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1 UNITED STATES OF AMERICA

2 NUCLEAR REGULATORY COMMISSION

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4 ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

5 (ACRS)

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7 REGULATORY POLICY AND PRACTICES SUBCOMMITTEE

8 + + + + +

9 WEDNESDAY

10 MARCH 4, 2015

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12 ROCKVILLE, MARYLAND

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14 The Subcommittee met at the Nuclear
15 Regulatory Commission, Two White Flint North, Room
16 T2B1, 11545 Rockville Pike, at 8:32 a.m., Harold B. Ray,
17 Chairman, presiding.

18 COMMITTEE MEMBERS:

19 HAROLD B. RAY, Chairman

20 RONALD G. BALLINGER, Member

21 DENNIS C. BLEY, Member

22 CHARLES H. BROWN, JR. Member

23 MICHAEL L. CORRADINI, Member

24 DANA A. POWERS, Member

25 PETER RICCARDELLA, Member

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1 COMMITTEE MEMBERS: (cont.)

2 MICHAEL T. RYAN, Member

3 STEPHEN P. SCHULTZ, Member

4 GORDON R. SKILLMAN, Member

5 JOHN W. STETKAR, Member

6

7 DESIGNATED FEDERAL OFFICIAL:

8 PETER WEN

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1	C O N T E N T S	
2	Introduction by Chairman Harold Ray	4
3	Staff presentation on proposed Reg Guide 1.27,	7
4	Rev 3, "Ultimate Heat Sink for Nuclear Power	
5	Plants," by Bruce Lin and Jerry Purciarello	
6	Opportunity for Public Comment	128
7	Committee Discussion	129
8	Adjourn	
9		137
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		

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

2 8:32 a.m.

3 CHAIRMAN RAY: The meeting will now come
4 to order.5 This is a meeting of the Advisory Committee
6 on Reactor Safeguards, Regulatory Policy and Practices
7 Subcommittee.8 I am Harold Ray, Chairman of the
9 Subcommittee. ACRS members in attendance are Steve
10 Schultz, Dick Skillman, Dennis Bley, Dana Powers, John
11 Stetkar, Charles Brown, Mike Ryan, Ron Ballinger, and
12 Michael Corradini.13 Peter Wen of the ACRS staff is the
14 Designated Federal Official for this meeting.15 The purpose of the meeting is to review the
16 proposed Regulatory Guide 1.27, Ultimate Heat Sink for
17 Nuclear Power Plants, Revision 3.18 We will hear presentations from the NRC
19 staff. The Subcommittee will gather information,
20 analyze relevant issues and facts, and formulate a
21 proposed position and action as appropriate for
22 deliberation by the Full Committee.23 We requested this meeting in recognition of
24 the fundamental and critical role of the ultimate heat
25 sink in providing reasonable assurance of adequate**NEAL R. GROSS**

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1 protection, and the fact that the current Revision 2 is
2 dated January, 1976, almost 40 years ago when it was
3 issued.

4 We would expect that the experience of four
5 decades might include some important lessons learned
6 regarding the critical role of the ultimate heat sink.

7 It's important to recognize that the
8 Regulatory Guide applies to design-basis requirements
9 and not to beyond-design-basis requirements, since
10 these are often being discussed here.

11 A draft Regulatory Guide was issued for
12 public comment, and the resolution of those comments
13 will be part of our review today. The resolution
14 included some interesting regulatory process issues
15 that we'll ask questions about, I am sure.

16 There is no requirement or current
17 expectation that a presentation will be made to the Full
18 Committee or that the Committee will comment on the
19 Regulatory Guide revision. We will caucus at the end
20 of the half-day meeting as to whether there are any
21 issues which should be presented to the Full Committee.

22 The rules for participating in today's
23 meeting have been announced as part of the notice of this
24 meeting, previously published in the Federal Register,
25 and the detailed procedures for the conduct and

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1 participation in these meetings were published also in
2 the Federal Register, on November 8, 2013.

3 The meeting is open to the public, and we
4 have a bridge line open. We have received no written
5 comments or requests for time to make oral statements
6 from members of the public regarding today's meeting.

7 The transcript of the meeting is being kept
8 and will be made available as stated in the Federal
9 Register notice. Therefore, we request that
10 participants in this meeting use the microphones
11 located throughout the meeting room when addressing the
12 Subcommittee. Participants should first identify
13 themselves and speak with sufficient clarity and volume
14 so that they can be readily heard.

15 We will now participate -- I should say the
16 bridge line will be kept in the listen only mode and
17 opened at the end of the meeting for any comments.

18 We will now proceed with the meeting, and
19 I call open Ms. Kathryn Brock, Deputy Director of the
20 Research Staff to begin.

