

Official Transcript of Proceedings
NUCLEAR REGULATORY COMMISSION

Title: Advisory Committee on Reactor Safeguards
Digital Instrumentation and Control
Systems Subcommittee

Docket Number: (n/a)

Location: Rockville, Maryland

Date: Thursday, December 17, 2009

Work Order No.: NRC-3254

Pages 1-145

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6 ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
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10 proceeding of the United States Nuclear Regulatory
11 Commission Advisory Committee on Reactor Safeguards,
12 as reported herein, is a record of the discussions
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14

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
(ACRS)

+ + + + +

DIGITAL INSTRUMENTATION AND
CONTROL SYSTEMS SUBCOMMITTEE

+ + + + +

THURSDAY

DECEMBER 17, 2009

+ + + + +

ROCKVILLE, MARYLAND

The Subcommittee met at the Nuclear
Regulatory Commission, Two White Flint
North, Room T2B3, 11545 Rockville Pike, at
8:30 a.m., Charles H. Brown, Jr., Subcommittee
Chairman, presiding.

COMMITTEE MEMBERS:

CHARLES H. BROWN, JR., Subcommittee Chairman

GEORGE APOSTOLAKIS, Member

DENNIS C. BLEY, Member

MICHAEL T. RYAN, Member

JOHN D. SIEBER, Member

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ACRS STAFF PRESENT:

CHRISTINA ANTONESCU

JORGE CRUZ-AYALA

NRC STAFF PRESENT:

DAVID DESAULNIERS, NRO

EUGENE O. EAGLE, JR., NRO

TERRY JACKSON, NRO

IAN JUNG, NRO

WILLIAM KEMPER, NRR

PAUL LOESEN, NRR

BARRY MARCUS, NRR

KHOI NGUYEN, RES

PUBLIC:

MARK BURZYNSKI, AREVA

GORDON CLIFTON, NEI

TOM HAYES, Westinghouse

JAMES KINSEY, INL

KAZ KOYAMA, HGNE

CHARLES MARTIN, DNFSB

KEN SCAROLA, NAE

SHELBY SMALL, AREVA

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

(8:33 a.m.)

CHAIRMAN BROWN: The meeting will now come to order. This is a meeting of the Digital Instrumentation and Control Systems Subcommittee. I'm Charles Brown, Chairman of the Subcommittee.

ACRS Members in attendance are George Apostolakis, Jack Sieber, Michael Ryan, Dennis Bley -- we hope. Christina Antonescu as the ACRS staff, is the designated Federal Official for this meeting.

The purpose of the meeting is to discuss Regulatory Guide 1.62, Manual Initiative of Protective Actions and other Related Matters.

The Subcommittee will gather information, analyze relevant issues and facts, and formulate proposed positions and actions as appropriate for deliberation by the full Committee.

The rules for participation in today's meeting have been announced as part of the notice of this meeting, previously published in the Federal Register on October 14th, 2009.

We have received no written comments or request for time to make oral statements from members of the public regarding today's meeting.

We also have Mr. Don Chase of Sciencetech on

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1 the bridge phone, listening to the discussions. To
2 preclude interruption of the meeting, the phone line
3 will be placed on listen in mode only during the
4 presentation and Committee discussions.

5 A transcript of the meeting is being kept
6 and will be made available as stated in the Federal
7 Register notice. Therefore, we request that
8 participants in this meeting use the microphones
9 located throughout the meeting room when addressing
10 the Subcommittee.

11 The participants should first identify
12 themselves and speak with sufficient clarity and
13 volume so that they may be readily heard.

14 We will now proceeding with the meeting.
15 I call upon Khoi, Mr. Khoi Nguyen of the Digital
16 Instrumentation and Control Branch, Division of
17 Engineering in the Office of Nuclear Regulatory
18 Research to provide introductory remarks.

19 MR. NGUYEN: Good morning. My name is
20 Khoi Nguyen, Digital I&C Branch, Division of
21 Engineering and Office of Nuclear Regulatory Research.

22 With me here today is Mr. Jackson and Mr.
23 Jung from NRO, and I would like to present to you the
24 Proposed Revision 1 of Reg Guide 1.62, Manual
25 Initiation of Protective Action.

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1 In the first session of this presentation
2 today, I would like to go over the background, summary
3 of changes, proposed changes to develop the Reg
4 Position basis for the scope expansion, benefits of
5 the scope expansion and the relationship between RG
6 1.62, ISG-2 and ISG-5.

7 The second section of the presentation I
8 would like to go over the public comments. And, Mr.
9 Loesen, all of them will highlight the major comments.

10 And to wrap up the presentation, we go
11 over to question-and-answer.

12 MEMBER APOSTOLAKIS: Do you want us to
13 wait until the questions?

14 MR. NGUYEN: You can interrupt me any
15 time. Interrupt me any time, but please don't bog me
16 down.

17 For the background, the current Reg Guide
18 has not been updated since October 1973. And in that
19 revision its reference to actuation and 279, which
20 have been withdrawn by the IEEE.

21 The latest standard endorsed by NRC in 10
22 CFR 50.55a(h) is IEEE 603 1991. One of the reasons we
23 would like to revise this Reg Guide was because the
24 current Reg Guide does not address the manual
25 initiation for digital I&C system.

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1 CHAIRMAN BROWN: Well, it doesn't
2 explicitly address. I mean, it addresses manual
3 operations kind of in a generic mode, as opposed to
4 being specific. So --

5 MR. NGUYEN: What I meant is it doesn't
6 address the consequence at all of the common-cause
7 failure, you know, for these I&C.

8 CHAIRMAN BROWN: Right.

9 MR. NGUYEN: That's what I meant.

10 Summary of changes, what we like to change
11 in this Proposed Revision, to update the reference to
12 IEEE Standard 603 1991 in addition to actually
13 Standard 279, 1971.

14 As we --

15 MEMBER APOSTOLAKIS: Excuse me. Did you
16 say that the 1971 Standard has been withdrawn? Is
17 that what you said earlier?

18 MR. NGUYEN: Yes.

19 MEMBER APOSTOLAKIS: By whom? By the
20 society?

21 MR. NGUYEN: By IEEE.

22 MEMBER APOSTOLAKIS: Why are you keeping
23 it, then? You say, in addition.

24 MR. NGUYEN: Because, in 10 CFR 50.55a(h)
25 it's specified that for the plants BOP 4999 is still

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1 applied. Still required to follow, to comply with
2 IEEE Standard 279.

3 So, we still want to --

4 MEMBER APOSTOLAKIS: I don't understand.
5 The redundancy FAR was issued in -- when? When was it
6 issued? When was it approved, 50.55a?

7 MR. NGUYEN: Many years. I don't remember
8 the date.

9 MEMBER APOSTOLAKIS: Was it after 1970 --
10 I mean, after the standard was withdrawn?

11 MR. NGUYEN: After, yes.

12 MEMBER APOSTOLAKIS: Why is it still there
13 then? I don't understand it. I mean, the Society
14 withdraws --

15 MR. NGUYEN: That is still applicable for
16 the plant building because we don't to want to back-
17 fit, to make the old plant to back-fit to follow --
18 follow the 603 1981. So we, for the old plans we have
19 the --

20 MEMBER APOSTOLAKIS: I guess it would
21 depend on why IEEE withdrew it. Was it because it was
22 out of date?

23 MR. NGUYEN: Yes, I think 603 replaced
24 279. That's why, the main reason they withdraw. It's
25 nothing wrong with 279.

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1 MEMBER APOSTOLAKIS: So you are saying if
2 we, as regulators, also withdrew our support --

3 MR. NGUYEN: We support both.

4 MEMBER APOSTOLAKIS: -- 279, that would
5 require back-fit, because 603 requires more.

6 MR. NGUYEN: That's correct.

7 MEMBER APOSTOLAKIS: I don't know exactly
8 --

9 MEMBER SIEBER: Yes. Well, I think the
10 plant designs, a lot of the early plants were based on
11 the 1971 edition, so even the Society, IEEE, withdraws
12 it, the designs are already there and comply with
13 that, which was legal at the time, so it becomes the
14 design basis for the plant. The licensing basis.

15 CHAIRMAN BROWN: And that is the way it's
16 referred to in 50.55a(h). I mean, it's very explicit
17 about the use of 19-279 for those plants prior to -- I
18 forgot. What was the date, 1999 or something like
19 that.

20 MEMBER SIEBER: Right.

21 CHAIRMAN BROWN: Well, there's --

22 MR. NGUYEN: And this is what we have been
23 --

24 CHAIRMAN BROWN: -- steps in there.
25 That's correct.

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1 MR. NGUYEN: This is what we have been
2 doing for all the I&C Reg Guides, not only this Reg
3 Guide.

4 MEMBER APOSTOLAKIS: So, future plants,
5 then, will have to comply with 603?

6 MR. NGUYEN: That's correct.

7 CHAIRMAN BROWN: And that's what's -- if
8 you'll look at the new plant designs we've been
9 looking at, they all use 603, 1991 version as the
10 reference basis.

11 MR. NGUYEN: Another change was the expand
12 of the scope to --

13 MEMBER APOSTOLAKIS: It's actually -- I
14 think it sounds bad to say "IEEE withdrew it." IEEE
15 replaced, right? To say it withdrew it, I mean,
16 sounds --

17 CHAIRMAN BROWN: I don't know whether
18 there was a formal letter or not. And, you know, did
19 they do a formal thing withdrawing, or do they just
20 don't cite it?

21 MR. NGUYEN: We show it on the website as
22 "withdrawn."

23 CHAIRMAN BROWN: Okay. So those words are
24 --

25 MEMBER APOSTOLAKIS: That's the word they

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1 use?

2 MR. NGUYEN: Yes.

3 MEMBER APOSTOLAKIS: Okay. Fine. Thank
4 you.

5 MR. NGUYEN: Another change to the Reg
6 Guide is to expand the scope to -- first to
7 incorporate the guidance for diversity and defense in
8 there, in digital computer based I&C system. This
9 guidance to be 7-19, with respect to manual initiation
10 of protective action.

11 And second, to provide the
12 applicant/licensee an option to pursue either safety-
13 related or non-safety related and -- I'm sorry, -- and
14 non-safety related manual initiation, separately or a
15 single safety manual initiation.

16 We will discuss more about this here later
17 on.

18 CHAIRMAN BROWN: Before you go forward.
19 On BTP 7-19, if you'll look at the words, if you'll go
20 read that, it talks about guidance for diversity and
21 defense in-depth and digital I&C programs relative to
22 manual initiation of protective actions.

23 But it largely discussed those in terms of
24 -- in fact, it only discusses those in terms of a
25 backup to automated protection systems, from what I

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1 could find. I --

2 MR. NGUYEN: It is as well for automatic.

3 CHAIRMAN BROWN: As a backup to automatic.

4 MR. NGUYEN: Backup to automatic, a manual
5 initiation, and all the manual initiations.

6 MEMBER APOSTOLAKIS: I am confused now.
7 Well, would you repeat the answer.

8 CHAIRMAN BROWN: There's two -- the point
9 I'm trying to make is, in RG 1.62, when we get there,
10 part of the discussion says -- and we can address this
11 later, but it says the use of manual operations solely
12 -- solely for protective actions.

13 In other words, no automated system in
14 front of it. If you go look at BTP 7-19, if you'll
15 look at the other documents they talk about as a
16 diverse backup to automated operations.

17 So, there's some points we'll make later
18 as we go through it, but that's why I'm asking, to
19 make sure I was right, relative to the BTP 7-19, and
20 how it is applied.

21 When we talk about manual initiation, it
22 is as a backup for automated protective actions for
23 DBEs or whatever other AOOs you're working with.

24 MR. NGUYEN: That's what we -- that's the
25 intent of the Reg Guide to refer to, 7-19.

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1 CHAIRMAN BROWN: BTP 7-19. So, if it's
2 for backup --

3 MR. NGUYEN: Backup to automated --
4 manual initiation.

5 CHAIRMAN BROWN: There's some other words
6 in Reg Guide 1.62 which we can -- which we'll address
7 later relative to the "solely" which I think is
8 pertinent to some other discussions.

9 No other questions. Go ahead.

10 MR. NGUYEN: I would like to go over the
11 changes, proposed changes to regulatory Positions. In
12 Position 1 and 2, we are -- the only change we make
13 was the change to system level to division level.

14 Position 3, again, we changed system level
15 to division level. In addition to that we incorporate
16 information display requirements from activity
17 standard.

18 CHAIRMAN BROWN: For the uninitiated, this
19 is nuances of the words you all used. Division level,
20 to me, means a subset of system level.

21 In other words, you can have a reactor
22 protection system which could have had -- if you read
23 the words the way they were in the previous document,
24 a single operation to take care of the entire, all
25 four divisions, all four channels.

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1 This breaks it down where you have to have
2 something that deals with division level responses.
3 Is that the point?

4 MR. NGUYEN: Yes.

5 CHAIRMAN BROWN: Okay. All right.

6 MR. JACKSON: I think -- Terry Jackson. I
7 think one of the other points, too, was to make it
8 more consistent with 603 because it talks about manual
9 initiation at the division level.

10 CHAIRMAN BROWN: Yes, that's fine. Yes, I
11 understood that point, but I just want to make sure I
12 understood that nuance.

13 MR. NGUYEN: And the reason, we tend to
14 see some level, the division level to be consistent
15 with the IEEE 603.

16 CHAIRMAN BROWN: Okay.

17 MR. NGUYEN: And in Position 4 we remove
18 the minimum --

19 MEMBER APOSTOLAKIS: So, let me understand
20 this. Is this now a more stringent requirement?

21 MR. NGUYEN: I believe so. Yes.

22 MEMBER APOSTOLAKIS: It is?

23 MR. NGUYEN: Yes.

24 MEMBER APOSTOLAKIS: All right. With
25 regard to redundancy and independent and plus the in

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1 defense-in-depth, the division level requirement is
2 better than the system level requirement.

3 CHAIRMAN BROWN: My perspective on that,
4 right or wrong, and hopefully somebody can correct me,
5 but at the system level you could have had one
6 actuator, one switch, one something to go manually
7 trigger all four divisions.

8 That sets you up for a potential single
9 point which could prohibit your manual operation from
10 taking care of everything.

11 Division-wise, and this came out in the
12 public comments as well, was now you're saying you
13 have to go each division individually, one for this,
14 one for division 2, division 3 and 4 now.

15 That's my interpretation of the way -- or
16 my understanding -- not interpretation, my
17 understanding of the way this thing is worded now.

18 MR. NGUYEN: You are right.

19 CHAIRMAN BROWN: So it's a little more
20 stringent in terms -- not in terms of technology or
21 attributes, it's just that you've got to have a few
22 more operations in order to complete a manual
23 actuation of all the divisions.

24 MEMBER SIEBER: And I take it that's
25 driven by the 3D requirements?

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1 CHAIRMAN BROWN: The defense in-depth?

2 MEMBER SIEBER: Yes.

3 CHAIRMAN BROWN: Yes. Yes, diversity --
4 well, you have primarily defense in-depth, yes. So,
5 it makes sense to do it this way.

6 MEMBER APOSTOLAKIS: So the industry did
7 not object to that?

8 MR. NGUYEN: No.

9 CHAIRMAN BROWN: Well, they pointed --
10 they did point out that it was more -- they had to do
11 more. I've forgotten who did it.

12 MEMBER SIEBER: It's more wires.

13 CHAIRMAN BROWN: More wires and --

14 MEMBER SIEBER: More operator --

15 CHAIRMAN BROWN: -- more actions have to
16 be taken. But, if you look at it in its totality, it
17 makes some sense.

18 MR. NGUYEN: But it's been the
19 requirements in 10 CFR 50.55a(h) for a while, so
20 there's nothing new with this division requirement.

21 Any questions regarding to --

22 MEMBER APOSTOLAKIS: Okay. Okay.

23 MR. NGUYEN: -- Position 3?

24 Let me repeat the change Position 4. That
25 removes minimum common-requirement guidance, which we

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1 believed at the time is somewhat covered the diversity
2 and defense in-depth for analog agreement. We don't
3 have a basis to back it up, but we believe that.

4 And now, we're not saying that we want to
5 remove the diversity and defense in-depth guidance
6 from the Reg Guide, but we have a new Position 7 to
7 cover the D3 guidance for both, analog and digital I&C
8 equipment.

9 CHAIRMAN BROWN: That actually -- the
10 requirement of minimum common equipment actually kind
11 of makes some sense. I mean, if you think about it.
12 And I went -- go back and read 279 --

13 MR. NGUYEN: Yes.

14 CHAIRMAN BROWN: -- and so I was trying to
15 connect the dots between 279 and the new reading where
16 you say it's covered by Position 7, and the only way I
17 could see how this relates is that you've made the -
18 you've made the second -- third says "The point at
19 which manual controls are connected to the safety
20 equipment should be downstream of the digital I&C
21 system -- safety system outputs, and don't compromise
22 the integrity of interconnecting cables."

23 So that, in itself, that statement -- I'm
24 just trying to connect the dots here between the old
25 minimum common equipment, which makes sense.

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1 You ought -- if you're worried about
2 failures of equipment that's supposed to automatically
3 respond, you certainly don't want to have your manual
4 initiation trigger yourself through the entire
5 division worth of stuff, if you're worried about some
6 failures or common failures.

7 So, going downstream, it's like putting a
8 switch right in the power lines to the control room
9 mechanisms. That's a good idea. It's very effective.
10 Shuts the plant down. Doesn't require anything.

11 So, I was trying to understand why -- why
12 we're throwing that away, or how does that get
13 incorporated, or how is it left in place if somebody
14 chose to do analog style equipment?

15 MR. JACKSON: Khoi, maybe I can take a
16 shot at it as far as the background of where this came
17 from.

18 During the review of some of the new
19 reactor designs we saw, we came up on this issue of
20 the use of common equipment in the manual actuation,
21 particularly the safety-related division level manual
22 actuation which was required by 603.

23 And we saw the equipment was common
24 between the automatic initiation and the manual
25 initiation.

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1 CHAIRMAN BROWN: This is in the new
2 reactor design?

3 MR. JACKSON: In the new reactor designs
4 we were seeing that.

5 So, the question came up and, you know, we
6 interacted with the applicants on that and at the same
7 time we learned that research was updating Reg Guide
8 1.62 to a new version, so we -- we started discussing
9 it and we had to look at, well, what was the basis for
10 that guidance to not have the minimum common
11 equipment.

12 Back in the analog world, of course, it's
13 very hard -- we really couldn't find any basis written
14 down somewhere. But what we surmised was that this
15 was to provide some type of diversity back in the
16 analog world because you had the automatic path and
17 you even had a manual path, which gave a diverse
18 means.

19 And even it gave a stipulation in the
20 current draft of the Reg Guide that if you -- you
21 could common -- they call it fan-out logic, I think,
22 in the current version where you could -- you know, if
23 you send a signal and it could tell a different
24 equipment to start or, if there's a time delay and so
25 forth in there.

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1 That could be common so long as you could
2 manually initiate the equipment by component at the
3 switchboard.

4 We looked at it for new reactors and, of
5 course, this upgrade -- update to the Reg Guide, and
6 the most we could surmise was that it was put in there
7 for diversity. But then we said, well, the agency has
8 a position on defense in-depth and diversity, which
9 was in BTP 7-19 where we require a system level manual
10 actuation for defense in-depth and diversity, so there
11 was --

12 CHAIRMAN BROWN: Do you mean system or
13 division level?

14 MR. JACKSON: It's currently system level
15 in BTP 7-19. And so you could -- you could manually
16 initiate a diverse means to manually initiate the
17 safety function.

18 So, we looked at that and we said, well,
19 there's a diversity criteria that's already there. Do
20 we need to continue with this position here.

21 And we felt that, well, the diverse -- the
22 defense in-depth and diversity
23 was criteria in BTP 7-19 was adequate so that we could
24 remove the minimum common equipment for the safety-
25 related system.

