member Brown, I'm back. Thank

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 you very much.

2 CHAIRMAN BROWN: Oh, okay. Very good.  
3 Thank you, Tekia. Take care.

4 With that, I will adjourn the meeting, and  
5 we'll get on with business.

6 Matt, I presume we will get on with our --  
7 this is your P&P Subcommittee at o'clock, correct?

8 MEMBER SUNSERI: That is correct.

9 CHAIRMAN BROWN: Okay. And we've got a  
10 separate thing to go to. So, we close this meeting  
11 out, and we'll then meet you at 1:00 p.m.

12 MEMBER SUNSERI: Very good, Charlie.  
13 That's correct. Thank you.

14 CHAIRMAN BROWN: Okay. Thank you all,  
15 everybody.

16 Logging off. The meeting's adjourned.

17 (Whereupon, the above-entitled matter went  
18 off the record at 12:40 p.m.)  
19  
20  
21  
22  
23  
24  
25

# Draft Branch Technical Position 7-19, Revision 8

Advisory Committee on Reactor Safeguards  
Subcommittee Meeting  
NRC Staff Presentation  
September 8, 2020

---

---

# Agenda

- Objectives
- Summary of Key Changes
- Topics within the draft BTP 7-19
- Scope of the draft BTP 7-19
- Editing and Restructuring of the BTP
  - D3 Assessment
  - Manual Action Means to Address Position 4 in SRM-SECY-93-087
  - Justification for Not Correcting Specific Vulnerabilities
- Status and Next Steps

---

# Objectives

- Present key changes made in the draft BTP 7-19, Rev. 8, in response to public comments, as well as, ACRS feedback received in June 2020
- Obtain ACRS Subcommittee feedback on the draft BTP 7-19, Rev. 8

---

# Summary of Key Changes

- Each section of the BTP saw refinements in light of public comments and ACRS:
  - Graded approach revised to a categorization scheme
  - Qualitative assessment and spurious operation guidance moved to Section 3
  - Numbering for BTP sections now slightly different
- Edited and restructured the BTP to emphasize guidance is directed to staff reviewers
- Other improvements:
  - Readability
  - Technical content and regulatory bases
  - Overall clarity of positions contained therein
  - Organization

---

# Topics within the draft BTP 7-19

- Scope of the BTP
- Graded Approach Revised to a Categorization Scheme
- 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 Applicability
- Spurious Operation Evaluation Guidance
- Manual Action Means to Address Position 4 in SRM-SECY-93-087
- Justification for Not Correcting Specific Vulnerabilities

---

# Scope of the draft BTP 7-19

- Included consideration of active hardware, software, and software-based logic when addressing CCF (originating from latent defects)
  - Clarified the definition of “latent defect”
- Clarified that the design and/or analytical solutions in this BTP are applicable for latent defects in active hardware or software
- Resolved several public comments regarding the scope of the BTP
- Made conforming changes to reference latent defects with regard to CCF

---

# Editing and Restructuring the BTP

- Maintained focus of the BTP as *staff guidance*
- Refined background section discussion:
  - Failure types clarification
    - Single failures and single malfunctions (out of scope)
    - CCFs due to latent defects (**in scope**)
- Consolidated technical guidance and corresponding acceptance criteria for the D3 Assessment:
  - Qualitative assessment guidance
  - Spurious operation guidance

---

# Editing and Restructuring of the BTP – Refinements based on ACRS feedback

- 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

---

## D3 Assessment – Description

- 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
- Consistent with SRM-SECY-93-087, a D3 assessment should be performed for all systems determined to be of higher safety significance

---

# D3 Assessment – Process

## (previously called Graded Approach)

- D3 assessment to be based on the safety significance of the system
  - Design and analytical approaches applied are based on the safety significance determination
  - General focus on characteristics of the SSCs rather than ‘categories’ (A1, B1, etc. and Table 2-1 removed)
- Risk insights (if available) can be an input to the safety significance determination
- Applicants do not need to base their D3 assessment based on the safety significance of the systems

---

## D3 Assessment – Process(Continued)

- Clarified flexibility for SSCs in applications where a D3 Assessment is not necessary
  - **For lowest safety significant systems only**
- Identified flexibility based on the following criteria:
  - Failure does not adversely affect a safety function
  - Failure would not place a plant in a condition that cannot be reasonably mitigated