21 MS. BROCK: Hi, thank you very much for
22 having us today.

23 As you mentioned, this Reg Guide is a long
24 time coming, and it is part of the effort to do an update
25 to all the reg guides that have needed revision over the

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1 years, and I think you'll find that the staff has done
2 a great job over the last few years to bring in those
3 lessons learned on the heat sink into this document.

4 Thank you very much.

5 CHAIRMAN RAY: Okay. Turning it over to
6 staff to commence presentation.

7 MR. LIN: Good morning. I am Bruce Lin, I
8 work at the Office of Research, Division of Engineering.

9 With me up here is Jerry Purciarello with
10 NRR's Division of Safety Systems.

11 As Chairman Ray mentioned, this is a pretty
12 old Reg Guide. It was last revised in 1976, so we
13 started to revise this Reg Guide a few years back with
14 staff from NRR, NRO, and Research, and we finished the
15 draft about two years ago, and we subsequently issued
16 it for public comments.

17 So we are here today just to brief the
18 Subcommittee on the changes that were made to the Reg
19 Guide and our response to the comments.

20 This is an overview of what we're going to
21 cover today. I'll briefly go over some background and
22 an overview of Reg Guide 1.27 and reasons for the
23 revision and a brief summary of the revisions that were
24 made, and then I'll turn it over to Jerry, who is going
25 to talk about some of the detailed changes that were made

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1 to the Regulatory Guidance, and we're going to discuss
2 the public comments and our response to the comments.

3 So what is an ultimate heat sink? Well, an
4 ultimate heat sink is the system of structures and
5 components and associated water supply that is credited
6 for functioning as a heat sink to remove the reactor
7 decay heat and essential station heat loads after a
8 normal reactor shutdown or shutdown following a DBA, or
9 design basis accident.

10 So this includes the necessary water
11 retaining structures and the associated pipings that
12 connect the water source to the essential water intake.

13 So essentially, the ultimate heat sink
14 performs three principal safety functions: dissipation
15 of the residual heat after reactor shutdown;
16 dissipation of the residual heat after a design-basis
17 incident, such as a loss of cooling incident; and then
18 it also removes the maximum expected decay heat from the
19 spent fuel pool. This is something we added in the
20 current revisions, and I think Jerry is going to talk
21 about it later.

22 And Reg Guide 1.27 basically describes the
23 methods and procedures that are acceptable to the NRC
24 staff to satisfy the regulations that are applicable to
25 the ultimate heat sinks. This guide applies to active

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1 plants that use water as ultimate heat sinks.

2 Passive plants have very different design bases
3 for ultimate heat sinks. They -- for example, they --
4 the passive containment cooling basically serves as the
5 ultimate heat sinks for the passive plants, and a lot
6 of the guidance and requirements in this Reg Guide will
7 not apply to the passive plants.

8 MEMBER CORRADINI: Yes, and that is now
9 stated?

10 MR. LIN: It's stated in the Reg Guide that
11 this Reg Guide applies to active plants.

12 And when we were revising this Reg Guide,
13 NRO was in the process also of updating their guidance
14 for the small modular reactors that would have some
15 guidance on the heat sink requirements for passive
16 plants.

17 MEMBER CORRADINI: Just one technical
18 question: so in current active plants, if I have a
19 free-standing steel containment, there is no credit
20 given to any sort of heat loss through that?

21 (No audible response.)

22 MEMBER CORRADINI: Okay. You said no,
23 right, that's what you said?

24 MR. PURCIARELLO: Well, I mean, if the
25 licensee made the case for heat loss through the

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1 containment, I mean he could make that case.

2 MEMBER CORRADINI: Okay, but in the
3 guidance, there is -- the expectation is there -- you
4 assume not.

5 MR. PURCIARELLO: We have not assumed not,
6 nor for, neither nor. It's just that the licensee would
7 have to make the -- when he does his accident analysis
8 and describes how heat is removed, if he would include
9 the heat lost through containment, then I think his
10 staff would look at that and consider that, but it's not
11 -- I have not seen that personally in any analysis that
12 I looked at.

13 CHAIRMAN RAY: It is not prohibited by the
14 Reg Guide, it's simply not addressed.

15 MEMBER CORRADINI: Okay.

16 CHAIRMAN RAY: And there is no --

17 MEMBER CORRADINI: So the Reg Guide is
18 silent about it.

19 MR. LIN: Yes.

20 MEMBER CORRADINI: Okay.

21 CHAIRMAN RAY: But the Reg Guide does say
22 in a positive way what was said earlier, that is, that
23 for passive plants a passive containment cooling system
24 may be used as the ultimate heat sink. The guidance
25 provided in this Reg Guide does not apply to passive

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1 plants.