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1 Now, in this Reg Guide, and I think Khoi
2 will probably get to it a little bit later. You don't
3 have to have two separate manual initiations. You
4 could have a manual initiation that meets both the 603
5 requirement and the BTP 7-19 criteria, but it would
6 have to meet the criteria for both, so it would be a
7 safety-related manual initiation, and they could do
8 that.

9 But they could have two separate manual
10 initiations also. One to meet the 603 that's safety-
11 related, and another that meets the BTP 7-19, and is
12 not safety-related.

13 CHAIRMAN BROWN: Which is the diversity,
14 defense in-depth --

15 MR. JACKSON: That's correct.

16 CHAIRMAN BROWN: -- backup system.

17 MR. JACKSON: Right. So, then kind of in
18 summary, the basis for removing that was we didn't see
19 -- we felt that the basis back in 1973 was to have
20 some sort of diversity in the analog world and we felt
21 that our current defense in-depth and diversity
22 position we have now in BTP 7-19 adequately covered
23 that.

24 MR. NGUYEN: Thank you, Terry.

25 CHAIRMAN BROWN: Any more questions?

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1 Okay.

2 MR. NGUYEN: I'll keep moving. In
3 Position 5 this, we make no changes in this one.

4 In Position 6, we update the reference to
5 IEEE 603, and we added two new Position, 7 and 8. In
6 7, as we briefly mentioned before, that we incorporate
7 the diversity guidance from manual initiation of
8 protective action from BP 7-19.

9 In Position 8, the -- I wouldn't --
10 "allow" is not a good word, but offer --

11 CHAIRMAN BROWN: Oh, go back to 7. You
12 don't actually refer to BTP 7-19 in Position 7.

13 MR. NGUYEN: In discussing section, we
14 refer to BTP 7-19, but we don't --

15 CHAIRMAN BROWN: I understand. That's
16 true, but where you referred to other sections of the
17 IEEE Standard 603, 1991, you did bring those points
18 out in the Positions where you said if you complied,
19 followed it with IEEE 603 for, you know, .4 -- excuse
20 me, 1991 and .4.

21 In other words, you used references to
22 IEEE in various places in the Positions, but here was
23 a point -- it's a minor inconsistency. That's all.

24 MR. NGUYEN: Oh, well, we normally refer
25 to the rules, which actuates 603 in 10 CFR.

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1 CHAIRMAN BROWN: It's a rule.

2 MR. NGUYEN: These are rules. We normally
3 -- it's not that the requirements do the Reg Guide,
4 but we normally don't refer to ISG, BTP in the
5 regulatory position. We discuss it -- may discuss it
6 in the discussion section, but we don't refer directly
7 to those documents.

8 MR. JACKSON: Yes, I think the idea is
9 that BTP 7-19 will refer to this, the new Reg Guide.
10 The current Position on D3 and BTP 7-19, you think we
11 would eventually like to get it towards -- in a Reg
12 Guide or in some kind of regulatory guidance versus in
13 a branch technical position.

14 CHAIRMAN BROWN: Right now it's just part
15 of the SRP, is that right?

16 MR. JACKSON: It is. Standard Review
17 Plan. Excuse me.

18 MR. NGUYEN: Any more questions on this?
19 Okay. On Position 8, we offer an optional manual
20 initiation that satisfies both requirements of 603 and
21 BTP 7-19.

22 The licensee or applicants can choose to
23 do either safety-related manual initiation required by
24 603 and manually -- non-safety related manual
25 initiation required -- not required, but satisfy BTP

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1 7-19 separately or they have the option to do both in
2 single safety-related manual initiation. That's both
3 -- specified both.

4 And we believe this --

5 CHAIRMAN BROWN: .4 of the NRC Position on
6 D3, is that Position 4 in this document, or is that --

7 MR. NGUYEN: That is --

8 CHAIRMAN BROWN: You might have talked
9 about that in there that fogged right by me.

10 MR. NGUYEN: I have a snapshot of BTP 7-
11 19, and this .4.

12 CHAIRMAN BROWN: Which one, the first
13 point?

14 MR. NGUYEN: The first header -- the first
15 sub bullet, not the whole .4, but that's a part of .4
16 from BTP 7-19, in which it say, "A set of display
17 placed in a control located in the main control room
18 should be provided for manual system level actuation"
19 --

20 CHAIRMAN BROWN: Now I remember.

21 MR. NGUYEN: -- "of critical safety
22 function and for monitoring the parameter steps for
23 safety function.

24 "The display and control should be
25 independent and diverse from computer-based safety

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1 system."

2 CHAIRMAN BROWN: Okay.

3 MR. NGUYEN: And the second sub bullet is
4 in the dispersion section of the BTP 7-19. It's not
5 in .4, but in the discussion.

6 CHAIRMAN BROWN: So, both requirements.
7 This was fairly nuance to me, so I'm -- you know, I'm
8 struggling to understand this one.

9 Safety Requires IEEE 603 is called out by
10 -- in the Rule?

11 MR. NGUYEN: Yes.

12 CHAIRMAN BROWN: Okay. BTP 7-19 is
13 strictly a standard review plan item, how the staff
14 would use and what they're looking for?

15 MR. NGUYEN: Right. And it doesn't have
16 to be safety-related.

17 CHAIRMAN BROWN: It doesn't have to be
18 safety-related. If you satisfy -- I mean, I'm trying
19 to figure out why it you satisfy the 603 one, why
20 don't you satisfy the .4 automatically?

21 MR. NGUYEN: Well, in the old design or
22 plans we have manual initiation, in the analog world.
23 We have no, you know, concern about common cause
24 failure -- software common cause failure.

25 So, in the old days we -- the old design

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1 only has safety-related manual initiation requirement,
2 and you have the manual initiation, that's in the
3 control room. It rarely available -- if the automated
4 protective action fail to initiate it. Period.
5 That's a requirement.

6 But when we -- when the common cause
7 failure from the software base leads to I&C equipment
8 emerge to be the concern. We have the diversity and
9 defense in-depth, and we need the diversity and
10 defense in-depth guidance.

11 That BTP 7-19 came from the safety support
12 -- supported by SECY 93-087. That provide guidance
13 for diversity and defense in-depth. And this manual
14 initiation can be independent.

15 It doesn't have to be safety-related.
16 This can be non-safety related, as it provide
17 diversity and defense in-depth -- I mean, that was
18 diverse manual initiation. It's not the manual
19 initiation backup for the automated protective action.

20 Is that your question? There's two
21 different manual initiation here. You can combine if
22 you choose to, but there's two different manual
23 initiation requirement.

24 CHAIRMAN BROWN: 603 is automated. That's
25 fundamentally the basis for your automated protection

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1 systems? Correct or not correct.

2 MR. NGUYEN: Yes, because they are both
3 automatic and manual initiation, both, yes.

4 CHAIRMAN BROWN: Okay. But if -- so she's
5 got manual and the automated and comply with the 603?

6 MR. NGUYEN: Must be safety-related.

7 CHAIRMAN BROWN: What circumstance, then
8 why -- if I've got that, why would I then go put in
9 another non-safety related backup?

10 MR. NGUYEN: That's to provide the diverse
11 measure.

12 CHAIRMAN BROWN: So, under the automated
13 system, the manual backup uses the software? Is that
14 the point?

15 MR. NGUYEN: Currently --

16 CHAIRMAN BROWN: Could use the software?

17 MR. JACKSON: I think in 603 there's a
18 requirement for the division level actuation of safety
19 functions, and that's basically all it says. It
20 doesn't necessarily say that it has to be separate
21 from the automatic.

22 CHAIRMAN BROWN: I mean, can use the
23 common equipment?

24 MR. JACKSON: It could be -- yes. And, in
25 fact, that's what we're seeing in the new designs, is

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1 that they are using common equipment and able to
2 comply with 603 in that sense.

3 The NRC's staff position on defense and
4 in-depth diversity in BTP 7-19 says it has to be
5 diverse from the primary system that uses software.

6 And so therefore, that's why we put it in
7 the criteria. They have it coming in downstream of
8 the safety-related system outputs to avoid all the
9 software that did have the common cause failure
10 potential.

11 And so I think what Khoi is saying here is
12 that we recognize there will -- in designs, there
13 could be a potential for two manual actuations just
14 because of the way the regulations and their inner
15 guidance are set up.

16 And the Position 8 is basically saying
17 that you can actually kill two birds with one stone by
18 having a manual actual that meets the 603 criteria.
19 So, it means it would be safety-related, but also be
20 diverse from the automated protection system.

21 CHAIRMAN BROWN: So, it's incorporated in
22 a design somewhere of the automated protection system,
23 but has a diverse component as part of it that doesn't
24 utilize that part where the software common cause
25 failure is concerned?

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1 MR. JACKSON: Yes. The designs will have
2 a diverse manual way to actuate the safety functions
3 to meet the BTP 7-19 criteria.

4 CHAIRMAN BROWN: Okay.

5 MR. NGUYEN: It must be downstream to
6 satisfy --

7 CHAIRMAN BROWN: Well, I mean, it just
8 seems to me you've covered a bunch of that in the
9 other items but it's not -- 603 doesn't mandate some
10 of the stuff -- it's not part of the Rule.

11 Okay. I think -- I think I vaguely
12 understand what you're talking about. Thank you.

13 MR. NGUYEN: Thank you, Terry.

14 Any other question on Position 8?

15 CHAIRMAN BROWN: Although I will come back
16 to those later.

17 MR. NGUYEN: Okay. And the basis for the
18 scope expansion, we have a regulatory basis in GDC 21.
19 No single failure results in the loss of the
20 protective system.

21 GDC 22 is activity such as functional
22 diversity or diversity in component design and
23 principles of operation to be used to expand practical
24 to prevent loss of the protection function.

25 In Reg Guide 1.152 we have the same manual

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1 operator actuation of safety and non-safety system are
2 acceptable, provided that the necessary diverse
3 control and indications available to perform the
4 required function under the associated event
5 conditions and within the acceptable term.

6 CHAIRMAN BROWN: Is that the -- is this
7 the guide that says you can have -- or the guidance
8 that says you can have -- you need to accomplish a
9 safety function. It can be accomplished by manual
10 operation as opposed to automatic operation?

11 MR. NGUYEN: Non-safety function, but
12 provide in the diverse control and indications.

13 CHAIRMAN BROWN: Okay. All right.

14 MR. NGUYEN: Non-safety function.

15 MEMBER APOSTOLAKIS: What do you mean no
16 safety function?

17 MR. NGUYEN: Because I believe what his
18 question was, that non-safety system can -- can
19 provide the safety function. Is that what you were
20 asking?

21 CHAIRMAN BROWN: No. If you had -- I'm
22 just trying to get calibrated with some of the words
23 that you've got in the Reg Guide, but this implied,
24 when I read this, and went to look at 1.152, that --
25 just because the way it was worded, somewhere along

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1 the line you can have manual.

2 If you've got an accident, a casualty that
3 requires a protective action, it doesn't necessarily
4 require an automated system if you can demonstrate
5 that a manual response is satisfactory, can be done in
6 whatever the time, available time required, based on
7 whatever the analysis you do.

8 And you have that in the Reg Guide, and I
9 was wondering how -- did this -- is this the source --
10 you're telling me it's not because this is only for
11 the diverse --

12 MR. NGUYEN: Well, the point I tried to
13 point out when I quote this, is non-safety system can
14 be used to provide the diverse controls indications.
15 That's all I want to point out, by quoting this 1.152.

16 CHAIRMAN BROWN: Okay.

17 MR. JACKSON: I think the question to you
18 -- or the answer to your question, Charlie, is that
19 603 allows for use of manual
20 actions for safety functions. You have to identify
21 that.

22 So, Reg Guide 1.152, which is --

23 CHAIRMAN BROWN: Those are backups.

24 MR. JACKSON: Yes. But actually they --

25 CHAIRMAN BROWN: They are in addition to

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1 the automated function, I thought.

2 MR. JACKSON: Well, for example, like a
3 lot of plants for steam generator tube rupture to
4 isolate the generators and things and like that, they
5 will use manual actions as part of the safety
6 function, instead of using automatic functions.

7 So, in that case the regulations allow for
8 use of manual actions, and not necessarily that they
9 had to be automatic, but you do have to have the
10 operator -- the analysis to show the operators can
11 actually perform those functions.

12 MEMBER APOSTOLAKIS: Okay. I've heard
13 that --

14 CHAIRMAN BROWN: Well, we've had that
15 comment on steam generator tube ruptures before.

16 MEMBER APOSTOLAKIS: Well, this was
17 actuation.

18 MR. NGUYEN: Yes.

19 MEMBER APOSTOLAKIS: The steam generator,
20 the operator doesn't actuate anything. It actually
21 isolates it.

22 CHAIRMAN BROWN: Well, it isolates the
23 steam generator isolation valves.

24 MR. NGUYEN: It's manual controls, not the
25 manual initiation.

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1 MEMBER APOSTOLAKIS: Manual action there
2 is, by itself, a safety action for isolating this
3 steam generator. This literally says manual operator
4 actuations of safety system. So, this is broader.
5 And manual action is not just an actuation, it's
6 actually performing the safety -- the required safety
7 function.

8 MR. NGUYEN: Yes. Manual initiation --

9 MEMBER APOSTOLAKIS: I don't know why the
10 difference makes any difference, but --

11 MR. NGUYEN: Well, my --

12 MEMBER APOSTOLAKIS: But it is different,
13 isn't it?

14 CHAIRMAN BROWN: It was -- there were
15 nuances between words, and I just --

16 MR. NGUYEN: Manual actuation is a subset
17 of manual control. Manual control cover, you know,
18 more than, you know, safety actuated or initiated.

19 MEMBER APOSTOLAKIS: Yes. This is very
20 specific, isn't it?

21 MR. NGUYEN: Yes.

22 MEMBER APOSTOLAKIS: I would not have
23 included the steam generator tube rupture action as
24 part of this, but that's fine. That's what we do.
25 That's what we do.

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1 MEMBER BLEY: You mean, and your
2 interpretation of the words?

3 MEMBER APOSTOLAKIS: Yes. Because this
4 has explicitly "actuactions." That's actuactions --

5 MR. NGUYEN: Yes.

6 MEMBER BLEY: You've got a distinction I
7 don't get. If you actuate the valve operator it
8 drives a truck. You're still actuating. I don't get
9 what you're --

10 MEMBER APOSTOLAKIS: But then everything
11 is an actuation in that sense, because nobody will go
12 with his bare hands and do something.

13 MEMBER BLEY: Well, that was my next
14 comment. He goes and puts his hand over the hole,
15 that would certainly not respond --

16 MEMBER APOSTOLAKIS: Yes. Go ahead and
17 put that there. Anyway. Okay. So you're -- the
18 consensus is that this includes that. All right.

19 MEMBER BLEY: Okay.

20 MR. NGUYEN: As I said earlier the SECY
21 93-087 support need to be 7-19 on diversity and
22 defense in-depth.

23 Another basis to expand the scope of this
24 Reg Guide, but what the current version of the Reg
25 Guide does not, which is not -- it doesn't address D3

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1 guidance for this two I&C equipment with respect to
2 manual initiation of protective action.

3 This proposed revision of the Reg Guide
4 incorporates guidance for D3 in digital computer-based
5 I&C system with respect to manual initiation of
6 protective action.

7 Providing guidance for D3 and digital
8 computer-based I&C system will respect -- with respect
9 to manual initiation of protective action will reduce
10 regulatory uncertainty as more plants upgrade their
11 I&C system from analog to digital.

12 This is a snapshot of BTP 7-19 with regard
13 to diversity and defense in-depth, and therefore is
14 the computer-based I&C system.

15 And we incorporate this into the revision
16 of the Reg Guide. A set of display and controls
17 located in the main control room should be provided
18 for manual system level actuation upgrade for safety
19 function and from monitoring the parameters. That's
20 for safety function.

21 The displays and control should be
22 independent and diverse from computer-based safety
23 system. The point at which the manual controls are
24 connected to safety equipment should be downstream of
25 the plant digital I&C system outputs.

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1 CHAIRMAN BROWN: Was there some push-back?
2 I'm trying to remember from the comments on the
3 connecting downstream.

4 MR. NGUYEN: Yes. There's push-back
5 because --

6 CHAIRMAN BROWN: You were only in partial
7 agreement with that, if I remember. You did something
8 with that, I believe.

9 MR. NGUYEN: We partially agree. The
10 reason we partially -- we not totally agree was we
11 should address this, but the way we present it in the
12 -- in the --

13 CHAIRMAN BROWN: In the draft?

14 MR. NGUYEN: -- in the draft was confused.
15 Everybody -- we mixed safety-related requirements
16 into the non-safety related BTP 7-19 guidance. That's
17 not the way we should do.

18 We should have separated the requirements
19 separately from the BTP 7-19 guidance, which can be
20 non-safety related.

21 CHAIRMAN BROWN: Okay. So the key words
22 here now are safety equipment? To make it clear. The
23 point at which the -- for safety systems, it's got to
24 be downstream, and that was not clear in the initial
25 draft, and that's where you got the confusion.

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1 MR. NGUYEN: No. We have this BTP 7-19
2 guidance mixing in the requirements of IEEE 603.

3 CHAIRMAN BROWN: I understand that. But
4 when you put this into -- this is in BRP 7-19, isn't
5 it?

6 MR. NGUYEN: Yes.

7 CHAIRMAN BROWN: And all you're doing is
8 referencing it?

9 MR. NGUYEN: Yes.

10 CHAIRMAN BROWN: Or you're talking about
11 it?

12 MR. NGUYEN: We talk about it, and we
13 incorporate it into the --

14 CHAIRMAN BROWN: Yes, it's one of the --

15 MR. NGUYEN: Point out Regulation Position
16 7. Not a word-by-word, but --

17 CHAIRMAN BROWN: Right. So this is one
18 where you lifted it and you stuck it in the Reg Guide.

19 This seems to make sense to me, so I was trying to
20 understand what the reason was for the comment you got
21 back that the --

22 MR. NGUYEN: We -- when we draft the draft
23 guide and send out for public comment, we have these
24 mixing together in all over the place, so the industry
25 said, wait a minute.

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1 The Reg Guides is to provide guidance to
2 comply with 603, not to provide guidance for beyond
3 these basic items. We disagree --

4 CHAIRMAN BROWN: There's one basis to --

5 MR. NGUYEN: I'm sorry, yes.

6 We disagree with that push-back. We
7 believe that in the light of, you know, digital and --
8 digital modification, we need to address the common
9 cause failure for digital I&C system.

10 CHAIRMAN BROWN: Okay. So, you retained
11 that thought process.

12 MR. NGUYEN: Yes, but we make clear that
13 there's two different set of -- one requirement for
14 actuate and 603, must be safety-related. We put it in
15 the front of the Reg Guide.

16 And the second guidance, the second part
17 of the Reg Guide is the guidance for a system to
18 satisfy the D3 from the BTP 7-19. That can be non-
19 safety related.

20 And we -- in the end of the Reg Guide we
21 provide the option for the applicant licensee to
22 either do the two I mentioned earlier separately, or
23 they can combine into the single safety-related manual
24 initiation.

25 CHAIRMAN BROWN: Okay.

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1 MR. NGUYEN: So, go back to the present,
2 there's a push-back from industry on why we address
3 this diversity for -- to prevent common cause failure
4 for, you know, for manual initiation.

5 But we think -- we believe that it's
6 necessary to address this.

7 CHAIRMAN BROWN: I don't -- okay. That's
8 fine. I got it. I understand.

9 MEMBER SIEBER: But let me ask you a
10 question about the instrumentation part of it as
11 opposed to the control part of it for D3 applications.

12 The control part, to me, is pretty simple
13 because you either have circuit breakers or trip coils
14 or closing coils or -- that are easy to connect by
15 manual switches, but the instrumentation that the
16 operator relies on to know whether the action is
17 performing as he expected it to or performing at all,
18 my vision of newer plants is that the actual center
19 elements are going to be digital and they are going to
20 need some kind of digital processing in order to
21 provide a reading in the control room for the operator
22 to look at.