---

# D3 Assessment – Improvement

- Modified D3 Assessment process to include:
  - Qualitative Assessment methodology
  - Guidance and acceptance criteria for addressing spurious operation
- Provided more flexibility under the D3 Assessment method
- Provided better synergy with the safety significance determination process

---

# D3 Assessment – Framework

- Identified means to eliminate from consideration:
  - CCF vulnerability to latent defects can be eliminated from further consideration by use of these design attributes: diversity, testing, NRC-approved *defensive measures* or qualitative assessment;
  - or**
- Identified means to prevent or mitigate the effects of CCFs:
  - A diverse means can be used to perform the same or different function than the safety function disabled by the postulated CCF;
  - 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.

---

# D3 Assessment – Means to Eliminate CCF from Further Consideration

- Diversity within the DI&C system or component
  - Provided staff guidance to evaluate diversity within each safety division or among redundant divisions to address CCF
  - Provided staff guidance to evaluate that sufficient diversity exists in the design so different portions of the system are not subject to the same CCF
- Testing to identify and eliminate latent defects
  - Revised staff guidance to align with testing criteria described in IEEE Std. 7-4.3.2-2016

---

# D3 Assessment – Means to Eliminate CCF from Further Consideration

- Defensive Measures:
  - Defined as a type of design attribute
  - Added to conceptually allow for new and innovative design techniques to be employed to address CCF
  - Clarified that it must be NRC-approved to be creditable

---

## D3 Assessment – Means to Mitigate CCF

- Clarified staff guidance on the evaluation of the use of diverse means to perform the same or different function as the safety function:
  - The types of diverse means that can be credited
  - Guidance on the quality level for credited equipment
- Included staff guidance on the evaluation of the use of equipment outside the main control room for the performance of manual operator actions. Applies only for use of diverse means to address Position 3 in the SRM-SECY-93-087

---

## D3 Assessment –

### Coping with the Consequences of a CCF

- Included staff guidance to evaluate whether the facility can operate and consequences remain acceptable:
    - When vulnerabilities to CCF are not addressed
  - OR**
  - When remaining (residual) CCF vulnerabilities exist
- 
- Identified acceptance criteria to conclude that consequences of CCFs of a proposed system, or portions of a proposed system, are acceptable

---

# D3 Assessment – Qualitative Assessment Guidance

- 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 constitute a Qualitative Assessment
  - Three factors used in the aggregate to demonstrate likelihood of failure (i.e. CCF due to latent defect) remains acceptable:
    - Design attributes
    - Design quality
    - Operating experience
  - Supporting failure and consequence analysis (e.g. FMEA, FTAs, etc.)
- Provided staff guidance and acceptance criteria in Section 3 of the draft BTP 7-19

---

# D3 Assessment – Spurious Operation Guidance

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

---

## 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-- necessary to address Position 4 of the SRM on SECY-93-087, Item 18
- Clarified that reviewers should accept these displays and manual controls as diverse means to address CCF (Position 3) only if they are not susceptible to the same CCF vulnerabilities

---

# Justification for Not Correcting Specific Vulnerabilities

- Modified Section B.6.5 to highlight the possible use of alternative methods to not address specific CCF vulnerabilities
- Updated review guidance to specifically refer to the potential for licensees or applicants to credit other systems and manual operator actions
- Emphasized that justifications would be reviewed on a case-by-case basis only

---

# Status and Next Steps

- Draft BTP 7-19, Rev. 8, is in final concurrence review
- ACRS Full Committee Meeting slated for November 2020
- 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
IEEE	Institute of Electrical and Electronics Engineers
FMEA	Failure Mode and Effects Analysis
FTA	Failure Tree Analysis
OMB	Office of Management and Budget
RG	Regulatory Guidance
SECY	NRC Office of the Secretary to the Commission
SRM	Staff Requirements Memorandum
SSC	Structures, Systems, and Components
Std.	Standard