2 MEMBER CORRADINI: Thank you.

3 MEMBER STETKAR: Bruce, you mentioned that
4 the NRO is developing, you used the term guidance, for
5 the SMRs. Are they -- are they developing, like this
6 Reg Guide, a general reg guide for --

7 MR. LIN: No, I --

8 MEMBER STETKAR: Well how -- okay.

9 MR. LIN: They basically --

10 MEMBER STETKAR: Then tell me what they're
11 doing.

12 MR. LIN: -- updated the Standard Review
13 Plan Section 9.2.5, specific for the mPowers that have
14 the guidance, the requirement for --

15 MEMBER STETKAR: But that's a
16 design-centered or a plant-specific review --

17 MR. LIN: Right.

18 MEMBER STETKAR: -- guidance.

19 MR. LIN: Right.

20 MEMBER STETKAR: So how -- how is the staff
21 addressing general review guidance for passive ultimate
22 heat sinks like an ESBWR or like an AP1000 or like any
23 other plant?

24 MR. LIN: I don't know specifically, but I
25 did look at the AP1000, and if you go to the DCD, they

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1 actually refer to SRP Section 6.2.2 for containment heat
2 removal, because the passive containment coolings
3 basically serve as the ultimate heat sinks.

4 MEMBER STETKAR: What I am think about is
5 there is a lot of guidance in Reg Guide 1.27 about how
6 one considers meteorological effects, temperatures,
7 historical effects, evaporative losses that happen to
8 be from cooling towers, mass and energy balances, and
9 I don't see a lot of that stuff in Chapter 6 of the
10 Standard Review Plan.

11 MEMBER CORRADINI: Can I ask John's
12 question a little differently?

13 My impression was that with each of the ones
14 that he identified, it's an I'll say case-by-case, but
15 a specific, design-specific -- a design-specific
16 analysis. At least for ESBWR, my memory was that it was
17 looked at that and only that, that there was no general
18 reg guide that addressed it. Is that a fair statement?

19 MR. PURCIARELLO: I was not involved in the
20 review of the ESBWR, so I can't specifically answer that
21 question --

22 MEMBER CORRADINI: But --

23 MR. PURCIARELLO: -- for new reactors or
24 for the AP1000, the other --

25 MEMBER CORRADINI: So my expectation is

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1 anything new is going to be approached on a case-by-case
2 basis --

3 MEMBER STETKAR: This --

4 MEMBER CORRADINI: -- design-by-design.

5 MEMBER STETKAR: This Reg Guide applies to
6 a wide variety of designs, anywhere from something that
7 looks like Lake Michigan to something that looks like
8 recirculating mechanical draft cooling towers, and yet
9 there's a generic -- a general reg guide that applies
10 across the board to things that the staff should
11 consider and ask applicants whether they've considered
12 during their designs of those very specific systems.

13

14 My question is why isn't there comparable
15 guidance for the staff when they review different ways
16 of passively removing heat?

17 To look at, for example, mass balances
18 would be something, to see whether or not the water is
19 coming back to where you think it's going to come back,
20 to see whether you considered the range of environmental
21 conditions that you've assumed is going to be present
22 for --

23 MEMBER CORRADINI: Right.

24 MEMBER STETKAR: -- evaporating from the
25 surface of a large cylindrical structure.

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1 MEMBER CORRADINI: But I guess, just to
2 make sure, but when we looked at AP1000 and ESBWR, they
3 did address it, but they addressed it for that design
4 and only that --

5 MEMBER STETKAR: Right.

6 MEMBER CORRADINI: -- design. Okay.

7 CHAIRMAN RAY: Well --

8 MEMBER STETKAR: Of course, as do people
9 who have a large natural draft cooling tower or several
10 small porous draft cooling towers or, you know, Lake
11 Michigan, for their particular design.

12 CHAIRMAN RAY: Well, the nature of
13 regulatory guides, of course, is to provide information
14 that is needed widely to tell lots of people how to
15 comply with regulatory requirements. That
16 need is going to exist. I guess the question at hand
17 would be does that need exist for SMRs at this point in
18 time?

19 AP1000 is behind us, but sort of, not quite,
20 but the -- the issue of -- the regulated issuance of a
21 regulatory guide would be that this would be beneficial
22 to people who are having to -- having to put together
23 an application that would be reviewed by the staff.

24 Yes, and you just haven't gotten around to
25 it is I guess the --

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1 MR. PURCIARELLO: I think yes, that is
2 correct. Yes, there is a need, and no, there is no
3 provision for that at the moment.