23 This seems to imply that that signal
24 doesn't go through the normal processing system in
25 order to make those instruments work. You have to

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1 have something distinct from that, but my way of
2 looking at it, it's still going to be digital in the
3 process. You're just going to have another subsystem
4 which is digital.

5 How do you refer yourself that you're
6 truly getting diversity and defense in-depth in the
7 indications available to the operator when you start
8 off with digital signals in the first place?

9 Where do you make the separation? Right
10 at the sensing element, and bring it out to a separate
11 microprocessing system that converts it, or do you
12 require the installation of analog sensors with A to D
13 converters before you -- you know.

14 Just exactly what do you have in mind when
15 you make the statement in this first bullet under the
16 branch technical position?

17 MR. JACKSON: Okay. I'll try to answer
18 that one there, because I think it's a lot related to
19 the new reactors and -- the new reactor designs we've
20 seen, they are planning to use analog sensors for the
21 safety-related functions.

22 So, you're not required for, say, the
23 diverse -- any kind of diverse actuation system
24 because it's analog. There's not a software common
25 cause failure potential there.

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1 Typically what they do is they split it
2 off, split off the analog signal and isolate it and
3 send it to the -- any kind of diverse actuation signal
4 before there's any kind of digital processing
5 performed to it.

6 MEMBER SIEBER: So the sensing elements,
7 themselves, are they separate sensing elements or --

8 MR. JACKSON: There would be --

9 MEMBER SIEBER: -- would you not have any
10 digital outputs, is that what you're telling me?

11 MR. JACKSON: They could be -- they could
12 be common to -- they could be common between the
13 diverse actuation system and the primary protection
14 system.

15 CHAIRMAN BROWN: You didn't really answer
16 that. What he's -- correct me if I'm wrong. In all
17 the premium plants that we've looked at, all of the
18 sensors are just like we've had before. You've got
19 RTDs, pressure set -- you know, they are standard
20 analog type sensors. They brought the sensor inputs
21 to the safety systems --

22 MEMBER SIEBER: Through an A to D
23 converter.

24 CHAIRMAN BROWN: No, not yet. They bring
25 them all and then they split -- they go to an A to D

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1 converter for the safety system. They go to a A to D
2 -- they -- then that analog system is sent off to the
3 diverse system, separate so you don't depend on that A
4 to D conversion.

5 MEMBER SIEBER: Not conversion process.

6 CHAIRMAN BROWN: Not processed. It's
7 unprocessed data. In other words, it's raw analog
8 signal conditioned information that's sent to the
9 diverse system. At least that's -- correct me if I'm
10 wrong.

11 MR. KEMPER: Yes, that's correct.

12 CHAIRMAN BROWN: That's what I've seen in
13 the other -- in the --

14 MR. KEMPER: Particularly in the --

15 MEMBER SIEBER: My understanding of the
16 most modern instruments, though, is that the output
17 from the sensing element, the head of it is digital.

18 CHAIRMAN BROWN: That's not --

19 MR. JACKSON: There is equipment that --

20 CHAIRMAN BROWN: There are some, but
21 that's not being used.

22 MR. JACKSON: There's equipment out there
23 that is -- can provide a digital from a transmitter to
24 the control system, can be digital, but in the case of
25 the designs we're seeing, they are analog, it's being

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1 transmitted by --

2 MEMBER BLEY: But suppose you get one of
3 these new ones, how does -- I think Jack's question
4 still applies. How does --

5 MEMBER SIEBER: Yes, there's no --

6 MEMBER BLEY: -- this guidance apply?

7 MEMBER SIEBER: I don't see anything in
8 the words that say don't buy digital sensing elements.
9 There's nothing that says that.

10 MR. JACKSON: Right. And they could
11 propose a digital transmitter for the designs. In
12 that case they would have to address it as part of the
13 diversity analysis.

14 MEMBER SIEBER: Well, you could make two
15 digital systems diverse from one another, but I don't
16 see enough stuff in here to say, to conclude that
17 they're diverse or not. Do you have to use different
18 algorithms and calibration techniques and --

19 MR. JACKSON: I think that's probably --

20 MEMBER SIEBER: And can you have a serial
21 bus that -- where the sensor says I'm pressure
22 transmitter 42-A and here's my output, and it all --
23 it just jumps in there with all the other ones and you
24 -- you know, people like to save money on wires, and
25 that's the way to you do it.

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1 MR. JACKSON: I think that criteria is not
2 in this particular position here. It's in the other
3 positions in BTP 7-19 as well as the other references,
4 such as NUREG 6303 and other documents to analyze
5 that.

6 But that is one thing that we do. When we
7 do a review we are looking to see is there -- are the
8 sensors digital. If they are, then how do they
9 address that. So far we haven't seen that.

10 MEMBER SIEBER: Is that NUREG referenced
11 by the latest red-line strike-out version? I can look
12 it up here, but --

13 MR. JACKSON: It's in BTP 7-19.

14 MEMBER SIEBER: -- if it's not referenced
15 then it doesn't apply.

16 CHAIRMAN BROWN: It's not in this Reg
17 Guide.

18 MEMBER SIEBER: Right.

19 MEMBER BLEY: But this references BTP 7-
20 19?

21 CHAIRMAN BROWN: BTP 7-19 is referenced in
22 this, in this document.

23 MEMBER SIEBER: I -- you know, as a
24 designer with a crafty mind, myself, I could figure
25 out some ways to put in a not so good system and still

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1 follow this Reg Guide, I think.

2 I wouldn't do that, however, because it
3 would break traditional standards.

4 MR. JACKSON: Yes, that's -- that's
5 certainly one thing we look at is, from the sensor all
6 the way down to the actuation device when we're doing
7 a diversity analysis.

8 MEMBER SIEBER: Well, I think it's
9 something you need to think about.

10 MR. KEMPER: This is Bill Kemper. Yes, in
11 the Oconee RPS and FS upgrade, when they submitted
12 their diversity and defense in-depth analysis they had
13 to consider sensors as well.

14 So, just like Terry said, I agree with
15 him. It's -- you really have to take it from the
16 sensor all the way through the final actuation device
17 to adequately perform your diversity and defense in-
18 depth analysis pursuant to NUREG 6303, and as we've
19 all said, that's referencing BTP 7-19.

20 This Reg Guide is not intended to
21 promulgate that guidance explicitly, if you will.
22 We're just -- we brought that piece of the diverse
23 actuation manual system, manual actuation for
24 diversity into this because of the topic.

25 It covers manual actuations, and the

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1 designer can make a choice as to whether they want to
2 satisfy just the 603 requirements, in which case it
3 doesn't have to be independent of the software, or
4 whether they want to satisfy both the 603 and the BTP
5 7-19 requirements for manual diverse actuations, in
6 which case they would choose a different way to
7 implement that -- that manual actuation system like
8 Khoi just said a moment ago.

9 CHAIRMAN BROWN: But either way they still
10 have to satisfy 7-19.

11 MR. KEMPER: Yes, sir. Absolutely right.
12 Yes.

13 CHAIRMAN BROWN: Okay. So, like you said,
14 the digital system didn't have to satisfy 7-19. If
15 they did it -- if they satisfied the 603 only.

16 MR. KEMPER: Yes.

17 CHAIRMAN BROWN: I'm trying to take your
18 two sets of words. 603 only, you made -- I may be --
19 I've already lost it.

20 MR. KEMPER: They can design the system to
21 comply with 603, yet that solution wouldn't be
22 acceptable for a diverse manual actuation system,
23 because it's still subject to common cause failure.

24 CHAIRMAN BROWN: Yes. You could use -- I
25 got out of your comment that if you satisfy 603 you

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1 can initiate your manual actuation and it can use the
2 software.

3 MR. KEMPER: Yes.

4 CHAIRMAN BROWN: That's part of the design

5 --

6 MR. KEMPER: Yes.

7 CHAIRMAN BROWN: -- the division level
8 design, multidivisions, redundancy, all the other sho-
9 fa-fa that goes with it.

10 MR. KEMPER: Yes.

11 CHAIRMAN BROWN: And meet the requirements
12 of that and use of software?

13 MR. KEMPER: That's correct, for 603.

14 CHAIRMAN BROWN: But -- but, it still has
15 to meet your overall -- overall design, plant design.
16 Aside from that unique protection system, whichever
17 one it is --

18 MR. KEMPER: Yes.

19 CHAIRMAN BROWN: -- still has to meet 7-19
20 relative to diversity and defense in-depth. You have
21 to have a diverse methodology.

22 MR. KEMPER: That is correct.

23 CHAIRMAN BROWN: Which is different --
24 might be another software set of stuff. You haven't
25 precluded that --

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1 MR. KEMPER: It could be, yes. Exactly.
2 It could be another microprocessor.

3 CHAIRMAN BROWN: -- but you have not
4 precluded it, but it's got to be different from the
5 basic system that complies with 603?

6 MR. KEMPER: Yes.

7 CHAIRMAN BROWN: And it does not have to
8 be necessarily safety-related, if I'm not mistaken.

9 MR. KEMPER: That is exactly right. Yes,
10 sir. That's the way we envisioned it when we crafted
11 this Reg Guide, and we just chose to try to clarify
12 that since it deals with the same basic functionality
13 of the system, you know, and there was actuating
14 systems -- systems manually.

15 So that's why we chose to add this to
16 provide that clarification. I think we might have
17 confused the industry a little because, based on some
18 of the comments we got back, but hopefully we cleared
19 that up in our comment resolution to this Reg Guide.

20 MEMBER SIEBER: Well, just so it's clear,
21 what I'm referring to, you know, usually an automatic
22 system, the parameter comes into some control or some
23 place that says I've hit the set point, I'm going to
24 actuate a closing coil here, modulate this valve or
25 what have you.

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1 I'm not referring to that part of it
2 because manual action is an on-off function as I see
3 it. What I'm referring to is the instrument the
4 operator is looking at in order to know whether the
5 manual action was successful and is it accomplishing
6 its purpose, and is that indicator that he's looking,
7 does it go through the old chain of software and
8 digital instruments, or is it separate.

9 MR. KEMPER: Well, as long as that
10 instrumentation is not subject to the same common
11 cause failure that takes out the protection system
12 that requires that manual action --

13 MEMBER SIEBER: That tells --

14 MR. KEMPER: -- then that's okay.

15 MEMBER SIEBER: -- me it's separate. That
16 tells me it's separate.

17 MR. KEMPER: Yes. In all likelihood it
18 could.

19 MEMBER SIEBER: Because I could dream up
20 common cause failures that if it isn't separate it's
21 going to take them all.

22 MR. KEMPER: Yes. For example at Calvert
23 Cliffs, they've initiated a postaction and monitoring
24 system upgrade a few years ago using common Q
25 microprocessor, and so those instruments are now --

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1 now they're processed digitally with analog sensor
2 inputs, but that is a complete diverse system from
3 their reactor protection system. So that could be
4 relied upon, you know, for this purpose.

5 MEMBER SIEBER: Yes, but the reactor
6 protection system is generally associated with design
7 basis accidents, as opposed to abnormal operating
8 occurrences, to which this refers.

9 You know, first of all, you don't
10 necessarily need safety-grade equipment to deal with
11 that, and there's more operational occurrences than
12 there are design basis accidents.

13 You know, design basis accidents have
14 classic -- there's a classic number of accidents with
15 a classic set of set points and, you know, for every
16 reactor there's a fixed way to deal with them, in
17 general -- more or less.

18 Whereas, AOOs are a different ball game
19 altogether, and not necessarily safety-related, but
20 you're still requiring 3D and all these other
21 functions.

22 I just wanted to make sure that -- that
23 all of this is covered the way I think you're telling
24 me that, and the way I think it says that it should be
25 covered.

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1 I don't know if my question's clear or
2 not.

3 MEMBER BLEY: Nothing about this is clear.

4 MEMBER SIEBER: I guess if I'm in doubt,
5 I'll start reviewing individual systems in detail.

6 CHAIRMAN BROWN: Well, one of the points -
7 - and I'd just belabor this a little bit more. If you
8 look at the analog systems that you had in the older
9 plants for pressure, temperature flow levels, you had
10 independent instruments for everyone.

11 MEMBER SIEBER: Yes.

12 CHAIRMAN BROWN: So you might have 20, 25
13 instruments telling you what's going on in the plant.

14 Today, you've taken those same sensors and
15 you've congregated them into four divisions. All of
16 that data from one division for one-fourth of the
17 sensors is processed in that one division.

18 So, I've gone from 20 or 30 separate
19 indications of things operators can look at see what's
20 going on in the plant to four, and if they all had the
21 same -- I'm hypothetically saying this, all had a
22 common mode failure of some software failure of some
23 subtype, all of your indications would be bogus.

24 MEMBER SIEBER: Right.

25 CHAIRMAN BROWN: And you would not tell

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1 the plant to protect itself.

2 MEMBER SIEBER: Right.

3 CHAIRMAN BROWN: So you've really necked
4 down, you know, the overall independence and diversity
5 of the systems relative to what the operators have to
6 look at.

7 You've got fundamentally four divisions of
8 stuff processing data that's being put on screens.

9 MEMBER SIEBER: All subject to sudden
10 error --

11 CHAIRMAN BROWN: All subject -- many times
12 in some of these designs with the same software in
13 each division.

14 It's just -- it's a hierarchical
15 architectural type thought process. That's all. We
16 can -- if some -- Bill, you looked like you all wanted
17 to talk.

18 MR. KEMPER: Yes. I'm not sure I'm
19 completely following your logic, but --

20 CHAIRMAN BROWN: My point being is that
21 monitoring equipment for the operators had 15 or --
22 you had four or five, six different pressure
23 instruments. You had four, five, six different
24 temperature instruments. You had four or five --
25 three or four different levels -- flow, you have

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1 multiple -- and they're all separate analog,
2 independent -- they all went to a meter that you could
3 select.

4 MR. KEMPER: Right. Right.

5 CHAIRMAN BROWN: So the only common
6 element typically was a switch. Sometimes you even
7 had separate meters.

8 MR. KEMPER: Yes. Typically they all have
9 their own loop, instrument loop, right, they come
10 right straight from the sensor, from the power supply,
11 they're processed through signal listening devices and
12 read-out --

13 CHAIRMAN BROWN: Read-out, then they read
14 something off to the, quote, the trip systems.

15 MR. KEMPER: Right. Exactly.

16 CHAIRMAN BROWN: But if they see a certain
17 number that they go shut down.

18 MR. KEMPER: That's correct.

19 CHAIRMAN BROWN: Now, all that data comes
20 into four divisions of processing. If you look at the
21 designs they're working on, the pressure, temperature
22 and flow, you've got separate centers for each
23 division.

24 MR. KEMPER: Right.

25 CHAIRMAN BROWN: But that means you've got

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1 all your processing, you've got fundamentally one
2 division processes, it integrates --

3 MR. KEMPER: Well, that's true, but bear
4 in mind that the strategy shouldn't change. Now, I'm
5 speaking a little bit out of my element, because this
6 is a new reactor you are speaking to here.

7 But for operating reactors, I think it
8 should be the same. You're still going to have that
9 instrumentation as good as it's going be -- it's going
10 to branch off.

11 In other words, there's going to be input
12 to the reactor protection system to perform its
13 function based on temperature, level, pressure, but
14 that indication is still going to branch off through
15 that same instrument loop to read-outs for the
16 operators in the control room.

17 Now, those read-outs will be digital in
18 all likelihood, rather than --

19 CHAIRMAN BROWN: You just said the magic
20 word. "Through the same loop."

21 If the data comes into the same processing
22 loop, then the output, all the indications, they get
23 processed. Two things happen with that data.

24 Number one, you get a read-out that tells
25 you to go display on a meter some output.

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1 MR. KEMPER: Yes.

2 CHAIRMAN BROWN: The other thing you get
3 is another piece of information that says -- goes off
4 to another trip unit, a comparison unit.

5 MR. KEMPER: Right.

6 CHAIRMAN BROWN: The same piece of data.

7 MR. KEMPER: Right. Right. But
8 traditionally that will be an analog signal unless --

9 CHAIRMAN BROWN: No. No.

10 MR. KEMPER: -- they use Rosemount, you
11 know, 3051s or something like that.

12 CHAIRMAN BROWN: Some people use serial
13 transmissions of that data. It's just -- it's not all
14 -- it's not just a discreet digital data at that point
15 in many circumstances.

16 That's not the point. It comes in, it
17 gets processed, pressure, temperature, flow, level,
18 whatever it is in one division. Two things happen to
19 it.

20 Some of that -- whatever the parameter
21 value is goes off to an indication function. That
22 same output, another output goes off and says I go to
23 a comparison function, and once it's compared it says,
24 oh, I've got to trip, but then goes to your two out of
25 four logic, what units, whatever that is.

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1 That's all -- all that data, all those
2 indications are processed in the same processing loop
3 in the new reactors. In Oconee it's the same way.

4 MR. KEMPER: Let me confer with my
5 colleague for just a minute.

6 MEMBER APOSTOLAKIS: Charlie.

7 CHAIRMAN BROWN: Tell them to hold up?

8 MEMBER APOSTOLAKIS: Behind you.

9 CHAIRMAN BROWN: Oh, hi.

10 MR. LOESEN: Paul Loesen. I'm with the
11 I&C Branch.

12 You're mistaken on one area. If you look
13 at the display it says the displays and controls
14 should be independent and diverse. You're talking
15 about -- what we're talking about is that for the
16 independent controls it cannot go through the same
17 processing loop.

18 It needs to be split off at the sensor, go
19 to a completely different processing loop. It may
20 also be digital, but it has to be diverse digital, not
21 subject to the same --

22 MEMBER SIEBER: Yes. I got that.

23 MR. LOESEN: So, you don't have that same
24 choke point you talked about. The processing that
25 occurs for the trip function is not the same

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1 processing that occurs for the display function.

2 So, even if the trip function fails, the
3 operators will still have the diverse displays in
4 order to be able to take a manual action.

5 CHAIRMAN BROWN: I don't know. I looked
6 at -- there was one design we looked at that all the
7 data came into one set of stuff and then it split out.
8 That's the one we just finished looking at.

9 MR. LOESEN: I can't speak about what --

10 CHAIRMAN BROWN: It's the one we just had
11 the presentation on.

12 MR. LOESEN: I can't talk about what the
13 new reactors may have proposed, but that's what the
14 regulation says they need to have.

15 CHAIRMAN BROWN: The diverse part, if you
16 satisfy this -- Jack's point was, and all I'm trying
17 to do is get the point across, is that the operator
18 has to rely on indications.

19 MEMBER SIEBER: Right.

20 CHAIRMAN BROWN: How those indications are
21 presented for use directly in front of you. You know,
22 how far away is that diverse backup indication set of
23 stuff. When do you know, how do you know.

24 MEMBER SIEBER: How separate is the --

25 CHAIRMAN BROWN: That's our -- just -- I

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1 was trying to elaborate on his point in terms of how
2 the safety systems are processed and how the main
3 operating indications are processed, and you have to
4 make sure that you have something that's not going to
5 get contaminated that way.

6 MR. LOESEN: Yes, and it's true --

7 CHAIRMAN BROWN: And all I was trying to
8 show was that if you went from the old analog world
9 and compressed down to the way we're doing it now with
10 software, you have to be more thoughtful in terms of
11 how you do that in order to make sure that any
12 failures you have allow the operator to know what's
13 really going on.

14 MR. LOESEN: I agree. And D3 analysis is
15 to postulate that kind of failure and make sure they
16 can handle it.

17 CHAIRMAN BROWN: We're keeping our fingers
18 crossed.

19 MEMBER SIEBER: It's clear that the
20 composed Guide makes the control function diverse.

21 CHAIRMAN BROWN: The control function,
22 exactly. That's what this is.

23 MEMBER SIEBER: My question --

24 CHAIRMAN BROWN: Except for the first --

25 MEMBER SIEBER: -- is communication that

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1 the operator uses.