---

# 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.

# NEI Perspective: Draft Revision 8 to BTP 7-19

ACRS DI&C Subcommittee  
Meeting

September 8<sup>th</sup>, 2020



# DI&C Categorization (Section 2)

- Use of risk insights from site-specific PRAs
  - Risk insights are not only used to demonstrate that “an SSC is less safety-significant” than the deterministic criteria
  - Previous drafts of the BTP noted that “risk insights should be an input to an integrated decision-making process” – this language should be added back
- Deterministic Criteria
  - It is not clear whether all (or just one) of the criteria under each of the four categories needs to be met
  - In category (a) (i.e., high safety-significance) the phrase “significant contributors to plant safety” and “GDC 22” are challenging to use as criteria.
  - The 1<sup>st</sup> and 4<sup>th</sup> criterion in (a) should be deleted

# Defensive Measures (Section 3.1.3)

- The purpose of this section is to allow the use of an NRC-approved methodology to limit the likelihood of latent design defects and thus, limit the likelihood of a CCF.
  - A draft version of NEI 20-07, “Guidance for Addressing Software CCF in High Safety Significant Safety Related DI&C Systems” was provided to the staff for review in late August.
  - NEI appreciated the opportunity to develop guidance as an alternative to Diversity (3.1.1) and Testing (3.1.2) and will suggest wording changes to Section 3.1.3 to ensure there is an appropriate linkage.
  - We look forward to a technical and regulatory discussion with the staff in a public forum later this year.

# DI&C SSC Scope: Safety vs Non-safety

- The title and scope statement of the BTP focuses on safety systems
- Sections of the guidance still address non-safety systems and this inconsistency between the title/scope and review details creates confusion
- The only link to non-safety systems should be “system integration and interconnectivity” as described in Section 2.1

# Latent Design Defects: Hardware and Software

- Recommend adding “design” to the term “latent defects” to ensure other latent defects (e.g., fabrication) are not in scope
- Footnote 2 refers to “active hardware components” but it is not clear what “active” means in this context.
  - Do FPGAs fall under this?
  - How is this different from “software-based logic”?
- Recommend that the scope of latent design defects that can cause a CCF in hardware is limited to hardware that is programmed using software tools (e.g., FPGAs).

# Spurious Operations (Section 3)

- Current draft provides an example of a partial actuation of an emergency core cooling system (i.e., spurious operation of a single division) with false indications stemming from postulated CCF
- The example is inconsistent with the evaluation guidance in NUREG/CR-6303
  - NUREG/CR-6303 (Section 3.6) requires concurrent failures of the same blocks in all redundant divisions, which precludes partial actuations
  - NUREG/CR-6303 (Section 3.8) specifies that downstream blocks are assumed to function correctly in exact response to correct or incorrect inputs they receive, which precludes false indications

# Additional Items...

- No mention of the phrase “best estimate” (various Sections)
  - BTP states in several places “consequences of CCFs are bounded by the acceptance criteria defined in the FSAR”, with no mention of “best estimates” or “realistic assumptions”
- “Independent” and Diverse (various Sections)
  - Add clarification on “independent” that isolation is not required for safety-related manual controls that are connected downstream of the digital I&C safety system outputs in the same safety division
- Crediting Existing Systems (Section 3.2.1) “using independent sensors and actuators”
  - The phrase “using independent sensors and actuators” is not consistent with 10 CFR 50.62(c)(1) through 10 CFR 50.62(c)(3)
  - 10 CFR 50.62 should be a reference in the Regulatory Basis section

# Additional Items (continued)

- BTP (page 29, 1<sup>st</sup> paragraph states), “the applicant may credit some or all of these displays and manual controls to meet Position 4 as the diverse means called for under Position 3”
- The following paragraphs states,” The applicant may credit existing displays and controls in the MCR to satisfy Position 4. However, the reviewer should confirm that the applicant did not also credit the same digital platform or analog technology for Position 1 or 3 (e.g., for mitigating DBEs) because Position 4 specifies that the MCR displays and controls shall be independent and diverse from those **credited for** Position 1 and **3**.
- System credited for Position 3 must be diverse from the digital system being replaced. Does it also have to be diverse from Position 4?

# Closing Remarks

- The NEI team appreciates the opportunity to share our perspective
- Looking forward to resolving the remaining regulatory and technical aspects of the guidance