4 CHAIRMAN RAY: Yes.

5 MR. LIN: Not in a reg guide, right. The
6 Standard Review Plan has been updated to provide some
7 guidance for the small modular --

8 CHAIRMAN RAY: Well, but as John
9 mentioned, it's limited and not comprehensive --

10 MR. LIN: Right.

11 CHAIRMAN RAY: -- and it's not as complete
12 as this --

13 MR. LIN: Right.

14 CHAIRMAN RAY: -- is, and so on.

15 So, but your -- I think your input to us at
16 this point is you're not aware of any intention to
17 address proactively this future potential need with a
18 reg guide that talks about passive cooling --

19 MR. PURCIARELLO: Not to my knowledge.

20 CHAIRMAN RAY: SMRs.

21 MR. PURCIARELLO: That's correct, not to
22 my knowledge.

23 MEMBER CORRADINI: So not to beat it to
24 death, but the staff must have some sort of attributes
25 it looks for even though it's case-by-case. So is that

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1 written down somewhere?

2 In other words, just to lay it out, so
3 AP1000 is behind us, the ESBWR is behind us, but now
4 you've got mPower, now you're going to have NuScale, you
5 could have Holtec, is there a set of principles that the
6 staff goes through even though they're unique designs?
7 I think that's where John is going.

8 MR. PURCIARELLO: Yes. Is there anybody
9 in the New Reactors Office that could answer that
10 question?

11 MS. BROCK: This is Kathryn Brock. I
12 think we'll probably have to take an action to get some
13 answers for you.

14 CHAIRMAN RAY: Well, some of us have roles
15 to play elsewhere in which people would like to know what
16 the NRC's requirements are, and of course, the NRC's
17 response typically is well show me the design and I'll
18 tell you whether it's adequate or not, so it's a loop
19 that we get into, and some of us are on both sides of
20 that loop, and so it's a natural question: should we
21 attempt to answer, as an agency, people's questions
22 before they present a design?

23 And in some ways, of course, we can do that.
24 Like John suggested, there is guidance here that would
25 apply, potentially.

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1 But as to writing a reg guide -- we had
2 someone who wanted to speak also.

3 MR. LI: My name is Chang Li from NRO.
4 From our review experience so far, it's like AP1000,
5 ESBWR, those new reactors, we have design-specific
6 review. We don't have generic rules that we still
7 apply. That's Reg Guide 1.27, the previous revision,
8 those parameters that John was mentioning, it was
9 reviewed, it's according to the previous --

10 MEMBER STETKAR: Give you one example, and
11 I can't -- I have to be careful because I didn't look
12 up history, but my recollection is that when we looked
13 at ESBWR and AP1000, they used, for example, five years
14 of meteorological data to characterize their range of
15 meteorological parameters.

This Reg Guide says if I have Lake Michigan,
I have to use 30 years of meteorological data. So I am
questioning this notion of design-specific stuff that
tends to be inconsistent with what we're requiring for
a general class of plants, that each have their own
individual heat sink design, and whether or not the
Agency has carefully thought about those types of
consistencies.

24 MEMBER SCHULTZ: And that is just an
25 example.

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1 MEMBER STETKAR: Across -- and that is just
2 an example, I mean, that's one that comes to mind --

3 MEMBER CORRADINI: But that's an example
4 that caused a lot of discussion at the time.

5 MEMBER STETKAR: Indeed it did.

6 MEMBER CORRADINI: And not to say -- not to
7 say five years is any more conservative or less
8 conservative, it's just different.

9 MEMBER STETKAR: It is just different, and
10 this Reg Guide specifically says 30 years or more of
11 weather data is preferred.

12 MR. MAZAIKA: This is Mike Mazaika from
13 NRO, I'm a meteorologist.

14 I guess to clarify, the five years I think
15 that you're referring to has to do with dispersion
16 meteorology as opposed to design-basis climatological
17 conditions, so I think --

18 MEMBER CORRADINI: Well my memory --
19 again, we can check --

20 MEMBER STETKAR: I --

21 MEMBER CORRADINI: -- but my memory is it
22 was about control room habitability, it was about a
23 number of things.

24 MEMBER STETKAR: Let me not --

25 MEMBER CORRADINI: Yes.

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1 MEMBER STETKAR: I tend to bring up
2 specific items, and I said I had to be careful because
3 I didn't go back and study all of the stuff, but it's
4 issues of that notion, of that ilk, that -- that gives
5 me pause to think about should the staff be stepping back
6 and saying what types of issues should be addressed in
7 the design and the review of passive cooling systems?
8 And don't try to do that on a kind of ad hoc, case-by-case
9 basis when you're looking at details of a specific
10 design, in the same way that this Reg Guide doesn't look
11 at the details of a particular type of cooling tower
12 design.