2 CHAIRMAN BROWN: The first bullet,
3 theoretically on -- not in the Rule, but BTP 7-19.

4 MEMBER SIEBER: Yes.

5 CHAIRMAN BROWN: I haven't seen it in the
6 Rule. I just see it here. It says it's got to have a
7 set of what stuff that's -- blah, blah, blah, blah,
8 blah, "independent, diverse from the computer-based
9 safety system."

10 So, it's not in the Rule, it's in the
11 guidance.

12 MR. NGUYEN: These are follow-up to all
13 those inputs, and I agree with him that the input
14 signal should not be split before go to the process --
15 I mean, after -- after. It should be split before it
16 goes --

17 CHAIRMAN BROWN: I'm too old. You can't
18 give me a heart attack like that. Okay.

19 MR. NGUYEN: And I think your question was
20 does the input signal go to the --

21 CHAIRMAN BROWN: No. That's what Jack's
22 point was. When does -- when do you have digital
23 processing established, and where do you split, and I
24 think we've had that --

25 MR. NGUYEN: But it doesn't meet this

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1 independent and diverse.

2 CHAIRMAN BROWN: I don't think it would
3 be.

4 MR. NGUYEN: Yes. If it goes into the box
5 and then --

6 CHAIRMAN BROWN: Well, no --

7 MR. NGUYEN: -- process and submit --

8 CHAIRMAN BROWN: If you have a digital
9 detector that develops a digital signal out, it
10 depends on what that looks like. Okay. If you've got
11 four different ones, four different sensors and they
12 are digital outputs, you've got four analog sensors.

13 They've got analog outputs, and if that
14 software is incumbent and embedded right in that
15 sensor head itself, you have to -- you're going to get
16 hit with that sometime and you're going to have to
17 think about the additional level of software that you
18 have to deal with. You haven't gotten there yet.

19 MR. JACKSON: Yes, we haven't gotten there
20 yet, but that is something, you know, if we did get
21 that, we would look at -- the applicants would have to
22 address the diversity aspect for that, and that's
23 something we would have to review.

24 MEMBER SIEBER: I suspect we could beat
25 this to death.

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1 CHAIRMAN BROWN: Yes. Time to move on.

2 MEMBER SIEBER: Any other questions?

3 Okay. Go ahead, Khoi. Thank you.

4 MR. NGUYEN: Thank you, Terry and Bill.

5 The benefits to expand the scope of this
6 Reg Guide is to enhance the reactor safety by
7 addressing one of the -- of the common cause failures
8 of the technology and by providing D3 guidance in --
9 with respect to manual initiation for protective
10 action, and so to fulfill the user need of having the
11 guidance.

12 Right now we have -- it's in BTP 7-19, but
13 it is not in regulatory guide space. Another benefit
14 is to provide the licensee or applicant an option to
15 satisfy both requirements of 603 and BTP 7-19 by
16 providing a single safety-related manual initiation
17 that satisfy BTP 7-19 guidance.

18 I think we already discuss about this.

19 CHAIRMAN BROWN: So this is kind of your
20 summary of the eight positions?

21 MR. NGUYEN: Not a summary --

22 CHAIRMAN BROWN: Well, I mean -

23 MR. NGUYEN: We -- the --

24 CHAIRMAN BROWN: -- what it brings --

25 MR. NGUYEN: Yes. These are benefit, why

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1 we want to expand the scope.

2 CHAIRMAN BROWN: Okay.

3 MR. NGUYEN: Okay. This we talk about
4 relationship between Reg Guide 1.62, ISG-2 and ISG-5.

5 I would like to go over the sequence of
6 the development of these ISGs revision to this most
7 recent. The time respond associated with these ISG,
8 and why we are not using time response, specific time
9 response in the Reg Guide.

10 We talk about time respond, but we don't
11 specify a specific a specific, say like, 30 minutes,
12 15 minutes, or 20 minutes.

13 To provide additional guidance to BTP 7-
14 19, in September 2007, the NRC start issue Rev. 1 of
15 ISG-2, in which it states "Manual operator action may
16 be rated for responding to events in which the
17 protective action, such as the common-cause failure is
18 not required for at least first 30 minutes and the
19 plant response is bounded by BTP 7-19, recommended
20 accepted criteria.

21 If I go further, I would like to say that
22 you may want to pay attention to the language of the
23 text I quote here because it change and it change the
24 meaning, too.

25 Subsequent to either the ISG-2 in November

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1 '08, the NRC issue Revision 1 of ISG-05 to provide
2 further guidance crediting manual operator action
3 during an AOO and PA -- and I mean anticipated
4 operational occurrence on that and postulated accident
5 concurrent with the software common cause failure.

6 Section 3, this document, this actually
7 provides guidance on how to demonstrate through a
8 suitable HFE analysis that the manual operator action
9 that can be performed inside the control room and
10 acceptable in lieu of automated backup function.

11 In addition, this guidance can be used to
12 demonstrate the acceptability of operator action
13 requiring less than 30 minutes.

14 During the review of the Revision 1, ISG-
15 05 in April, 2009 the ACRS had noted --

16 CHAIRMAN BROWN: Wait. Let me make one --
17 The reason you went from ISG-2 to the Section 3 of
18 ISG-05 was based on an ACRS letter back in -- on the
19 2007 revision, where they suggested looking at an
20 alternative to the single 30-minute requirement.

21 MR. NGUYEN: That's correct.

22 CHAIRMAN BROWN: And then so this -- so
23 this Section 3 was developed to address that.

24 MR. NGUYEN: Yes.

25 CHAIRMAN BROWN: That question raised by

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1 the ACRS. I've probably got the letters here, but
2 that's -- I just wanted to get a calibration of how we
3 went from bullet 1 to bullet 2.

4 MR. NGUYEN: Right. And in April 2009 the
5 AC -- during the ACRS meeting, the ACRS had noted that
6 that is for creating of the operator action included
7 in the list, include a list of acceptable methods, be
8 driving the estimate time required for task components
9 and conclude that the time estimates using these
10 methods can be biased and the associated concern in
11 these can be difficult to assess.

12 Furthermore, as the difference between the
13 time available and the time required decrease,
14 confidence in analysis decrease.

15 Subsequently, to address the ACRS concern
16 on Revision 1 of ISG-05, the staff is -- ISG --
17 Division 2 of ISG-2 in June 2009, and in the ISG, the
18 language it was softened with the "after 30 minutes"
19 for action with limited margin, such as -- I
20 underlined "such as" to point out this specific
21 example, not the magic, you know, number such as less
22 than 30 minutes between time available and time
23 required for operators to perform the protective
24 action.

25 A more focused staff review will be

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1 performed. So, for action with limited margin, for
2 example, 10 minutes -- 10 minutes to require for
3 operator action, but the margin, do we add it on the
4 top of 10 minutes, the 20 minutes to make 30 minutes,
5 or 15 minutes.

6 There's no magic scale for, you know,
7 using to set the time line here, so 30 minutes in this
8 ISG, Revision 2 is just an example, not the magic word
9 -- I mean, magic --

10 CHAIRMAN BROWN: In our letter we said
11 that the time available for accomplishing a plant
12 protection function -- action would be based on BTP 7-
13 19 requirements, or guidance, in terms of realistic
14 analysis, et cetera, et cetera, and that the time
15 required for operators to respond would be based on
16 the Section 3 except the analysis which was a four-
17 step or four-phase process.

18 And we raised the concern, as you stated
19 that, as the delta between the time available to
20 accomplish the protection action of those -- how much
21 time was available to protect the plant from an event,
22 and is the difference between that time and the time
23 for operators to act based on the HFE, it only got
24 smaller and smaller, that it became more likely to be
25 biased, was more latent with uncertainty.

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1 There were some other words in there I'm
2 not exactly sure. George had some really good words
3 at the time.

4 MEMBER APOSTOLAKIS: But you got the
5 flavor.

6 CHAIRMAN BROWN: Yes, but you got the
7 flavor. And so, that's the way we left it at that
8 time. And we didn't see this change to ISG-2, I don't
9 believe.

10 MEMBER BLEY: That's true. This is the
11 first time we've seen it.

12 MR. NGUYEN: All right.

13 CHAIRMAN BROWN: I wasn't even aware that
14 was issued, and all it says is a more focused staff
15 review will be performed.

16 MR. NGUYEN: So, is it like an indicator -
17 - I am not talking about 30 minutes, but when you have
18 the --

19 CHAIRMAN BROWN: It's for operator actions
20 less than -- yes. Well, it kind of threw out the 30
21 minutes and as a matter of fact, you have other times.

22 30 minutes is fine if you want to use it, but you can
23 have less than 30 minutes if you do these other type
24 things.

25 MEMBER BLEY: The thing they've done here

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1 that's -- that I like is that they've moved away from
2 the time required to do the action being 30 minutes to
3 the delta --

4 CHAIRMAN BROWN: Exactly. Yes, that's
5 fine. Well, that's in accordance with our --

6 MEMBER BLEY: It is.

7 CHAIRMAN BROWN: -- our letter said that.

8 MR. KEMPER: Right. Yes. This is Bill
9 Kemper --

10 MEMBER BLEY: It's a little vague about
11 what you do about it, but if it starts getting short
12 we have to be little bit more careful.

13 MR. KEMPER: This is Bill Kemper. If I
14 could just add a word here. Yes, the idea was to de-
15 emphasize, as you all rightly pointed out to us this
16 bi-stable, if you will, this 30 minutes, because that
17 was based on judgment, engineering judgment we'll call
18 it, back in 2007.

19 Since then the HFE group have developed
20 this process that you just described, Charlie, to now
21 do a detailed analysis to establish the difference
22 between the time available, I believe, and the time
23 required to implement the manual action, and that's
24 where the focus really is.

25 And so both those documents just used

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1 timing elements. It's just a reference to inform the
2 industry that the less time you have, the less margin
3 you have between those two variables it will get more
4 scrutiny by the staff. That's all we're really trying
5 to do here.

6 CHAIRMAN BROWN: But in ISG-2, was that --

7 MR. KEMPER: ISG-2, yes. And ISG-05 has
8 some wording in there that alludes to the same thing.
9 Just as a note really.

10 CHAIRMAN BROWN: Was ISG-05 revised? I
11 haven't seen that.

12 MR. NGUYEN: Well, we --

13 CHAIRMAN BROWN: It seems to be that's
14 been morphed into this Appendix 18-A for the SRP. Is
15 that correct or not?

16 MR. NGUYEN: That's correct. It
17 identifies --

18 MR. KEMPER: Yes, it has. ISG-05 has been
19 revised.

20 MEMBER BLEY: Well, the first bullet says
21 so.

22 CHAIRMAN BROWN: No. It says "supersedes
23 Section 3 of ISG-05."

24 MR. NGUYEN: Supersedes. Well, I think
25 the Revision 1 of ISG-05 state, that the draft --

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1 right now there's a draft revision in Appendix 18 --
2 that's A of SRP. It's been out for comment. It's not
3 officially issued.

4 CHAIRMAN BROWN: No, I understand that.

5 MR. NGUYEN: But the intent of that,
6 Appendix 18-A is to supersede this Section 3 of IGS-
7 05, just Section 3, nothing else.

8 CHAIRMAN BROWN: Just answer me one
9 question before we go on, is that after we wrote our
10 letter in April of 2009 you issued a revision to ISG-
11 2.

12 MR. NGUYEN: That's correct.

13 CHAIRMAN BROWN: To add this heads up.
14 Okay. Was ISG-05 revised in Section 3 different than
15 what's in --

16 MR. KEMPER: If -- David Desaulniers, he
17 took the lead on that. Let Dave.

18 MR. DESAULNIERS: David Desaulniers with
19 NRO. The staff elected not to revise ISG-05, but
20 rather to go forward with development of Appendix A to
21 Chapter 18 of NUREG 0800, and to take the guidance
22 that we -- had we realized ISG-05 -- what we did is,
23 we incorporated that into the Appendix.

24 So the Appendix basically incorporates
25 ISG-05, but we made some changes to address the ACRS

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1 comments in order to ensure that there is appropriate
2 focus on the potential for bias in the estimates, have
3 the staff look at that, that there's consideration of
4 methods to reduce that potential for bias.

5 CHAIRMAN BROWN: Okay. Now, -- yes.

6 MEMBER APOSTOLAKIS: The next slide
7 actually refers to those. Maybe we can look at the
8 next slide. The relationship between 1.62 and the
9 ISGs.

10 MEMBER BLEY: We seem to -- I'm a little
11 confused. Are you hanging on -- ISG-05, Section 3 no
12 longer exists. It's gone.

13 CHAIRMAN BROWN: Yes. No, I understand.
14 I was just trying to make sure that was the case --

15 MR. DESAULNIERS: ISG-05 -- well, right
16 now Appendix A is out for comments. Until we go final
17 with it, that Appendix, ISG-05 still is out there.

18 MEMBER BLEY: It was the last.

19 CHAIRMAN BROWN: Yes, and if you'll look
20 at Appendix A, it mirrors Section 3 virtually
21 identically except where they incorporated the thought
22 process.

23 Now, we can argue about the thought
24 process, because we haven't seen Appendix A. I
25 presume at some point we will see Appendix A?

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1 MR. DESAULNIERS: Correct.

2 CHAIRMAN BROWN: After the public comment
3 is done. And all I'm trying to do is establish when
4 do we get to touch the end result on this because if
5 you look at Appendix A there is no criteria -- in
6 other words, you could go to zero the way this is
7 written right now.

8 I'm not saying that's good or bad. You
9 can listen to my voice and draw your own conclusions,
10 but it's very vague relative to that.

11 And so, I mean, it's -- and I'm not
12 objecting. I'm not saying we have to have more, it's
13 just that right now, RG 1 -- the Reg Guide 1.62
14 doesn't even have a position -- even though they --
15 and this is where we get into the "solely" versus the
16 "backup."

17 Okay. If you look at 1.62 under the
18 Discussion part of this section, it's in paragraph
19 one, bottom of page three, it says "Design analyses
20 determine the appropriate safety functions and
21 corresponding protective actions for each plant
22 design.

23 "The protective actions can be initiated
24 automatically or, in certain cases, can be
25 accomplished solely by manual controls."

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1 So now, in other words, protective actions
2 initiated solely by manual controls are subject to
3 consideration of the time available to the operator to
4 analyze. It probably ought to be "time required" for
5 the operator to analyze, not "time to complete."

6 We've mixed -- terminology is inconsistent
7 between the Appendix and the Reg Guide and -- but this
8 is sending the message that you can use it solely.
9 You don't have to have an automated system. You can
10 use it solely.

11 There's no position on this at all in the
12 Reg Guide, if you go to the back. In other words, it
13 just kind of hangs out relative to manual operation
14 for a protective action solely. There's no automated
15 system.

16 And I guess I'm a little fuzzy on why that
17 should be absent from the Reg Guide. I'm not talking
18 about being specific in terms of what the numbers are.

19 They should be developed probably in this Appendix
20 somehow, which we can discuss later, but the idea of
21 how you go do that seems to be missing from the Reg
22 Guide.

23 MR. EAGLE: Yes. Charlie, this is Gene
24 Eagle, Instrument Control. We've got a group, too.
25 Yes, we have also -- we have BRP 7-19 and it's been --

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1 the ISG-2 is being rolled in -- the guidance from ISG-
2 2 is being rolled into a revised version of BTP 7-19,
3 and we picked up the same language in ISG-2 in which
4 we said the -- as he has quoted here, the action for
5 less than 30 minutes, but we also say the first thing
6 you do is, looking at a digital common cause failure
7 is, you do the analysis to find out if you do have a
8 potential for a common cause failure.

9 Once you've identified that, then you have
10 your choice of manual or automatic action. But we did
11 specifically say that automatic action was preferred,
12 and we remain -- retained -- it's not completely --
13 I'm very disappointed it's being taken out and being
14 weakened here, but we -- I felt we had, in ISG-2 had
15 gave a proper perspective by using this comment for
16 actions with limited margin, such as less than 30
17 minutes between the time available and the time
18 required for operators to perform the protective
19 actions and more focused staff review will be
20 performed.

21 We did not put a hard 30 minutes, but you
22 still -- we're still keeping that 30 minutes as a kind
23 of a rough guideline, and the fact that the IS -- this
24 view Appendix 18-A in which the analysis is done to
25 determine if you can make this time available, time

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1 required.

2 When the group did that, they did not make
3 a cake-walk in making that analysis. It is very
4 detailed and very thorough. But we did try to
5 emphasize once again that if you have identified a
6 common cause, then you have to have an independent
7 diverse system, and that can be manual or automatic,
8 but we're saying you prefer a manual system -- excuse
9 me. Prefer an automatic system as is the preferred
10 method.

11 CHAIRMAN BROWN: You just said "diverse.

12

13 MR. EAGLE: Right. It has to be -- once
14 you've identified that there's a common cause --
15 potential for a common cause in your digital systems -
16 - this is those four safety -- those safety systems
17 that provide the safety protection, then you must have
18 a diverse system.

19 And to meet that it has to be independent
20 and diverse from the safety systems, but you have now
21 a choice of either manual or automatic.

22 We're saying, however, in this same
23 guidance we said that, first, that the automatic
24 system is the preferred method, or that you have your
25 choice. If you do choose to use a manual system --

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1 CHAIRMAN BROWN: For diverse backup.

2 MR. EAGLE: Right. This is the diverse
3 backup, independent diverse backup.

4 CHAIRMAN BROWN: Step back from the
5 microphone.

6 MR. EAGLE: I'm sorry, sir.

7 (Off the record comments.)

8 MR. EAGLE: Anyway I want you to have the
9 -- you have to have a diverse independent backup.
10 Then you've got your choice of manual or automatic,
11 and we prefer the automatic system.

12 If you choose the manual system, then that
13 throws you over into this new Appendix to make the
14 analysis.

15 However, we did -- once again, we did not
16 eliminate the 30 minutes, but left it in there as kind
17 of a guideline in BTP 7-19, and I think that kind of
18 got it -- should also be left in this Reg Guide, too.

19 MEMBER APOSTOLAKIS: So, in regulatory
20 space, what does it mean "prefer"? It means you're
21 going to have more scrutiny if you don't go with the
22 preferred way?

23 MR. EAGLE: If you go -- if it's, for
24 instance, less -- the way you pointed it, you have a -
25 - if you choose a manual system for your diverse

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1 system and you have actions under this less than 30
2 minutes, it's definitely going to be a much more
3 focused and more detailed review of it.

4 MEMBER APOSTOLAKIS: So that's what the
5 preference means?

6 MR. EAGLE: Right.

7 MEMBER APOSTOLAKIS: One is talk --

8 MR. EAGLE: Exactly. It was one talk
9 about, if you have an operator action, you've got at
10 least 30 minutes to take care of it, which is almost -
11 - remember, we're talking about a failure of an
12 automatic system, due to common cause.

13 And it's hard to imagine any action that
14 it would take -- you have up to 30 -- over -- maybe 30
15 minutes or more before you actually have to do it.

16 But if -- at one time we looked at the
17 idea of even having the manual -- the manual
18 evaluation have a break and have actually two. If it
19 was more than 30 minutes, a type of time period, then
20 it will be a much -- maybe have a separate evaluation
21 that will be much easier.

22 But instead we just made it one whole
23 thing. So, the evaluation is being mentioned in this
24 Appendix 18-A, is a very detailed -- a very thorough
25 evaluation.

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1 CHAIRMAN BROWN: Yes, I went through it.
2 Actually, I don't have -- there's some inconsistencies
3 -- there's a few things that need to be done. We
4 haven't looked at 18-A, Appendix A yet -- or, yes, 18-
5 A and you know, that's -- so we can address that.

6 The problem I had was twofold. Number
7 one, you've just gone through the argument on diverse
8 backup. That's what we're talking about.