13 CHAIRMAN RAY: Well, or -- just to repeat
14 it yet again, there are elements here which are not
15 specific to the limited application of this Reg Guide
16 to the water cooling systems that are hypothesized here.
17 There are meteorological conditions, there are many
18 others as well.

19 And one could try to formulate a way of
20 saying well, these are applicable generally. They are
21 not limited just to the scope that this Reg Guide applies
22 to at present. You could do that, and I think that's
23 the observation that's being made.

24 Now, whether that would be productive of
25 Agency time or not, that's a different question, but it

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1 would certainly settle issues that sometimes we grapple
2 with, which is do the meteorological conditions that are
3 specific here, do they apply to an SMR, for example, or
4 is there some reason why they don't?

5 MR. LIN: When we started revising this Reg
6 Guide, we actually had tried to include the passive
7 plants. Part of the reason we didn't was because the
8 passive plants have different safety requirements --
9 not safety, like, for the 72 hours, you know, they
10 consider it safety-related, but post-72, they have a
11 different category and different design requirements
12 for components that are only needed for the
13 post-72-hours, so for the current Reg Guide, we would
14 basically require that your system and structure have
15 to be designed to GDC too, and for the -- I guess we call
16 it regulatory treatment of non-safety systems have a
17 different set of design requirements, and it was too
18 confusing to merge the two.

19 And we have a staff from NRO that is
20 actually working on this Reg Guide, and they do one for
21 ultimate heat sink for new plants.

22 CHAIRMAN RAY: Well that, I think, goes
23 then to answer the question better than anything else
24 you have said so far.

25 You say there is some initiative to address

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1 this proactively for plants that would be outside the
2 scope of this Reg Guide?

3 MR. LIN: No --

4 CHAIRMAN RAY: New plants, you said?

5 MR. LIN: No, as part of the review, we have
6 a staff from NRO that is also part of this Reg Guide
7 revision time. He works in NRO, and he --

8 CHAIRMAN RAY: Okay, well listen, let's
9 move on. I think the question has been recognized here
10 --

11 MR. LIN: Right.

12 CHAIRMAN RAY: -- we'd appreciate some
13 feedback just so that --

14 MR. LIN: Yes, we can take an action and --

15 CHAIRMAN RAY: -- give us a better
16 understanding --

17 MR. LIN: -- get back to you.

18 CHAIRMAN RAY: -- because, as I say, it's
19 not that we're unaware of the value that such things
20 would have in plants that aren't yet applicants or new
21 reactor applicants, just to reinforce that oh yes, these
22 same requirements do apply, or something different.

23 MR. LIN: Right.

24 CHAIRMAN RAY: Okay. Why don't you
25 proceed?

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1 MR. LIN: Okay.

2 So I also list some of the related guidance
3 here. Obviously, the Standard Review Plan Section
4 9.2.5 on ultimate heat sinks is related, and SRP Section
5 2.3.1 on regional climatology basically is concerned
6 with identifying the meteorological data that would
7 result in a maximum water loss or that can result in
8 maximum intake water temperature to the plant.

9 Standard Review Plan Section 2.4.11, low
10 water considerations, is concerned with natural events
11 that can limit or reduce the supply of the water.

12 So we incorporate some of the guidance from
13 the various Standard Review Plans into the current Reg
14 Guide.

15 This slide just provides a very high-level
16 overview of what's in Reg Guide 1.27. It describes the
17 critical rules and regulations related to ultimate heat
18 sinks, primarily many of the general design criteria,
19 and it contains system design considerations for
20 ultimate heat sinks such as the safety features that the
21 heat sink has to perform, and it provides meteorological
22 conditions to consider in the design of the ultimate
23 heat sinks.

24 MEMBER SKILLMAN: Let me ask this
25 question. If you go back to your slide 2 -- excuse me,

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1 slide 3, at the top of the page, you give a succinct
2 definition of UHS, and in this particular version, you
3 identify design basis effects.

4 If you look at the old General Design
5 Criteria 44, the original, 1976, those words are
6 different. If you weave your way through 50.2, 50.4,
7 if you look at the definitions, there is no definition
8 involving a heat sink. If you look at the definition
9 in the revised Standard Review Plan, it's different than
10 that.

11 So my question is really on your slide 5.
12 Why don't you consider a definition of UHS that is
13 appropriate for the Part 50 plants, all of which are
14 Appendix A 10 CFR 50, plus the comments that my
15 colleagues have made? It seems to me that a very slight
16 adjustment to what you have on that one slide would
17 address what all of us are saying.