9 MR. EAGLE: Right. 7-19.

10 CHAIRMAN BROWN: Reg Guide 1.62 talks
11 about manual actions being the sole mode of
12 protection. There is no automatic backup. It says
13 very clearly. "The protective actions can be
14 initiated automatically for an event, or, in certain
15 cases, can be accomplished solely by manual controls."

16 MR. EAGLE: Yes.

17 CHAIRMAN BROWN: "Solely by manual
18 controls." That's it. It just stops right there.
19 Okay. Which implies to me that I could have an event
20 where people can make an evaluation that says, "Okay,
21 we've got enough time based on whatever this thing
22 is," and if that's okay, that's -- we can do that, if
23 that's the decision.

24 The point being, it just stops right
25 there. There is no more -- it's not addressed anymore

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1 in the Reg Guide at all. It's -- that point is not
2 addressed at all in the Appendix.

3 I've read it and -- the Appendix virtually
4 mirrors what ISG-05, Section 3 said plus the
5 discussions of introducing, I guess, uncertainty by
6 changing your HFE analysis for operator response by
7 some ability to recover from a mis -- an incorrect
8 action.

9 You know, how do you get some conservatism
10 or margin into that analysis?

11 MR. EAGLE: I agree with you a hundred
12 percent there. I believe that it's this presentation
13 of the 1.62 has left out that, it did not pick up all
14 of the items -- when the ISG-2 did emphasize that the
15 preference would be an automatic system.

16 CHAIRMAN BROWN: That's for backup.

17 MR. EAGLE: For backup.

18 MR. JACKSON: He's talking about a primary
19 system --

20 CHAIRMAN BROWN: This implies that it's
21 for a primary protection system, manual.

22 MR. JACKSON: That's right. And that --
23 the paragraph at the bottom of page three there on the
24 draft Reg Guide is really restating what's in Section
25 3 as a regulation that you can provide manual --

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1 manual actions in place of automatic actions, in
2 essence, you know, leading back to the steam generator
3 tube rupture --

4 CHAIRMAN BROWN: I'm not going to tell you
5 -- I don't necessarily disagree with that. It's just
6 the point is it stops.

7 MR. JACKSON: Right.

8 CHAIRMAN BROWN: There's no position in
9 the guidance which then addresses this point.

10 MR. JACKSON: Right.

11 CHAIRMAN BROWN: And how you then deal
12 with it subsequently, either via the Appendix A, or
13 some other guidance in some other -- you know,
14 whatever the circumstances are. It just kind of hangs
15 there.

16 MR. JACKSON: And I think the old guidance
17 did that also, and this is an interface point between
18 what the I&C reviewer is doing and what the Human
19 Factor reviewers come in.

20 So, I'll let Dave talk about what they do
21 in Human Factors review as far as like crediting
22 manual actions for safety -- actuating safety
23 functions.

24 MR. DESAULNIERS: David Desaulniers again.
25 You're correct in that your Appendix 18-A does not

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1 address the particular case that you're speaking of in
2 which the manual initiation is -- there's no automatic
3 initiations. It's solely manual initiation.

4 The scope of 18-A is limited to what was
5 addressed in ISG-05 and going back to BTP 7-19. It
6 was for manual backup for a diverse actuation system.

7 Now, with respect to the case that you're
8 speaking of here that, as Terry noted, that situation
9 has been there for some time, but the guidance is
10 limited. It is referenced to IEEE 603, Section 4.5,
11 which provides the limited review guidance or design
12 guidance, I should say for instances where manual
13 initiation is relied upon.

14 CHAIRMAN BROWN: Again -- okay. Okay, I
15 got that. I think I got that, anyway. I'm not trying
16 to express a disagreement with the ability to use
17 manual actions for some types of events.

18 In some circumstances, that may be the
19 only choice you have. I'm trying to think of some of
20 them, but that may be. All right. My concern is an
21 inconsistency of -- between 1.62, Rev. 1, the
22 explanations if you look even at the Appendix A, the
23 definitions and relative to time available, time
24 required, in other words, time available as based on a
25 BTP 7-19 analysis of what's the plant response, and

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1 then time required based on the HFE analysis for the
2 operator action to do that, and no guidance in terms
3 of how does my delta -- how specifically -- there's
4 some suggestions on how margin can be incorporated in
5 there in terms of responding for the diverse one or
6 the sole one, whichever one it is.

7 It doesn't make any difference because it
8 applies in both of them. You have to have a good
9 rational basis for the manual action, whether it's for
10 a diverse backup or whether it's for the sole purpose
11 of being the primary protection function.

12 And so these -- the Appendix, and these,
13 they just kind of -- you're just kind of left hanging
14 by the time I finish -- by the time I finish reading
15 this.

16 The Reg Guide doesn't even talk about time
17 required. It just talks about the time available to
18 the operator -- excuse me. It's terminology is
19 incorrect. It should have said time required. It
20 doesn't talk about the time available as based on an
21 analysis.

22 I've allowed us to run over the scheduled
23 break. Is it acceptable to hold off on that, or
24 should we finish this discussion first? I mean, I'm
25 unfamiliar with that approach.

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1 MS. ANTONESCU: It's up to you.

2 MEMBER BLEY: I think it's up to you, but
3 we're going to start individually taking breaks, Mr.
4 Chairman

5 CHAIRMAN BROWN: I'm very sympathetic to
6 that.

7 MR. KEMPER: If I could -- if you'd just
8 give me two minutes, hopefully I can answer your
9 question in two minutes.

10 Okay. This part of the Reg Guide deals
11 with 603, and this requirement has been in 603 for a
12 long time. The industry has not asked for
13 clarification or guidance or regulatory positions on
14 that, so --

15 CHAIRMAN BROWN: Which part?

16 MR. KEMPER: On page 3 --

17 CHAIRMAN BROWN: Yes.

18 MR. KEMPER: -- the last paragraph that
19 you're reading, that really is intended just to
20 amplify in the discussion part of the Reg Guide what's
21 already stated in Section 4.5 of IEEE 603.

22 So, the industry has never asked us for
23 any further clarification on that, and obviously all
24 the plants are designed, have been designed for many,
25 many years with some actions being manual and some

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1 being automatic.

2 The staff accepted those as Dave said a
3 minute ago, and so that's why you don't see a specific
4 regulatory position on the implementation of manual
5 actuations from this perspective to comply with 603.

6 The industry asked for guidance
7 specifically on the timing requirements for manual
8 action for a diverse backup system. So, that's --
9 it's easy to confused these things.

10 As I say, I'm not sure we've made the best
11 choice here, in hindsight, in trying to combine all
12 the manual actions that we've been -- that we deal
13 with on a regulatory basis in one Reg Guide.

14 But we tried as hard as we could to try to
15 clarify the same requirements for different reasons
16 with slightly different design solutions, if you will.

17 MEMBER BLEY: One point before we break.
18 4.5 doesn't say much at all.

19 CHAIRMAN BROWN: I read that --

20 MR. KEMPER: This is true. 603 is just
21 full of high-level, grandiose --

22 CHAIRMAN BROWN: They are really high-
23 level --

24 MR. KEMPER: -- that don't say much at
25 all, and you're right.

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1 MEMBER BLEY: It's not guidance.

2 MR. NGUYEN: And I know, and I tried to
3 follow up and --

4 CHAIRMAN BROWN: No, I want to -- wait,
5 there's a -- we will take the break and we will come
6 back and finish this discussion. We will take a 15-
7 minute break right now and reconvene at 10:28. How
8 about 10:30. Okay.

9 (Whereupon, the above-entitled matter went
10 off the record at 10:13 a.m. and resumed at 10:33
11 a.m.)

12 CHAIRMAN BROWN: The meeting will come
13 back into session.

14 Khoi, we interrupted you as you wanted to
15 make a point, so if you could summarize what point you
16 were going to make and why.

17 MR. NGUYEN: Not a summary. Some
18 regulations.

19 CHAIRMAN BROWN: Well, go back and state
20 your point.

21 MR. NGUYEN: Yes. I just try to follow up
22 on Bill Kemper and the other person on the point that
23 why the Reg Guide, the last -- the paragraph on bottom
24 of page three you point out, you mentioned respond
25 time in terminology in the --

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1 CHAIRMAN BROWN: Yes, the time available
2 to the operator --

3 MR. NGUYEN: Okay.

4 CHAIRMAN BROWN: -- to analyze. That --
5 if you'll look at the terminology in the ACRS letter,
6 and in ISG Section -- -05, Section 3, and in the
7 Appendix, it's time required for the operator to act
8 based on HFE analysis and the protection -- and that's
9 what you're talking about, the operator to analyze and
10 respond.

11 So, we just need consistent terminology
12 between the documents in terms of time required, time
13 available. That's all. And the terms need to be
14 defined.

15 MR. NGUYEN: That's all? That's all your
16 concern and --

17 CHAIRMAN BROWN: That's -- well, that's
18 not my only concern. Okay.

19 MR. NGUYEN: I just agree to come back to
20 --

21 CHAIRMAN BROWN: Okay. And you only
22 addressed one of the --

23 MR. NGUYEN: -- clarify --

24 CHAIRMAN BROWN: And you only addressed
25 really one. And I'm not saying you want to set the

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1 metric here, but if you're going to talk about, if
2 you're subject to consideration of, it needs to be
3 more than just the time available -- time required for
4 the operator to respond. It needs to be consistent
5 with the time available, based on accomplishing --
6 needed to accomplish the desired protection or safety
7 function, whatever you're doing.

8 And so, the point being is that the time
9 available, time required type functions, the
10 terminology ought to be fine since they're consistent
11 in all the documents.

12 That's a different -- you know, it's a --
13 I call that somewhat editorial, but --

14 MR. NGUYEN: I take action to come back to
15 clarify the terminology on the time available and time
16 required in Reg Guide.

17 CHAIRMAN BROWN: It's in the Appendix, so
18 if you use something to -- if you use those words, you
19 know, out of the new Appendix or ISG-05, Section 3,
20 whatever it is, they are all -- those are all
21 consistent.

22 MR. NGUYEN: Okay.

23 CHAIRMAN BROWN: Relative to -- if you're
24 going to have manual controls, they are based on the
25 time available for -- to take the action necessary to

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1 protect whatever function you're trying to do and then
2 the time required for the operator to respond based on
3 the HFE.

4 Time available is based on BTP 7-19
5 analyses, the realistic assumptions, et cetera, and
6 the time required is based on HFE, expert elicitation,
7 simulators, walk-throughs, whatever they happen to be,
8 plus a subsequent analysis.

9 MR. NGUYEN: Well, I tried to point out
10 the difference between this -- the scope of this Reg
11 Guide and ISG-2, ISG-5 and corresponding Appendix 18-
12 A.

13 The Reg Guide 1.62 focused on design and
14 installation guidance for manual initiation of
15 protective action. Once you decide you need the
16 manual initiation of protective action, you need to
17 follow this guidance.

18 These other documents, ISG-2, ISG-5 --

19 CHAIRMAN BROWN: You ought to say that.

20 MR. NGUYEN: ISG-5.

21 CHAIRMAN BROWN: You're saying -- you
22 ought to say that. I know what you're talking about,
23 because that's one of the first notes I made was that
24 the original version of the 1.62 really focused on
25 just telling people how to design the manual

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1 functions.

2 That's effectively what it is. And what
3 you've done is try to expand that to cover digital I&C
4 systems and how do you -- you know, how do you
5 incorporate that thought process into the digital I&C
6 systems. That's --

7 MR. NGUYEN: Well --

8 CHAIRMAN BROWN: -- except you threw this
9 other stuff in.

10 MR. NGUYEN: For ISG-5 or the HFE analysis
11 process to determine if manual initiation can be
12 created, or the automatic manual -- automatic action
13 required it.

14 That's a different process.

15 CHAIRMAN BROWN: I agree. We're all on
16 the same page. It's just that you -- but you discuss
17 part of it, Khoi. You discuss -- you talk about it a
18 little bit, but you don't talk about it enough, and
19 you don't --

20 MR. NGUYEN: Because that --

21 CHAIRMAN BROWN: Let me finish. Let me
22 finish. And you don't say because you've got this in
23 there, you don't say this, our Reg Guide is -- you
24 actually say, "This Reg Guide provides an acceptable
25 method for establishing the design criteria for

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1 digital and advanced analog systems for the manual
2 initiation of protection actions."

3 You don't say it's not -- you address
4 these other issues, and then you don't say, "Our
5 intent is not, in this Reg Guide, to define when these
6 are acceptable approaches."

7 You're not trying to set the metric for
8 the delta between time available and time required in
9 this, although I had that written, why didn't you.
10 But the terminology, when you start talking about it
11 ought to be the same and say that's addressed
12 somewhere else. That's all. Just so it's clear --

13 MR. NGUYEN: Okay.

14 CHAIRMAN BROWN: -- what this Reg Guide is
15 doing, as opposed to -- I don't want to make --
16 encumber this any more than what it is. And my
17 problem with it is that it gives the impression that
18 it gives you some guidance when it's not. That's all,
19 relative to these other --

20 MR. JACKSON: Is that what you're saying,
21 we just need to clarify -- make clear what the scope
22 is --

23 CHAIRMAN BROWN: Yes. That's right. In
24 the discussion part of it. That's fundamentally from
25 -- so that now we will have a consistent set of

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1 terminology relative to this and what it means
2 relative to the other documents that are going to
3 actually do the other analysis. That's all.

4 MR. NGUYEN: Okay. I will clarify that to
5 determine if we need to include time available and
6 time required in the Reg Guide.

7 CHAIRMAN BROWN: And your intent and
8 clarify your intent on -- that this is only to do the
9 design parts, the hardware. How do you design these
10 functions and where do they come in? It's --

11 MR. NGUYEN: Because the one thing I need
12 to point out is the section you point out, besides 603
13 requirements for manual initiation. In 603, it
14 doesn't specify time available and time required. It
15 just say time available, and we don't want to go --
16 exceed the, you know, what the 603 intended.

17 CHAIRMAN BROWN: Put it up in the upper
18 part when it's not under 1. I don't know where you
19 put it. Okay. I'll let you figure out how to get
20 that clarified. I'm not trying to tell you how to
21 write it, just how to make sure it's clear as to what
22 the intent is.

23 MR. NGUYEN: To me, when the ISG-05 used
24 both terms in the HFE analysis to determine if, you
25 know, the manual initiation can be created, but this

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1 Reg Guide doesn't, you know, try to determine if the
2 manual initiation to be created or not.

3 When you decide manual initiation is
4 required, you follow these guidance. So, we -- I
5 don't think -- I don't know if we need to, you know,
6 cite both time required and time available as a factor
7 to -- for the HFE analysis to use to determine it or
8 not.

9 MR. JACKSON: I think we understand the
10 concern in your comment, so we'll take that back with
11 us.

12 CHAIRMAN BROWN: Okay.

13 MEMBER BLEY: Since you raised -- we're
14 talking about scope. Is it okay if I bring up John's
15 comment now?

16 CHAIRMAN BROWN: Oh, yes. Oh, the RTNSS
17 stuff?

18 MEMBER BLEY: Yes.

19 CHAIRMAN BROWN: Yes, I was --

20 MEMBER BLEY: This guidance applies to
21 safety systems. Is there -- will there be, or have
22 you thought about what guidance there will be for
23 manual actions of systems or functions for new
24 reactors that are classed as RTNSS systems, things
25 that are important to safety, but not right away.

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1 They occur 72 hours later or something of
2 that order, but they aren't safety systems. Is it
3 likely this will apply to some of those or will there
4 be other guidance?

5 MR. NGUYEN: Let me try this, and then you
6 -- you support me on this. This Reg Guide only apply
7 to protective action. This include RPS, SFAS, and I
8 don't think those systems to be classified as a RTNSS.
9 I don't think so.

10 MEMBER APOSTOLAKIS: Say that again.

11 CHAIRMAN BROWN: RTNSS.

12 MEMBER APOSTOLAKIS: Which systems are
13 going to be classified as RTNSS?

14 MR. NGUYEN: RPS and --

15 CHAIRMAN BROWN: No, no. Of course not.

16 MR. NGUYEN: And SFAS tested under the
17 scope of the Reg Guides.

18 MEMBER APOSTOLAKIS: Yes, we understand
19 what the scope of this is, but the question is:
20 Should there be something also about the RTNSS
21 systems, or have you thought about it?

22 MR. NGUYEN: It's not system other than
23 RPS and SFAS. I don't think we need to include it in
24 this Reg Guide.

25 MEMBER BLEY: We're not suggesting you

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1 include it in this Reg Guide. What I was asking is
2 there could be important manual actions for those
3 systems for some of the new reactors. Do you have any
4 idea where guidance will exist to help people deal
5 with that?

6 MR. JACKSON: Yes. Right now there's --
7 this wasn't intended to cover RTNSS, and so far,
8 particularly for the -- when we're talking about
9 actuation of systems and stuff for the passive plants,
10 we didn't address it for the safety systems and for
11 the -- any kind of diverse system that they may have,
12 first actuation system. But we have been addressing
13 for RTNSS type systems.

14 MEMBER BLEY: So nobody's been thinking
15 about what kind of requirements there would be for
16 that?

17 MR. JACKSON: No. And I think, you know,
18 we'd have to look at those words like regulatory -- it
19 would be a different regulatory basis.

20 MEMBER APOSTOLAKIS: Yes.

21 MR. JACKSON: From what we're looking at.

22 MEMBER BLEY: True. That's true. What
23 keeps coming up is -- there's a hole in things when we
24 ask about it.

25 MEMBER APOSTOLAKIS: My first reaction

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1 then, this is all that something like this probably
2 would be too much for RTNSS, probably. I don't know,
3 but because they are not safety systems.

4 MEMBER SIEBER: The RTNSS systems are not
5 intended to satisfy the regulations.

6 MEMBER APOSTOLAKIS: Exactly.

7 MEMBER SIEBER: And so these regulations
8 apply to those systems that are intended to do that.

9 On the other hand, the licensee or an
10 applicant would certainly want the RTNSS systems to
11 work because, in some passive designs what you're
12 inducement -- what the design does is induce a LOCA so
13 that the passive systems will operate.

14 And if I were the owner I would much
15 prefer to use a more appropriate safety system than
16 undergoing that big transient. And so, licensees may
17 believe that it is their -- it would be in their
18 commercial best interest to make the RTNSS systems
19 that have diversity and defense in-depth and make sure
20 they're operable all the time, even though, by law,
21 they would not be required to be.

22 And I don't think you could write that
23 into a regulations, that's just good advice.

24 MEMBER APOSTOLAKIS: Yes. Does anybody
25 remember or -- that's an unfair question -- a design

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1 of RTNSS system where this might apply? If not,
2 that's fine. I mean, it's --

3 MR. EAGLE: Gene Eagle. There are five
4 criteria that you use for the non -- use of non-safety
5 systems to decide if they're going to be -- fall into
6 the RTNSS area.

7 MEMBER APOSTOLAKIS: Yes.

8 MR. EAGLE: I think if we're almost
9 creating a third level of safety -- I mean, a third
10 category of safety -- we have safety and non-safety
11 right now, but we've kind of starting inching toward a
12 third level here by this RTNSS.

13 MEMBER BLEY: Yes.

14 MR. EAGLE: And so -- and what you have to
15 do is go through the analysis, looking at these five
16 criteria, and one of them, for instance, is what kind
17 of manual actions do you need beyond 72 hours, in the
18 case of the passive plants.

19 So you have to look at that and then if
20 those systems, you know, if they meet that, then they
21 have to have extra regulatory scrutiny and some kind
22 of plan to take care of it to help it increase its
23 quality level and its reliability level.

24 As far as how -- that analysis would kind
25 of state -- would kind of put you into that area. I'm

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1 not sure I'm answering your question properly.

2 MEMBER APOSTOLAKIS: I remember -- Jack,
3 maybe you remember, but the regulatory treatment for
4 those systems was fairly mild, but we didn't really
5 impose any serious requirements.