18 And I will tell you, I have worked with this
19 UHS term since 1966. I understand it. But for every
20 plant, as Jerry said, if you're going to say credit heat
21 removal through the supports and restraints of the
22 reactor cooling system, then your UHS might be the
23 river, the pond, the tower, plus metal structures.

24 And it seems to me that there is a way to
25 address what my colleagues and I are saying by creating

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1 a definition of what you mean by UHS, but I suggest to
2 you there isn't a definition codified anywhere on this
3 very important topic.

4 If we talked about SSCs, we know what those
5 are. We know what that means. UHS is equally
6 important in the vocabulary of NSSS design.

7 MR. PURCIARELLO: I agree, and I know that
8 the only time the term "ultimate heat sink" is even
9 mentioned in the regulations is in GDC 44.

10 MEMBER SKILLMAN: Yes sir.

11 MR. PURCIARELLO: It's not mentioned
12 anywhere else.

13 MEMBER SKILLMAN: Right.

14 MR. PURCIARELLO: And that is such a
15 high-level regulation requirement, we have to develop
16 guidelines that incorporate that, and GDC 44 says that
17 -- GDC 44 is really not even on the ultimate heat sink,
18 it's on the cooling water system --

19 MEMBER SKILLMAN: It's on the cooling
20 water system, right.

21 MR. PURCIARELLO: -- so it's on the system
22 that is supposed to transfer this type of heat to an --
23 and it mentions the term, it doesn't even define it, it
24 just says to an ultimate heat sink. I mean, I think this
25 implies, you know, a sink, you know, something where it

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1 can accept energy, and it just says there is a cooling
2 water system that has to be able to do that, and the
3 cooling water system has to mitigate any accident plus
4 bring the remaining units on the site to an orderly
5 shutdown and cooldown, and it has to do that assuming
6 a loss of off-site power and assuming an additional
7 single failure somewhere, you know, in the plant.

8 But I -- I agree, there is no -- in the
9 regulations, there is no definition of sink, ultimate
10 heat sink, and I think the question you're asking is why
11 don't we define that further? Well, as far as that
12 being in a regulation is concerned, you know, that would
13 be rulemaking, and that's a little bit beyond what we're
14 trying to do here on a guideline, so that might be a
15 question that would be -- the Commission should be
16 asked, you know, why isn't there a definition for it in
17 a regulation?

18 But in our -- to answer your question, you
19 said somewhere in the Reg Guide, we have a definition
20 that does not gibe with --

21 MEMBER SKILLMAN: Yes.

22 MR. PURCIARELLO: Where in the --

23 MEMBER SKILLMAN: Take a look at Rev 0, the
24 original.

25 MR. PURCIARELLO: Rev 0 of the --

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1 MEMBER SKILLMAN: Of General Design
2 Criteria 44.

3 MR. PURCIARELLO: Oh, I don't -- I don't
4 have that in front of me.

5 MEMBER SKILLMAN: Appendix A, 10 CFR 50,
6 it's the gold standard.

7 MR. PURCIARELLO: Yes, is that not --
8 that's different from the current version of GDC 44?

9 MEMBER SKILLMAN: Well, it is probably the
10 same version that it talks about, but it's supposed to
11 be the cooling water systems.

12 MR. PURCIARELLO: Right.

13 MEMBER SKILLMAN: And it is that criterion
14 that has driven the design of all the plants in the
15 country.

16 MR. PURCIARELLO: Right.

17 MEMBER SKILLMAN: In fact, it is alive and
18 well today on the best plants.

19 MR. PURCIARELLO: Right.

20 MEMBER SKILLMAN: And so we're talking
21 about, actually, the system that implements that, UHS.

22 MR. PURCIARELLO: Yes.

23 MEMBER SKILLMAN: And so the challenge is
24 why isn't there a definition of UHS that addresses the
25 types of questions our comments are providing?

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1 Because -- because in that definition would
2 be the guidance that would, if you will, create a
3 foundation for all of us who are doing this work.

4 MR. PURCIARELLO: Well, okay, but couldn't
5 we express that definition in a reg guide? I mean --

6 MEMBER SKILLMAN: Yes.

7 MR. PURCIARELLO: Okay.

8 MEMBER SKILLMAN: And this would be the
9 place to do it. That's exactly what I am saying.

10 MR. PURCIARELLO: But --

11 MEMBER SKILLMAN: That's exactly what I am
12 saying. This is the place to do it.

13 MR. PURCIARELLO: And you say that our
14 proposed version does not adequately define an ultimate
15 heat sink?

16 MEMBER SKILLMAN: I don't think so.

17 MR. PURCIARELLO: Okay, well, we should
18 take it under consideration then, and we should try to
19 develop a -- a definition.

20 I mean, it might --

21 CHAIRMAN RAY: Well, it -- I guess in
22 listening to this, a definition would tend to restrict
23 --

24 MR. PURCIARELLO: Yes.

25 CHAIRMAN RAY: -- rather than to better

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1 clarify what is an ultimate heat sink.

2 The way it -- here, it says, in GDC 44, "to
3 an ultimate heat sink," meaning to me that it is whatever
4 you choose to make it, whatever you choose to argue is
5 the ultimate heat sink in a particular case.

6 We're simply, in the Reg Guide, addressing
7 the ultimate heat sink as defined particularly by the
8 devices that you're talking about here, a cooling pond,
9 a river, an ocean, a lake, whatnot.

10 But that doesn't seem to me like that says
11 those are the only heat sinks that exist. In fact, we
12 specifically exclude passive containment cooling as one
13 of the heat sinks that are addressed for the Reg Guide.
14 That shows, well there is a heat sink, but it is not part
15 of this Reg Guide.

16 And so I am not sure that defining heat sink
17 and saying well it's this and not that advances the
18 objective that we have.

19 MEMBER SKILLMAN: But Harold, it could be
20 this and that. It doesn't have to be exclusive --

21 CHAIRMAN RAY: I understand.

22 MEMBER SKILLMAN: -- it can be written
23 broadly enough that it really identifies what is meant.

24 CHAIRMAN RAY: Well, I think one could
25 argue, Dick, that the words themselves address what is

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1 meant, and that is the place where the heat ultimately
2 goes, whether it's several places, just through support
3 structures and so on, as well as the cooling water
4 system. That is something that isn't precluded by
5 reference to ultimate heat sink.

6 The issue of information that is described
7 here in the Reg Guide, and the conditions, let me go back
8 to meteorological again, what time period, what tenure
9 one must use for the data that is being used in the
10 analysis, that is something that has applicability,
11 potentially, independent of what heat sink or what type
12 of reactor design you're using, whether it's active or
13 passive or whatnot, one would think that the
14 meteorological conditions that need to be taken into
15 account are independent of that. Maybe not, but at
16 least that's a starting point.

17 But I am not sure that is accomplished by
18 saying well, the ultimate heat sink is the following.

19 MEMBER CORRADINI: I am going to go a
20 different direction, so I don't want to stop --

21 CHAIRMAN RAY: Oh, that's fine. I just
22 wanted to make that comment after Dick had -- to me,
23 leaving it, it's the ultimate heat sink, whatever it is,
24 is the better way to go --

25 MEMBER CORRADINI: Right --

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1 CHAIRMAN RAY: -- here.

2 MEMBER CORRADINI: -- but the reason I
3 guess I am sympathetic to what Dick is asking, which is
4 it kind of goes back to your -- so you said something
5 at the beginning that I am -- my impression, so I am going
6 to say it and you tell me if I've got the wrong
7 impression.

8 The reason to review -- to upgrade or to
9 update this Guide is simply because it's old, or because
10 there's things missing that the licensees need
11 questions answered?

12 MR. PURCIARELLO: We had additional
13 regulatory positions that we put in the Reg Guide. We
14 needed to reword the Reg Guide so that it's clarified.

15 If you noticed, the existing revision has
16 the words "for comment" on it. I don't know 40 years
17 ago how far that went and where it ended and why it did
18 as such, so it being 40 years old, plus we know we've
19 got operating experience, information that we added as
20 a regulatory position --

21 CHAIRMAN RAY: Slide 8, Mike, shows you a
22 couple of additional regulatory positions that are --

23 MEMBER CORRADINI: The spent fuel is the
24 only one that I thought was going to be substantially
25 --

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1 CHAIRMAN RAY: Well, there's inspection,
2 maintenance, and testing, water chemistry and micro-bio
3 controls, those are two areas addressed --

4 MEMBER CORRADINI: Okay, so we're coming
5 to it then.

6 CHAIRMAN RAY: Yes.

7 MEMBER CORRADINI: But the reason I am
8 asking the question is, I guess, the reason I am
9 sympathetic to what Dick is asking is that if you're
10 going to go through the effort of updating something,
11 it seems you want to make it somewhat comprehensive, so
12 part of it is what he's asking, part of it is what John
13 is asking relative to saying okay, this is the only thing
14 we're going to consider until now, but we're aware of
15 advanced designs that have a different path to the
16 environment.