6 CHAIRMAN BROWN: For the RTNSS?

7 MEMBER APOSTOLAKIS: What?

8 CHAIRMAN BROWN: For the RTNSS?

9 MEMBER APOSTOLAKIS: For the RTNSS.

10 CHAIRMAN BROWN: It's still kind of vague,
11 George. There are requirements -- the regulatory
12 treatment is kind of outlined in the DCD, but as these
13 plants get closer it needs to get some more meat on
14 the bones.

15 That's why I brought it up here, but I
16 like your answer. I think that's helpful to us.

17 MEMBER APOSTOLAKIS: They don't take
18 credit, though, for making the regulations. I think
19 what the staff said is, yes, okay, you don't take
20 credit, but we can't have those systems there and do
21 nothing about them, but they impose some, I think,
22 inspection requirements and it was not really
23 something as serious as having a backup within so much
24 time.

25 And so -- and I don't -- but it's worth

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1 investigating.

2 MEMBER BLEY: An area, I think, that
3 hasn't gotten the scrutiny that it will get.

4 MEMBER APOSTOLAKIS: This is the problem
5 that I informed them about. We need people who
6 actually deal with RTNSS, right?

7 MEMBER SIEBER: It comes down to if I have
8 all the 1-A credentials for a piece of equipment, is
9 that going to be more reliable than a piece of
10 equipment from the same manufacturer that doesn't have
11 the paperwork that is operator maintained and tested
12 to the same rigor.

13 And my personal experience is you can make
14 commercial equipment operate well, and all the rest of
15 the system is commercial equipment.

16 MEMBER APOSTOLAKIS: Worse than safety
17 systems -- that doesn't mean they're -- well, --

18 MR. EAGLE: Gene Eagle. Once again I
19 might point out, particularly in a lot of these modern
20 designs where they can take advantage of the digital
21 electronics which are allowed to be able to put --
22 oftentimes, you're dealing with three sensors on the
23 non-safety side.

24 You'll have three sensors, three triple-
25 redundant controllers all looking at three different

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1 sensors with three different transmitters, and they
2 finally come down to a vote.

3 So, you've increased the reliability and
4 one of the, of course, driving functions behind the
5 non-safety systems, in particular the plant investment
6 is the vendor and the utility, particularly the
7 utility wants to be able to keep that plant on line.

8 So it wants the quality and reliability.
9 And, for instance, the feedwater control systems that
10 used to be maybe just one channel, now are about
11 triple-redundant, and they're increasing reliability
12 of these systems.

13 MEMBER SIEBER: And the I&C part of the
14 system is a modest cost compared to the cost of the
15 rest of the system.

16 MEMBER BLEY: Sorry for the interruption.
17 Please go ahead.

18 MR. NGUYEN: That's all right. I'm
19 learning something.

20 MEMBER BLEY: Well, we keep asking, but we
21 haven't found the guy who's in charge of RTNSS yet.

22 MR. NGUYEN: The last time -- the last
23 time you asked me a question, I had no clue what you
24 were talking about.

25 MEMBER APOSTOLAKIS: Somebody from NRO.

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1 Somebody from NRO. I mean.

2 MEMBER BLEY: Probably the NRO, one would
3 think, because that's where they're all going to be.

4 MEMBER SIEBER: Hopefully the guy that's
5 in charge is also in charge of safety culture.

6 MR. NGUYEN: Well, so far I found Reg
7 Guide 1.206, talking about RTNSS. The guidance,
8 again, as you point out is very vague about the
9 criteria.

10 MEMBER APOSTOLAKIS: I'm sure Gary Holahan
11 probably is the guy to go to. He's the director of
12 NRO.

13 MEMBER BLEY: Gary knows it will work. I
14 know that.

15 MEMBER APOSTOLAKIS: Gary will know.

16 MR. NGUYEN: We need more regulatory
17 guidance, you know, the basis for the RTNSS before we
18 go further to, you know, a step --

19 MEMBER APOSTOLAKIS: Anyway, this
20 Regulatory Guide doesn't deal with that, so --

21 MR. NGUYEN: No. So, the next couple of
22 slides we already went through, and I will take action
23 to check on the terminology using in the Reg Guide
24 with regard to available and required time.

25 Any other question on that matter?

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1 CHAIRMAN BROWN: Just one question for the
2 -- you talked about there's certain things you don't
3 put in Reg Guides, and I recognize that 1.62 is
4 strictly the hard -- you know, how do you design the
5 equipment to go do this, how do you interface it, all
6 that type of stuff.

7 How do you intend to wrap up or get out to
8 the industry the translation of that Section 3 in ISG-
9 05 into the appendix to the SRP?

10 Does the industry use the SRP as part of
11 their design or is another Reg Guide --

12 MR. JACKSON: The industry is required to
13 address the criteria in the SRP when it submits an
14 application.

15 CHAIRMAN BROWN: So, by incorporating this
16 -- this methodology for the time available, time
17 required, how you do the analysis, all that type of
18 stuff, you consider, then, the Appendix as the
19 appropriate -- to Chapter 18 is an appropriate way to
20 get this information out to the public for their use,
21 is that the thought process?

22 I'm hypothesizing that based on just
23 reading this stuff.

24 MR. DESAULNIERS: Just -- it's unclear. I
25 was taking some notes and I didn't hear the beginning

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1 of your question.

2 CHAIRMAN BROWN: That's why I don't take
3 notes when I'm talking.

4 MR. DESAULNIERS: It's a danger to take
5 notes of what's going on. I want to make sure I'm
6 answering the question you asked.

7 CHAIRMAN BROWN: I guess -- well, I
8 understand, you know, what 1.62 is supposed to do, is
9 hardware, design the stuff. The issue of how does
10 this -- once we opened up this can of worms of the 30
11 minutes in ISG-2 and got all this push-back, then we
12 expanded it in ISG-05, Section 3 to say here's time
13 available, time required, and went through the stork
14 dance of how you determine, you know, what are the
15 bases for determining things.

16 But now you're taking that, ISG-05 is
17 going to kind of die a slow and painful death,
18 whatever, and it's going to be incorporated as part of
19 the Appendix A in Chapter 18 of the SRP.

20 How -- this is education for me. you've
21 got Reg Guides, you've got NUREGs, you've got the
22 Rules. Now, how -- if this is buried in the SRP for
23 the staff when they get a -- get an application or a
24 design change in, and they're going to review it
25 according to this, is now this 4,200-page document of

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1 the SRP, does that reside with industry as well? Do
2 they know --

3 MR. DESAULNIERS: Yes.

4 CHAIRMAN BROWN: So they use that as part
5 of their design process as well?

6 MR. DESAULNIERS: Yes.

7 CHAIRMAN BROWN: That's a very clear
8 answer.

9 MR. DESAULNIERS: It's a guidance
10 document. It's guidance for the staff for conducting
11 their review, but --

12 CHAIRMAN BROWN: All right. That point I
13 got.

14 MR. DESAULNIERS: It is -- but, you know,
15 our experience is that the applicants are very much
16 aware of that guidance and recognize that it
17 facilitates the review of their submittal if they
18 provide their application --

19 CHAIRMAN BROWN: I just don't like to have
20 surprises. That's all. I mean, I didn't like to have
21 people that I had building stuff for me have a
22 surprise that I was going to review it a basis other
23 than what their specifications says, but with more,
24 you know, elaboration on it. So, that's why I asked
25 the question.

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1 MR. KEMPER: Okay.

2 CHAIRMAN BROWN: Okay. Thank you. As
3 long as we get to deal with Appendix A at some point,
4 that will be even more fun.

5 Okay. Thank you, Khoi. I apologize.

6 MR. NGUYEN: Okay. Now we move to the
7 public comment, and resolutions.

8 We receive a lot of comments from the
9 industry and more than half of them identical, so we
10 try to highlight the major comments here.

11 There first one was the draft guide
12 incorrectly combine BRP 7-19 guidance and manual
13 control of source safety equipment, and we agree that
14 -- the staff agrees that that's caused the confusion
15 to the reader.

16 So, we -- in the revision of the draft we
17 separate IEEE 603 requirements and BTP 7-19 guidance.

18 We divided it into three parts. The first part we
19 address the requirements of the 603 -- actually 603-
20 1991 requirements.

21 The second part is to address the guidance
22 of BTP 7-19, and the third part we offer the option
23 for licensee applicant to combine those two into
24 single safety-related --

25 CHAIRMAN BROWN: So those were Positions 3

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1 and 7 and 8.

2 MR. NGUYEN: Seven. Seven was for the BTP
3 -- from 1 to 6 for 603. Seven for BTP 7-19.

4 CHAIRMAN BROWN: Okay.

5 MR. NGUYEN: And eight is an option.

6 CHAIRMAN BROWN: Okay. Well, a lot of the
7 1 through 6 are just carryovers from 2-79. They just
8 happened to be common. They are consistent with 603.

9 MR. NGUYEN: Yes.

10 CHAIRMAN BROWN: Okay.

11 MR. NGUYEN: And seven --

12 CHAIRMAN BROWN: Seven is the BTP 7-19.

13 MR. NGUYEN: That's correct. That's a new
14 Position, and 8 also is a new Position, which offer
15 the optional --

16 CHAIRMAN BROWN: Okay.

17 MR. NGUYEN: Any questions on this
18 comment?

19 The second comment was what is the reason
20 for requiring specific manual action time for 30
21 minutes?

22 It is D3 and ISG and the reasoning was
23 unknown, associated with the software common cause
24 failure. The resolution was the staff agrees to
25 remove the minutes reference in -- in the Reg Guide as

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1 the 30 minutes criteria is primarily an HFE review
2 criteria.

3 The next comment was the draft guide
4 discussed postulated software common cause failure
5 which is beyond design basis event. The common cause
6 failure discussed and should be ignored.

7 MEMBER APOSTOLAKIS: I would, you know,
8 back in the 15, the second resolution, I would just
9 put a period after "reference," as the 30-minute
10 criteria is primarily an HFE review criteria, I don't
11 know, but that's -- that's nit-picking.

12 MR. NGUYEN: Okay. I will fix that.

13 Any other comments?

14 CHAIRMAN BROWN: I presume that that's
15 going to -- you're going to revise the public comment
16 resolution to do what he just said?

17 MEMBER APOSTOLAKIS: Yes. I mean, the
18 resolution is ours.

19 CHAIRMAN BROWN: Yes.

20 MEMBER APOSTOLAKIS: So, I would say put a
21 period there and forget about what --

22 MR. NGUYEN: Well, not exactly the respond
23 to the comment.

24 MEMBER APOSTOLAKIS: Well, but you get my
25 point.

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1 MR. NGUYEN: Yes. As a three --

2 MEMBER APOSTOLAKIS: All right. You don't
3 need to elaborate on what 30 minutes does in HFE.

4 MR. NGUYEN: Okay.

5 MEMBER APOSTOLAKIS: In fact, I don't
6 know. Dennis, is that their standard criteria in
7 Human Factor evaluations, 30 minutes? I don't think
8 so.

9 MEMBER BLEY: It's cropped up here and
10 there. Thirty minutes and ten minutes have cropped up
11 here and there and we just --

12 MEMBER APOSTOLAKIS: So just drop the last
13 sentence -

14 MR. NGUYEN: Okay.

15 CHAIRMAN BROWN: Well, the public comments
16 at one point made a statement there was an ANCI
17 standard that used five to ten minutes for AOOs and 20
18 to 30 minutes for design basis events or something
19 like that. So, that's in an ANCI standard.

20 I don't know if that's invoked by
21 anything, but that's -- that's what --

22 MEMBER APOSTOLAKIS: You don't get into
23 that.

24 CHAIRMAN BROWN: You don't need to say
25 why, once -- if you're going to remove it, just remove

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1 it.

2 MEMBER APOSTOLAKIS: Remove it.

3 CHAIRMAN BROWN: Just agree. So, the
4 resolution ought to reflect a simpler response.
5 That's all.

6 MEMBER APOSTOLAKIS: Yes.

7 MR. NGUYEN: Yes, as I tried to explain
8 why we removed it to you.

9 The resolution for the next comment was
10 that staff disagree with the comment. The reason was
11 with many nuclear power plants planning digital
12 operations, addressing diversity with respect manual
13 controls for computer-based protective action to
14 reduce licensing uncertainties is appropriate and
15 necessary.

16 Any questions on this?

17 The next one is also the last comment I
18 highlighted here.

19 MEMBER BLEY: Did you -- that first
20 comment, many times, or was that a one-shot thing?

21 MR. NGUYEN: The first one?

22 MEMBER BLEY: Yes.

23 MR. NGUYEN: A lot.

24 MEMBER BLEY: A lot.

25 MR. NGUYEN: So, a lot -- in different

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1 language, but pointing to one same question and
2 concern was the previous version of the Reg Guide only
3 address 603. Why, you know, talking about 7-19 here,
4 but we -- so we compressed these comments into these
5 four comments.

6 MEMBER BLEY: I was just curious about
7 that one.

8 MR. NGUYEN: Okay.

9 MEMBER BLEY: Go ahead.

10 MR. NGUYEN: Okay. The last one was is
11 the NRC requiring component-level controls for the
12 completion of the core safety functions, and to
13 increase reliability beyond IEEE 603.

14 And the resolution was the staff agrees to
15 remove the guidance associated with component-level
16 manual control.

17 We thought that's a good practice to have
18 the manual -- the component-level manual control, but
19 we don't have basis to regular and it's -- I think we
20 agree with the industry. It will require a lot of
21 effort to upgrade the requirement to component level.

22 CHAIRMAN BROWN: So, in these plant
23 designs, I mean, I'm just going from my past
24 experience, okay, in the naval applications, I can go
25 down, stand right by the pump or whatever it is, and I

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1 can operate it independent of any other automatic
2 controls or any other -- I can just manually go turn
3 it on or off.

4 That's a naval ship. It's not a
5 commercial --

6 MEMBER SIEBER: You've got a big crew.

7 CHAIRMAN BROWN: We have a big crew, I
8 agree. We try to reduce it some, but --

9 MEMBER SIEBER: -- together.

10 CHAIRMAN BROWN: -- we do have folks in
11 the machinery spaces. I always thought it was a good
12 idea to be able to go down and turn something on and
13 off, but I was a little surprised when I keep hearing
14 that there are no -- there's no requirement like that.

15 There's no rule that addresses local component-level
16 controls. So, I just shut up on that.

17 MEMBER BLEY: Well, we saw one -- I don't
18 remember which design it is, in which the integrated
19 digital I&C system was set up such that you couldn't
20 locally -- and that doesn't mean at the pump, but at a
21 motor control center or something like that, you
22 couldn't operate the pump, that you had to do it
23 through the I&C system.

24 That was unusual and that one has worried
25 me a big, almost every one I'm familiar with in the

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1 other designs we've seen, you can go to a panel and
2 manually start the pump, except for that one that's in
3 the design cert process, and I forget which one that
4 is.

5 MEMBER SIEBER: Go get them.

6 MEMBER BLEY: That just didn't seem
7 sensible. And I guess I'm not quite sure what your --
8 I didn't look at the red line -- what your previous
9 draft had said and why this is so onerous to be able
10 to turn something on and off.

11 MR. NGUYEN: We not requiring the manual
12 control at the component level, but we, in the
13 previous draft, we required the safety classification
14 requirement for component level. It's not control,
15 but classification. All the requirements,
16 independent, single failure criteria, environment --

17 MEMBER BLEY: Oh, okay. Thank you.

18 MR. NGUYEN: -- qualification, all those
19 requirements were safety-related.

20 We would like to have it for component
21 level, not the component-level manual controls, so in
22 the previous Reg -- I don't know --

23 CHAIRMAN BROWN: The D3 and all of that
24 would have been --

25 MR. NGUYEN: Right.

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1 CHAIRMAN BROWN: -- I can understand that.

2 MR. NGUYEN: But we agree, that's too
3 much, and -- to upgrade all the systems to have all
4 the components to be safety-related, so we --

5 CHAIRMAN BROWN: Well, you said you
6 weren't going to back-fit this, anyway. You're not
7 intending to -- the plants that exist don't have to
8 follow this, from what I gathered from the last, under
9 implementation, isn't that correct?

10 MR. NGUYEN: You're correct.

11 MR. JACKSON: You're talking about the Reg
12 Guide?

13 CHAIRMAN BROWN: Yes.

14 MR. JACKSON: Yes. The new draft Reg
15 Guide comes out and the plant's already committed to
16 the older version --

17 CHAIRMAN BROWN: Yes, I mean, you did the
18 smart thing. You said you're not -- you don't --
19 unless you change something. Does this apply to
20 change --

21 MR. NGUYEN: Right.

22 CHAIRMAN BROWN: Okay.

23 MR. NGUYEN: If you decide to upgrade it
24 to digital and then you have to follow this.

25 CHAIRMAN BROWN: What if you decide to

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1 upgrade it to a different analog design?

2 MR. NGUYEN: If it match one-by-one, then
3 you don't have to do anything.

4 MR. JACKSON: It may not --

5 MEMBER SIEBER: Implementation.

6 CHAIRMAN BROWN: Yes. I was in the
7 implementation, and that's -- what he was commenting,
8 they didn't want them to have to -- the plants to
9 have to go out and do something and use the word
10 "back-fit." So I just wanted to make sure that there
11 wasn't some other nuance that I had missed in here
12 because I thought, you know, there --

13 MR. NGUYEN: Okay. Sorry, I
14 misinterpreted -- there's no back-fit with regard to
15 this Reg Guide.

16 CHAIRMAN BROWN: Okay.

17 MR. NGUYEN: Okay.

18 MEMBER SIEBER: Well, if we're talking
19 about implementation, there is a -- in the second
20 paragraph, Section D of the strike-out, red line copy.

21 The second paragraph, first line, the word
22 -- the second time the word "or" is used, I think
23 should be "to."

24 CHAIRMAN BROWN: Where are you?

25 MS. ANTONESCU: The implementation

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1 section.

2 CHAIRMAN BROWN: In the implementation
3 section.

4 MEMBER SIEBER: Implementation, second
5 paragraph, starts, "In some cases applicants or
6 licensees may propose." And it says "or use." I
7 think it should be "proposed to use."

8 In other words, you propose it or you just
9 say I'm going to use it, the hell with you guys, and I
10 think it should be in the form of proposal in all
11 cases.

12 MR. JACKSON: You know, it's a good
13 comment.

14 MR. NGUYEN: Okay.

15 CHAIRMAN BROWN: Change "or" to "to,"
16 right?

17 MEMBER SIEBER: Right.

18 MR. NGUYEN: Thank you.

19 MEMBER SIEBER: That's a two-letter
20 correction, but --

21 CHAIRMAN BROWN: Well, it doesn't change
22 the length of the sentence, either, so --

23 MEMBER SIEBER: It does change the --
24 changes the meaning.

25 CHAIRMAN BROWN: Changes the meaning a

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1 lot, yes. Absolutely.

2 Any other comments from the members right
3 now? There were a couple of folks that indicated
4 they'd like to make a comment, so I will take this
5 opportunity.

6 Since you ask me first, would you like to
7 go first?

8 MR. SCAROLA: I would love to go. Thank
9 you. It's Ken Scarola. I'm with Nuclear Automation
10 Engineering and I represent Mitsubishi Heavy
11 Industries.

12 I'd like to make a comment about the
13 requirement of system-level actuation in IEEE 279
14 versus division-level actuation, which is in 603 and
15 now reinforced through this Reg Guide.

16 And I have my notes, so bear with me. I
17 want to be brief.

18 Both IEEE 279 and 603 require a minimum
19 number of operator manipulations and they require
20 consideration of spurious actuation. In operating
21 plants today that were licensed to 279, many plants
22 meet this by having four buttons. You hit any two out
23 of the four and you actuate all divisions.

24 So, the nice thing about this is if you
25 get a button failure, a button shorts, there's no

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1 spurious actuation. Or if a button fails open it
2 doesn't stop you from actuating all divisions.

3 MEMBER SIEBER: Right.

4 MR. SCAROLA: And regardless of the number
5 of divisions, you hit any two buttons, you actuate all
6 divisions. So, if you have a two-train system, you
7 actuate two trains. If you have a four-train system,
8 you actuate four trains.

9 MEMBER SIEBER: Right.

10 MR. SCAROLA: If you imposes and strictly
11 enforce division-level actuation, in these new
12 advanced plants where we have four trains, it means
13 you have at least four buttons.

14 MEMBER SIEBER: Or 16.

15 MR. SCAROLA: That operators have to hit.
16 And if you worry about spurious actuation, then every
17 division needs two buttons.

18 MEMBER SIEBER: Right.

19 MR. SCAROLA: So now you need eight
20 buttons for a four-division system. So, this idea of
21 a division-level actuation really complicates the
22 Human Factors aspect of it.

23 MEMBER SIEBER: Yes.

24 MR. SCAROLA: Now, you know, I can
25 understand that there's a balance between minimum

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1 number of operator manipulations and backup
2 reliability, but it's important to understand that the
3 manual initiation required by 603 is initiation. It's
4 not actuation.

5 So, much of the manual function relies on
6 the same software as the automated systems. The
7 purpose of the manual function was to give the
8 operators the ability for anticipatory actions.

9 They can manually initiate something. It
10 was not really intended as a backup function because
11 it is really not an independent backup. A lot of it
12 goes through the same software.

13 And since we have BTP 7-19 that now truly
14 requires a manual backup that is completely
15 independent of the software, we really ought to look
16 at this balance and allow system-level actuation for
17 603 as opposed to division-level actuation.

18 So, I would simply request that the Human
19 Factors engineering branch weigh in on this issue of
20 the balance between complicating manual actions versus
21 adding this, what you think is additional reliability,
22 but I would contend it's really not additional
23 reliability.

24 MEMBER APOSTOLAKIS: That's why I asked
25 that question earlier this morning, whether the

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1 industry had any comments on this, and you said no.

2 I thought the industry would object.

3 MR. NGUYEN: Object on --

4 MEMBER APOSTOLAKIS: Yes, to go to the
5 division level, because then you have all these
6 complications. But evidently they did not.

7 MR. SCAROLA: No, in our comments we did
8 object about --

9 MEMBER APOSTOLAKIS: Really?

10 MR. NGUYEN: Well, the -- you -- what
11 comment you refer to?

12 MR. SCAROLA: There are comments where we
13 said that you should not impose division-level
14 actuation requirements, that the system-level
15 actuation requirement is sufficient.

16 MR. NGUYEN: I remember, it was the
17 comments. Mixing the operation and design together
18 from minimum operator manual manipulation with minimum
19 requirements of equipment.

20 MEMBER APOSTOLAKIS: No. What you said
21 that the Regulatory Guide went to division rather than
22 system level. I asked if anybody objected to that.
23 And I thought the answer was no, but now it appears
24 that there is an objection.

25 MR. NGUYEN: Yes. If I say so, that's my

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1 fault.

2 MEMBER APOSTOLAKIS: These kinds of
3 objections from the industry --

4 CHAIRMAN BROWN: If you -- just as a
5 counter point, okay, not an objection, but just
6 another point is if the words are only saying system
7 level, it could end up not having a configuration such
8 as Ken referred, in terms of -- he said some people
9 actually implemented with, say, four buttons.

10 You punch any two and therefore all of
11 them actuate. It doesn't have to be done that way.
12 There's no requirement to do it that way. That would
13 be a good way to do it, but they could have one button
14 imitation.

15 So, the -- I understand the point. I
16 don't disagree with it. I don't know how to put the
17 two together, because obviously, you know, using the
18 two out of the four and having them initiate, well,
19 it's a good idea.

20 But yet, if somebody doesn't design it in
21 a manner to do that, and now you end up with a single
22 function initiating all of them, there's nobody that
23 can say no.

24 MR. SCAROLA: Well, Charlie, that's not
25 really the case, though, because you still have to

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1 meet the single failure criteria.

2 MEMBER SIEBER: Right.

3 MR. SCAROLA: So you can't do it with only
4 one button, because if you have one button and a
5 single failure, then there's no ability for manual
6 actuation.

7 MEMBER SIEBER: Very true.

8 MR. SCAROLA: So you have to have at least
9 two.

10 CHAIRMAN BROWN: Two.

11 MEMBER SIEBER: And there's two failure --

12 MR. SCAROLA: And the problem with two --
13 well, if you have two, you can still get spurious
14 actuation.

15 MEMBER SIEBER: Right.

16 MR. SCAROLA: So that's why you have ended
17 up going to more.

18 MEMBER APOSTOLAKIS: Does the single-
19 failure criterion apply to this --

20 CHAIRMAN BROWN: To manual operation?

21 MEMBER APOSTOLAKIS: Yes.

22 MR. SCAROLA: Yes. It does.

23 CHAIRMAN BROWN: According to --

24 MR. SCAROLA: According to 603, you have
25 to be able to manually actuate with a single failure.

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1 MEMBER SIEBER: Right.

2 MR. SCAROLA: Now, if you do it on a
3 division basis then, of course, if you have a single
4 failure of a division you have the other divisions.
5 But if you did it on a system-level basis with
6 multiple buttons and voting logic, you can still meet
7 the same failure criteria.

8 And the advantage is you can prevent
9 spurious actuations as well, because if you do
10 everything by division with single buttons, then you
11 leave yourself open to spurious actuations.

12 MEMBER SIEBER: Or use all your fingers.

13 MR. SCAROLA: Or you -- or you have more
14 buttons.

15 MEMBER BLEY: Simplicity of operation.

16 MR. SCAROLA: And use a lot of fingers.

17 MEMBER APOSTOLAKIS: So what is the
18 staff's position? I mean, you obviously didn't agree.

19 MR. JACKSON: Well, we've seen -- we've
20 seen designs that have -- do it both ways. We've seen
21 it where they have -- on a division level they've got
22 a button, hit that button and it actuates for that
23 division.

24 So, if you've got a reactor trip you need
25 two out of four, you hit one button it won't give you

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1 a trip. You've got to hit at least two. And because
2 they've got four then that takes care of single
3 failure, and it takes care of independence.

4 On a system level, we've seen it where at
5 system level and you've got more than one button in
6 the control room, and you can hit it and that would
7 give you -- it would actuate all divisions from that
8 button, but they have to be able to address single
9 failure, so you've got more than one button, and they
10 also have to address independence, which is the
11 electrical isolation aspect between divisions.

12 MEMBER SIEBER: And since there's two
13 failure modes, that's what makes for four buttons.

14 MR. JACKSON: So, we'll evaluate it either
15 way. I mean, there's two different ways we could
16 attack the problem.

17 MEMBER SIEBER: So you would --

18 MR. SCAROLA: I'd like to point out one
19 more thing. 603 has been around, as you know, since
20 1991. There were designs certified, System 80 Plus, I
21 believe, ABWR as well, that used system-level
22 actuation, did not use division-level actuation.

23 And I realize that's not in strict
24 adherence with the words in 603, but the staff did
25 accept it at that time as an acceptable interpretation

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1 of meeting the intent of leading single-failure,
2 preventing spurious actuation and achieving minimum
3 manual manipulations.

4 So, it's not in strict compliance, but it
5 certainly was certified.

6 MEMBER SIEBER: But that's not -- now that
7 we're in the process of drafting these documents it
8 would be better to deal with that in the document,
9 rather than have the staff take an exception to them.

10 MR. SCAROLA: Well, the problem is, at
11 least before we had 603 that said division level, and
12 1.62 that said system level.

13 MEMBER SIEBER: Right.

14 MR. SCAROLA: So we could kind of make an
15 argument, look, --

16 MEMBER SIEBER: Right.

17 MR. SCAROLA: -- we can do it. But now,
18 if you eliminate system level from 1.62 and make it
19 strictly division level in both places, it makes it
20 much more difficult for a supplier to come in with an
21 alternate design.

22 CHAIRMAN BROWN: It was ambiguous.

23 MR. SCAROLA: Right. Before it was
24 ambiguous --

25 CHAIRMAN BROWN: So they presented more

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1 ambiguity and do what they wanted.

2 MR. SCAROLA: Well, let's bring in
3 something that had a basis --

4 CHAIRMAN BROWN: No, no. I'm not arguing
5 that that's good or bad. I'm just saying it was
6 ambiguous and it allowed you to make a judgment.

7 MR. NGUYEN: This may complicate, cost you
8 more to implement the division level, but 603s been
9 there for -- for a long time. And the design of your
10 plan or your design must be complied with 603.

11 We don't create the new rules or new, you
12 know, guidance here. We just, you know, make the
13 consistent between the Guidance and 603, that's all.

14 The previous version has not been updated
15 since '73, and it's associated with 279, and now we
16 endorse 603. Why should we use system level in, and
17 that will be the inconsistent between the Reg Guide
18 and 603.

19 CHAIRMAN BROWN: Well, on the division
20 level, doesn't -- don't you still have to meet -- you
21 still have to meet the single failure.

22 MR. NGUYEN: For the single failure
23 criteria.

24 CHAIRMAN BROWN: And you have to meet your
25 spurious -- you don't want to spuriously have

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1 evacuate, correct?

2 MR. NGUYEN: Yes.

3 CHAIRMAN BROWN: I mean, regardless of the
4 words, you're going to have to meet the same relative
5 criteria and then you also want the minimum number of
6 things the operator has to do to initiate it. So,
7 those kind of three -- there may be another one in
8 there, but that was the one that comes to mind
9 immediately.

10 So, if you do it at the division level,
11 you're still going to have to have some means to
12 prevent a guy from inadvertently doing one thing and
13 manually initiating a safety train or safety division
14 protection from operating, is that correct?

15 MR. JACKSON: Well, I think the spurious
16 actuation is probably more geared towards the hardware
17 issue versus the human.

18 CHAIRMAN BROWN: Well, you do a lot of
19 things that make people do something twice before they
20 -- before something happens, if it's critical enough.

21 MR. JACKSON: Right. I guess our
22 viewpoint on this system level and the division level
23 is that if you did it system level you could -- you
24 could meet the division level requirement because
25 you're -- instead of just initiating one division at

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1 one time, you're initiating four divisions at one
2 time.

3 So, it's a matter of being able to
4 demonstrate the single-failure protection and the
5 independence capability of doing it at the system
6 level actuation, versus the division level.

7 CHAIRMAN BROWN: So if that's the real
8 requirement, why do we even draw the distinction? Why
9 not stick with that as the requirement?

10 MEMBER BLEY: It is.

11 MR. JACKSON: Well, it was in 603.

12 CHAIRMAN BROWN: 603 is division level,
13 and that's in the Rule.

14 MR. SCAROLA: Yes, but I think what I'm
15 hearing Terry say, and I agree with him, the staff's
16 interpretation was that if you actuate it at the
17 system level and that actuated all divisions, then you
18 met the 603 requirement.

19 I think the problem now is you're adding
20 now -- and those words would be very good to put in
21 1.62, if that's the staff's interpretation.

22 I think the problem we have now is you're
23 writing words that simply reinforce division level
24 without this qualifier that system-level actuation of
25 multiple divisions is also acceptable.

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1 So, I think if we could get what you just
2 said into 1.62, it would be very helpful.

3 MEMBER SIEBER: Yes, and I don't see a
4 downside to that, either.

5 MEMBER BLEY: I'm just curious. Dave
6 hasn't said anything. Has the Human Factor side
7 thought about this aspect of it?

8 MR. DESAULNIERS: Yes.

9 MEMBER BLEY: Do you have any comment on
10 it? If no, don't bother, but --

11 MR. DESAULNIERS: No comment.

12 CHAIRMAN BROWN: I would --

13 MEMBER SIEBER: How many buttons can you
14 push at one time?

15 CHAIRMAN BROWN: But so we can get on --
16 so we can get on, but if -- I think we've heard this
17 stuff.

18 I would suggest -- and Terry, Khoi, that
19 this is going to come up in the full committee. I
20 would suggest you have part of the presentation in the
21 full committee meeting to address this.

22 I mean, there are some things that don't
23 have to be -- that can be -- I don't want to say it
24 can be addressed quickly relative to the changes to
25 1.62, but obviously I think this one is probably going

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1 to -- I don't want to try to resolve it right now, but
2 I think you ought to address it at the full committee
3 meeting and what -- there's the suggestion that you
4 revise 1.62 Rev. 1 to provide this nuance comment that
5 you just made that you can solve it at the system
6 level, and that meets it as -- that can solve it as
7 well, as long as you take care of single-failure
8 minimum operation, spurious action, blah, blah, blah.

9 MR. NGUYEN: Okay.

10 MR. JACKSON: Yes, I think we understand -

11 -

12 CHAIRMAN BROWN: Okay. So, that would be
13 a good thing to include and maybe even have it revised
14 by the time you get to the full committee with what
15 you're proposing. The way to address it is --

16 MR. JACKSON: There's two more.

17 CHAIRMAN BROWN: Yes, I know. I'll get
18 everybody. He was second. Are we done with this one?
19 Are there any more questions on this one?

20 MR. SMALL: Well, I hate to belabor that
21 point, but --

22 CHAIRMAN BROWN: You should use move.
23 You've got to use the mic and tell us who you are,
24 please.

25 MR. SMALL: Shelby Small with AREVA. And

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1 there are some nuances that weren't discussed related
2 to this division versus system level topic.

3 If you look at -- I know that EPR is on
4 well. If you look at, for example, a main steam
5 isolation valve in the EPR design, in order to close
6 one main steam isolation valve as a protective action,
7 it requires four divisions of the protection system to
8 actuate.

9 It's a two out of four mechanical voting
10 at -- at the valve to close the main steam isolation
11 valve. So, if I strictly implement division level
12 actuation and I press one division, which 603 defines
13 as an electrical division, which corresponds to one
14 division of the protection system, I will not close
15 the main steam isolation valve.

16 I will actuate one solenoid valve of which
17 you need to actuate two in order to close the main
18 steam isolation valve.

19 CHAIRMAN BROWN: You just said you needed
20 all four --

21 MR. SMALL: Well, --

22 CHAIRMAN BROWN: -- to do it, and now
23 you're saying you just need two of them.

24 MR. SMALL: That's right. So that gets to
25 -- my proposal here is that rather than trying -- in

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1 the guidance, rather than distinguishing between
2 division, system level, there's language in the
3 existing Reg Guide 1.62 that talks about implicating
4 the automatic protection function as closely as
5 practical.

6 And I think that if you don't specify
7 division or system level, and you simply say allow the
8 operator to duplicate the automatic protection
9 function with the minimum of actions, meeting the
10 independence and single-failure criteria, why do we
11 need to get into this division versus system level
12 discussion.

13 And that's what we've done in an RAI
14 response that we provided early on in the EPR project.

15 We were asked, do we provide system or division
16 level, and we said, well, in some cases it's division
17 level where we have four safety trains where each
18 division actuates a safety train.

19 In some cases it's system level where you
20 have multiple divisions that are required to actuate
21 one safety train. So, either way is not an accurate
22 description of what the designs now do.

23 But we said, we'll call it system level
24 because we have to call it something, but what we're
25 going to do is we're going to duplicate the automatic

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1 protection function and allow the operator to take a
2 minimum number of actions and if the protection system
3 automatically actuates all four trains of safety
4 injection at once, then when the operator presses the
5 buttons, it will actuate all four trains of safety
6 injection at once. We're going to duplicate the
7 automatic functionality.

8 So, I think -- I would like, you know, if
9 the staff and the committee could consider maybe in
10 the Guidance, we don't need to make a distinction
11 between division and system level, and let's emphasize
12 duplicating the automatic functionality. I think that
13 makes sense.

14 MR. NGUYEN: Let me try to answer your
15 suggestion. I think the Reg Guides should either
16 specify system or division level. We shouldn't leave
17 it blank because not only manual initiation, what
18 about indication if you don't specify division or
19 system level, how many indications you need in the
20 control room.

21 MR. SMALL: Well, Reg Guide 1.97 and IEEE
22 497 is going to take care of that issue. So --

23 MR. NGUYEN: Well, we need to define at a
24 certain point here. We cannot leave it blank, and you
25 may have one suggestion. Other people say that's a

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1 very, vague scope. We don't know what -- at what
2 level this Reg Guide apply to -- I think we need to
3 define the scope of the Reg Guide, either system or
4 division. We cannot leave it blank.

5 MR. SMALL: Okay. Well, that's -- I mean,
6 that's obviously the staff's choice. I'm just
7 providing the suggestion based on the experience.

8 And we've had a lot of discussions with
9 Terry and his staff on this, and, you know, the
10 division versus system level thing has become an issue
11 for us, and I think we've -- we've dealt with it
12 technically, but going forward -- you know, it's just
13 a suggestion.

14 MR. JACKSON: I think we'll take -- we'll
15 take the comment in consideration as we get back. It
16 will definitely take a little bit of thought on that
17 because of the whole discussion.

18 MR. SMALL: Okay. And that's -- that
19 wasn't what I wanted to talk about actually.

20 So, one of the -- on one of the first
21 slides, I think the staff said that one of the
22 benefits of this new revision was to provide an option
23 for an applicant to satisfy both the 603 requirement
24 for manual system level actuation and the BTP 19.4
25 requirement for system-level actuation through the

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1 same set of controls if they met both requirements.

2 I would like to point out that the 603
3 requirement is for specifically you have to provide
4 manual division-level actuation of all of the
5 automatically-actuated protection functions.

6 The BTP 19, Position 4 requires you to
7 provide system level actuation of the critical safety
8 functions. Critical safety functions is a subset of
9 all of the protective actions.

10 So, if you provided a set of safety-
11 related controls that were diverse from the software-
12 based safety system to actuate the critical safety
13 functions to satisfy BTP 19.4, that set of controls
14 would not include all of the automatically-actuated
15 protective actions.

16 So, there's a distinction that needs to be
17 made there where we're taking these two pieces of
18 different guidance and bringing them together.

19 There are two different requirements as
20 far as the amount of functionality that's required to
21 satisfy each -- each different piece. So, that's a
22 distinction that I think should be addressed in
23 guidance.

24 MEMBER SIEBER: How would you suggest that
25 be remedied?

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1 MR. SMALL: I would suggest that the BTP
2 7-19 guidance is completely left out of Reg Guide
3 1.62. That would be my suggestion, because the intent
4 of Reg Guide 1.62 is to provide guidance for how you
5 can meet the 603 requirements.

6 It has nothing to do with D3. It has
7 nothing to do with beyond design basis events. It
8 provides guidance for how to meet the safety-related
9 requirements of 603.

10 And I -- one of my initial comments back
11 to the NRC on the draft Reg Guide was that I believe
12 it's a mistake to try to combine the two topics.

13 BTP 7-19 guidance is very clear. There's
14 the SECY, there's the BTP 19 guidance, there's ISG-2
15 that clearly state what you need to do in case of a
16 software common-cause failure of your protection
17 system incurred with a design basis event.

18 As Ken pointed out, the 603 controls are
19 not there to be a backup for failure of your safety
20 system. They are there to provide the operator the
21 ability to anticipate when a deviation is occurring
22 and take action before the protection system.

23 So, I think, when you're bringing these
24 two topics together, I think that there are some
25 complications that get introduced.

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1 MR. NGUYEN: Well, in the previous version
2 we sent out for public comment we mixed them together.

3 That caused the confusion, but to eliminate BTP 7-19
4 from the Reg Guide, I don't -- the staff doesn't
5 believe that's a good idea.

6 We should address the common-cause failure
7 for digital I&C equipment, and we should provide
8 guidance for, you know, prevent -- preventing the
9 common-cause failure.

10 MR. SMALL: That's right.

11 MR. NGUYEN: And we don't need another Reg
12 Guide that's talking about different manual
13 initiation. We want to address all manual initiation
14 for protective action under same Reg Guide, and BTP 17
15 become the part of it.

16 MR. SMALL: Right. And my point is that
17 BTP 7-19 does not address manual actuation of
18 protective actions. It requires manual actuation of
19 the critical safety functions. They are two different
20 things.

21 MR. NGUYEN: Well, protective action is --
22 BTP 17, if you'll -- could you clarify me on this --
23 address that one, BTP 7-19, address manual initiation
24 for RPS and SFAS, is that the protective --

25 MR. SMALL: Critical safety functions is

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1 what .4 says. I'll give you an example.

2 In the Chapter 15 analysis for the EPR,
3 the protection system has a safety-related function to
4 isolate main feedwater on a high-steam generator
5 level. Okay. That's a credited function, a
6 protective action performed by the protection system
7 to respond to a Chapter 15 event.

8 However, providing manual isolation of
9 main feedwater is not a critical safety function
10 because it does nothing to remove heat, it does
11 nothing to ensure the containment, it does nothing to
12 control reactivity.

13 So, when I provide a critical safety
14 function at the system level for BTP 19, I provide the
15 operator the ability to actuate emergency feedwater
16 because that removes heat which is a critical safety
17 function.

18 I do not provide a diverse means at the
19 system level to isolate main feedwater. While it is a
20 protective action, it's credited in the Chapter 15
21 analysis, it's not a critical safety function.
22 There's a clear distinction.

23 MR. NGUYEN: I agree with you that BTP 7-
24 19 not only cover the manual initiation for protective
25 action, which call before -- or the -- as well. But

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1 the point we try to narrow the scope of the
2 incorporation of BTP 7-19 into the Reg Guide, the
3 portion of .4 --

4 MR. SMALL: The guidance in D3 is already
5 there. I agree that that the staff needs to provide
6 guidance for diverse manual controls. NUREG 800,
7 Section 7.8, BTP 7-19, SECY 93-087.

8 The industry has all the guidance that we
9 need as far as diverse manual controls in case of a
10 software common-cause failure with a design basis
11 event.

12 What Reg Guide 1.62 deals with is a larger
13 set of manual controls that are required to be safety-
14 related to meet the 603 requirements.

15 MR. NGUYEN: I don't think anything wrong
16 to address both into the Reg Guide, if you agree that
17 BTP 7-19 is a good guidance. Do you? Would you
18 accept BTP 7-19 as a good reg, and why -- what's wrong
19 for bringing this BTP 7-19 into this Reg Guide?

20 MR. SMALL: Because you're confusing --

21 MR. NGUYEN: We did think --

22 MR. SMALL: -- two different regulatory -

23 -

24 MR. NGUYEN: Right, in the previous
25 version I sent out for you to comment. We make a

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1 mistake to not clarify or distinguish two different
2 requirements, one for 603 and one for BTP 7-19. And
3 we admitted that was a mistake, and we try to clarify
4 it and make it clear in the revision of this Reg
5 Guide.

6 But to eliminate it from the Reg Guide, I
7 -- I don't believe that's the good practice. We need
8 to address it.

9 MR. JACKSON: Let me jump in and let the
10 meeting move on. I think we understand the --

11 MR. NGUYEN: Yes.

12 MR. JACKSON: -- we received it -- we
13 received this in the official comment, and we
14 responded. We thought that it was beneficial to
15 address all manual actuation here and so I think we
16 responded, you know, both here and in other forums.

17 MR. SMALL: Yes, I understand. The thing
18 that I would leave you with, and this is the last
19 thing I'll say on this topic, is that what my -- the
20 point that I opened with is that I understand that you
21 did some work to try to separate the two issues within
22 the Reg Guide, and I agree that if both issues are
23 going to be in the Reg Guide they need to be clearly
24 separated. I agree.

25 But one of the things that's still in

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1 there is you provide the applicant the option to
2 satisfy both criteria by providing the same set of
3 manual controls.

4 And what I'm cautioning you with is that
5 if I start with BTP 19 and provide the critical, the
6 manual controls for critical safety functions, that is
7 not all of the controls that are required by 603.

8 MR. JACKSON: I think we understand that.

9 MR. SMALL: Okay. That's -- okay. Thank
10 you.

11 CHAIRMAN BROWN: Okay. Thank you. Is
12 there one other? Okay.

13 MR. BURZYNSKI: My name is Mark Burzynski.
14 I'm with AREVA, and I did want to say that the
15 changes that we saw discussed regarding Position 4 and
16 the inclusion of Position 7 are important changes that
17 address our main concern with the draft document.

18 In particular, the changes would allow us
19 to implement the requirements of Position 2 for
20 cascading control or actuations and auto sequencing in
21 a digital format, eliminating or providing us the
22 opportunity to eliminate the problems associated with
23 wire circuit interactions or the use of relays that
24 sometimes have been proven to be unreliable.

25 And the addition of Position 7 clearly

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1 allows us to address, in a separate manner, the issues
2 associated with digital common-mode failure and
3 provide the appropriate manual actions, and we thought
4 those were important improvements to the draft
5 document we saw. Thank you.

6 MEMBER APOSTOLAKIS: So you just came up
7 here to praise the staff?

8 MR. BURZYNSKI: Yes.

9 (Off the record comments.)

10 MEMBER SIEBER: It's a decoy.

11 MR. BURZYNSKI: It's just part of the
12 holiday season.

13 MR. NGUYEN: Thank you.

14 MEMBER APOSTOLAKIS: Charlie, I think this
15 gentleman wants to --

16 CHAIRMAN BROWN: Good cop/bad cop.

17 MR. SCAROLA: Thank you. Ken Scarola
18 again. I'd like to make a comment to reinforce what
19 Shelby said, but from a different perspective.

20 603 requires manual initiation. The BTP
21 7-19 requires manual actuation. They are two
22 different things. Initiation means I manually start
23 the automated protection actions that would have been
24 started if the protection system saw a sensor
25 condition, low pressure, rising pressure, high steam

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1 generator level.

2 MEMBER SIEBER: Right.

3 MR. SCAROLA: That's manual initiation.

4 MEMBER SIEBER: Right.

5 MR. SCAROLA: When you do manual
6 initiation, you light off a ton of automation and you
7 start sequencing things, multiple systems. That's
8 initiation.

9 MEMBER SIEBER: Right.

10 MR. SCAROLA: BTP 7-19 says manual
11 actuation at the lowest level possible in the system
12 architecture. It means after all the automation.
13 It's totally different.

14 MEMBER SIEBER: Yes.

15 MR. SCAROLA: So, I have to agree with
16 Shelby, we've really got to be careful about how we
17 mix these two in the same document and how we say,
18 well, maybe you can meet both requirements with one
19 set of manual controls.

20 I'd be real cautious about that, because
21 if you're going to try and meet the 603 requirements
22 and the BTP 7-19 requirements with the same set of
23 controls it basically means that your diverse backup
24 system has to have the same level of sophisticated
25 automation as the primary system.

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1 So, this can become very, very complicated
2 and really void the intent of BTP 7-19, which is
3 simplistic.

4 MEMBER SIEBER: Yes, and it has to be
5 diverse.

6 CHAIRMAN BROWN: So 603 is the initiation.

7 MR. SCAROLA: 603 is initiation.

8 CHAIRMAN BROWN: All right. I just wanted
9 to --

10 MR. SCAROLA: Go look at the words.

11 CHAIRMAN BROWN: -- separate the --

12 MR. SCAROLA: It distinguishes
13 "initiation" from "actuation."

14 CHAIRMAN BROWN: Okay.

15 MR. SCAROLA: That's a very, very clear
16 distinction.

17 MR. NGUYEN: Well, 603, the whole scope of
18 603, more than initiation is manual controls, and
19 initiation, and other than -- and others.

20 So, you say 603 only manual initiation. I
21 disagree. The scope of the 603, more than initiation
22 is manual -- include manual controls, that when you
23 start, you have to start, and after you start, you
24 have to do something to make sure that all the manual
25 action have been completed.

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1 So, you say 603 only cover manual
2 initiation. I disagree. It covers more than that.

3 MR. SCAROLA: 603 in its entirety covers
4 the entire protective action from the sensor to the
5 actuated device, the automatic and manual actuation.

6 However, the requirement for manual
7 initiation in 603, which is in, I think, Section 6.1
8 or 6.2, is only for the initiation side. It's not for
9 the actuation side. It's the initiation of the
10 protective action. Thank you.

11 CHAIRMAN BROWN: Okay. Thank you.

12 MR. NGUYEN: Thank you.

13 MEMBER SIEBER: Thank you.

14 CHAIRMAN BROWN: I will let the staff
15 resolve. This is not the forum for resolution of
16 these particular comments and thought processes.

17 Hopefully you will take this and go do
18 something productive with it.

19 MEMBER SIEBER: When we have our full
20 committee meeting --

21 CHAIRMAN BROWN: Yes, I would expect that
22 you all --

23 MEMBER SIEBER: -- we will get a response.

24 CHAIRMAN BROWN: -- will make sure we
25 understand what you've done with these comments at the

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1 full committee meeting. Thank you very much.

2 MEMBER APOSTOLAKIS: That will be
3 February, Charlie?

4 CHAIRMAN BROWN: I think it's the February
5 meeting, yes. Isn't that correct, Christina? Yes,
6 that's the full committee meeting.

7 MR. NGUYEN: As you expect, I will -- we
8 will address the last comment in this, the full
9 committee, or --

10 CHAIRMAN BROWN: We -- I guess we should
11 be discussing these various issues --

12 MR. NGUYEN: Okay.

13 CHAIRMAN BROWN: -- that were raised and
14 bring them up because they're going to come up.

15 MR. NGUYEN: Okay.

16 CHAIRMAN BROWN: You might as well be
17 prepared to talk about them.

18 MEMBER BLEY: In fact, they will be of
19 more interest to the committee than the details we
20 went through --

21 CHAIRMAN BROWN: Yes.

22 MEMBER BLEY: -- for this meeting.

23 CHAIRMAN BROWN: Yes. I think if you --
24 the clarification on the Reg Guide that we asked for,
25 just to make sure we know what the scope is relative

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1 to the design, et cetera, et cetera.

2 If you can get those clarifications into
3 the Reg Guide, then you'll -- I think you'll eliminate
4 -- that's my personal opinion right now -- most of the
5 issues relative to -- it makes it very, very clear
6 what it is, and how you deal with whether you can use
7 manual controls for certain things falls into another
8 set of paperwork, documentation, methodologies, and
9 that these will probably be of more interest to the
10 committee, full committee than some of those other
11 nuances.

12 MR. NGUYEN: Okay.

13 CHAIRMAN BROWN: So, that's a suggestion.

14 And we will get there one way or the other.

15 Are there any other questions from the
16 members?

17 MR. EAGLE: I have a comment I could make.

18 CHAIRMAN BROWN: All right.

19 MR. EAGLE: Gene Eagle again. I'd like to
20 thank the people who made these extra comments and I'd
21 like to reinforce what you said, we're also working on
22 a revised version of BTP 7-19 in which we're rolling
23 the ISG-2 guidance into BTP 7-19.

24 Some of the very comments that were
25 brought up here will be very helpful to us. We want

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1 to go back and see that we've covered these key points
2 that you've brought, because there's some very good
3 things brought up by the different people and yourself
4 on this.

5 I thank you very much for that.

6 MS. ANTONESCU: Could we get a copy of
7 that, the revised --

8 CHAIRMAN BROWN: What, 7-19?

9 MEMBER SIEBER: Yes, the draft.

10 CHAIRMAN BROWN: Oh. Yes, the draft of
11 it. I presume we will see that at some point.

12 MR. EAGLE: Yes.

13 CHAIRMAN BROWN: Okay. Thank you. Are
14 there any other comments or questions?

15 MEMBER SIEBER: I'd like a transcript of
16 today's meeting electronically --

17 CHAIRMAN BROWN: Jack, did you have
18 anything else? Okay. Then, I guess the meeting is
19 adjourned. Thank you very much.

20 (Whereupon, at 11:45 a.m. the meeting was
21 concluded.)

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Revision of RG 1.62

“Manual Initiation of Protective Actions”

Khoi Nguyen
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Revision of RG 1.62
“Manual Initiation of Protective Actions”

- Background
- Summary of Changes
- Proposed Changes to Regulatory Positions
- Basis for the Scope Expansion
- Benefits of the Scope Expansion
- Relationship between RG 1.62, ISG-02, and ISG-05
- Public Comments and Resolutions
- Questions/Answers

Background

- Current regulatory guide – Has not been updated since October 1973
- Current standard referenced – IEEE Std 279-1971
- Latest standard endorsed by NRC (10 CFR 50.55a(h))– IEEE Std 603-1991
- Current regulatory guide does not address manual initiation of digital control systems
- Public comment period for Draft Regulatory Guide DG-1190 ended on February 20, 2009

Summary of Changes

- Updated to reference IEEE Std 603-1991 in addition to IEEE Std 279-1971
- Expanded the scope to:
 - Incorporate guidance for diversity and defense-in-depth (D3) in digital computer-based I&C systems (BTP 7-19) with respect to manual initiation of protective actions
 - Provide the applicant/licensee an option to pursue either safety-related and nonsafety manual initiations separately or a single safety manual initiation

Proposed Changes to Regulatory Positions

- **Position 1:** Changes “system level” to “division level”
- **Position 2:** Changes “system level” to “division level”
- **Position 3:**
 - Changes “system level” to “division level”
 - Incorporates information display requirements from IEEE Std 603-1991
- **Position 4:** Removes minimum-common-equipment guidance (D3 guidance is now covered under new Regulatory Position 7)

Proposed Changes to Regulatory Positions (Cont.)

- **Position 5:** No changes
- **Position 6:** Updates reference to IEEE Std 603-1991
- **Position 7 (New):** Incorporates diversity guidance for manual initiation of protective actions (BTP 7-19)
- **Position 8 (New):** Allows an optional manual initiation that satisfies both requirements of IEEE Std 603–1991 and BTP 7-19 guidance.

➤ Regulatory Basis

- GDC 21 _ “.. no single failure results in the loss of the protection system.”
- GDC 22 _ “...design techniques, such as functional diversity or diversity in component design and principles of operation, be used to the extent practical to prevent loss of the protection function.”

➤ Regulatory Guide 1.152, “*Criteria for Use of Computers in Safety Systems of Nuclear Power Plants*”

- Manual operator actuations of safety and nonsafety systems are acceptable, provided that the necessary diverse controls and indications are available to perform the required function under the associated event conditions and within the acceptable time.

BASIS FOR THE SCOPE EXPANSION (Cont.)

- *SECY 93-087, “Policy, Technical, and Licensing Issues Pertaining to Evolutionary and Advanced Light-Water Reactor (ALWR) Designs”* supports BTP 7-19.
- The current version of RG 1.62 does not address D3 guidance for digital I&C equipment with respect to manual initiation of protective actions.
 - The proposed revision of RG 1.62 incorporates guidance for D3 in digital computer-based I&C systems (BTP 7-19) with respect to manual initiation of protective actions.
 - Providing guidance for D3 in digital computer-based I&C systems with respect to manual initiation of protective actions will reduce regulatory uncertainty as more plants upgrade their I&C systems from analog to digital.

- BTP 7-19, “*Guidance for Evaluation of Diversity and Defense-in-Depth in Digital Computer-Based Instrumentation and Control Systems*”:
 - A set of displays and controls located in the main control room should be provided for manual system-level actuation of critical safety functions and for monitoring of parameters that support safety functions. The displays and controls should be independent and diverse from the computer-based safety systems.
 - The point at which the manual controls are connected to safety equipment should be downstream of the plant's digital I&C safety system outputs.

Providing guidance for diverse manual initiation of protective actions in the proposed revision of RG 1.62 will:

- Enhance reactor safety by addressing vulnerability of common-cause-failures of digital technology and by providing D3 guidance with respect to manual initiation for protection systems incorporating digital technology.
- Fulfill the user need of having guidance (in regulatory guide space) for manual initiation of protective actions provided as a diverse method for automatic initiation.
- Also provide licensee/applicant an option to satisfy both requirements of IEEE Std 603-1991 and BTP 7-19 guidance by providing a single safety related manual initiation that satisfies BTP 7-19 guidance.

Relationship Between RG 1.62, ISG-02, and ISG-05

- **ISG-02** (Revision 1, Sept. 2007)
“Manual operator actions may be credited for responding to events in which the protective action subject to a CCF is not required for at least the first 30 minutes and the plant response is bounded by BTP 7-19 recommended acceptance criteria.”

- **ISG-05** (Revision 1, Nov. 2008)
Section 3, “Crediting Manual Operator Actions in Diversity and Defense-in Depth”:
“This ISG provides guidance on how to “demonstrate through a suitable HFE analysis that manual operator actions that can be performed inside the control room are acceptable in lieu of automated backup functions.” In addition, this guidance can be used to demonstrate the acceptability of operator actions required in less than 30 minutes.”

Relationship Between RG 1.62, ISG-02, and ISG-05 (Cont.)

➤ **ISG-02** (Revision 2, June 2009)

“For actions with limited margin, such as less than 30 minutes between time available and time required for operators to perform the protective actions, a more focused staff review will be performed.”

➤ **Appendix 18-A of SRP** (Draft Revision 0, Nov. 2009)

- Supersedes Section 3 of ISG-05
- Incorporates modified guidance from Section 3 of ISG-05

“To credit operator actions, an acceptable method would be to demonstrate that the manual actions in response to a BTP 7-19 software CCF are both feasible and reliable, given the time available, and that the ability of operators to perform credited actions reliably will be maintained for as long as the manual actions are necessary to satisfy the D3 analysis.”

➤ **Relationship Between RG 1.62, ISG-02, and ISG-05 with regard to response time**

- Proposed Revision 1 of RG 1.62 provides design and installation guidance for manual initiation of protective actions (both safety related and diverse): “Protective actions selected to be controlled manually are subject to consideration of the time available to the operator to analyze and manually respond to an adverse condition....”
- ISG-02 and ISG-05 provide licensing review guidance on HFE for D3. For manual actions with limited margin between time available and time required for operators to perform the protective actions, 30 minutes for example, a more focused staff review will be performed to determine whether a diverse automated system is required instead of manual operator actions.

- **Relationship Between RG 1.62, ISG-02, and ISG-05 with regard to response time (Cont.)**
- While RG 1.62 discusses that the available time and operator response time should be taken into account for manual protective actions, there is no regulatory need for RG 1.62 to set any specific time criteria (e.g. 30 minutes) for manual actions.
 - Crediting manual operator actions, with respect to response time, in response to software CCFs (in an HFE analysis) is covered by ISG-02, ISG-05, and corresponding Appendix 18A of SRP.

Highlights of Public Comment Resolutions

- **Comment:** The draft guide incorrectly combines BTP 7-19 guidance and manual controls for safety equipment.
 - **Resolution:** The staff agrees to address IEEE Std 603-1991 requirements and BTP 7-19 guidance separately

- **Comment:** What is the reason for requiring a specific manual action time of 30 minutes? It is D3 guidance in ISG and the reasoning was the unknowns associated with a SWCMF.
 - **Resolution:** The staff agrees to remove the 30-minute reference as the 30-minute criteria is primarily an HFE review criteria (ISG-02 & ISG-05).

Highlights of Public Comment Resolutions (Cont.)

- **Comment:** The draft guide discusses postulated software CCF which is a beyond design basis event. The CCF discussion should be removed.
 - **Resolution:** The staff disagrees with the comment. With many nuclear power plants planning digital upgrades, addressing diversity (BTP 7-19) with respect to manual control for computer-based protective systems to reduce licensing uncertainties is appropriate and necessary.

- **Comment:** It seems that NRC is requiring component level controls for the completion of all safety functions and to increase reliability. This is beyond IEEE Std 603.
 - **Resolution:** The staff agrees to remove the guidance associated with component level manual control.

Question?