17 I mean, the ultimate heat sink is the
18 environment. I mean, that is what it is.

19 CHAIRMAN RAY: I think --

20 MEMBER CORRADINI: Whether it be a water
21 body connected to the air or the air.

22 But it just seems to me that this seems
23 really specific, given you're going through all this
24 effort, so I am -- that is why I am sympathetic to
25 actually doing it to improve it --

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1 MEMBER SKILLMAN: Yes, I believe what
2 you've written in your slide, first bullet on page 3,
3 gets to the heart of it.

4 "Credited for functioning," those are the
5 critical words. And that could be meteorological, that
6 could be supports and restraints, that could be a
7 passive system, it is what you have credited for your
8 thermal hydraulic heat balance, for your heat balance.

9 So it seems to me that you almost have a
10 diamond, and all I am saying is would you give
11 consideration to saying this is the definition of UHS?
12 And you could do that, I think you square with General
13 Design Criteria 44, I think you square with your
14 Standard Review Plan, and I think you really address the
15 concerns that we have for whether it's a small modular
16 reactor or whether it's a passive plant because what's
17 important is what is credited.

18 MEMBER CORRADINI: And then you could
19 admit that there's gaps to be filled later.

20 MEMBER SKILLMAN: Yes. But it seems
21 you're just about there, and so I commend you for what
22 you've done, I am not trying to give you raspberries
23 here, but I think the one thing that's missing are --
24 the several things that are missing are the definitions.

25 You know, those of us who were NSSL

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1 designers recognize, definitions are important, real
2 important, because they set kind of the markers on the
3 path for how you design one of these machines.

4 CHAIRMAN RAY: Okay, let's --

5 MEMBER SKILLMAN: Enough, okay.

6 CHAIRMAN RAY: -- let's -- we do have to
7 move on, but I do want to note here on the record that
8 the Rev 3 does say the following: "Note: passive light
9 water reactors have significantly different design
10 bases for UHS than traditional plants that use active
11 systems."

12 Now that implies that therefore, there is
13 a need for something beyond what's presently addressed
14 here to be addressed in the context of these
15 significantly different design bases. Now, we may
16 disagree with that, but at least that is the statement
17 that is made.

18 And then they elaborate by saying "For
19 passive plants, the passive containment cooling system
20 may be used as the ultimate heat sink." Well, that is
21 just an observation.

22 The guidance provided in this Regulatory
23 Guide does not apply to passive plants that utilize a
24 passive containment cooling system as their ultimate
25 heat sink. Now, the ultimate question I think we're

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1 asking is, well, why not? What is it that makes it --
2 makes this Regulatory Guide not applicable?

3 And so that ultimately is the question. If
4 you are going to write one that does apply to reactors
5 that use the primary containment as the cooling system
6 -- I mean the primary -- excuse me, the passive
7 containment cooling system as the ultimate heat sink,
8 how would it be different?

9 MR. PURCIARELLO: It would be different --
10 let me try to answer that question.

11 The -- there's different -- there's
12 different regulations in 10 CFR -- 10 CFR 52. There's
13 the 72-hour requirement for being able to remove decay
14 heat, the -- many of the components are not safety
15 related, they're RTNSS.

16 Just, it's a different regulatory
17 environment, and as far as SMRs are concerned, you know,
18 I have just seen a couple briefs on SMRs, and you know,
19 these plants are -- these reactors are submerged in
20 pools of water, and I would just feel very uncomfortable
21 saying this applies to SMRs because I would have to see
22 the design of the primary system of an SMR before I'd
23 say this is an adequate ultimate heat sink and these are
24 adequate rules --

25 CHAIRMAN RAY: Yes.

1 MR. PURCIARELLO: -- for making sure that
2 it's technically sufficient, so --

3 CHAIRMAN RAY: Okay. So I mean, I think
4 you're explaining why it wouldn't be practical to just
5 assume that this Regulatory Guide could be easily
6 adapted --

7 MR. PURCIARELLO: Yes.

8 CHAIRMAN RAY: -- to a passive cooling
9 system.

10 MR. PURCIARELLO: Right.

11 CHAIRMAN RAY: Now we may disagree with
12 that, I don't know, but I sensed some disagreement
13 anyway.

14 John's question I took -- since he is not
15 here I can say this now -- I took as a little different,
16 which was well there's stuff in here that we all would
17 agree does apply, and why can't it be made clear that
18 this is the Agency's position on issues like
19 meteorological tenure and things like that? That is a
20 little different question.

21 MR. PURCIARELLO: Yes.

22 CHAIRMAN RAY: Although it is related.
23 Yes.

24 MR. LI: This is Chang Li from NRO.
25 One example that I can give is, say, here

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1 is this Reg Guide, I am going to -- I am sorry, it's
2 inherited from the previous revision about the 30-days
3 water requirement, the heat sink requirements, but the
4 design criteria, when it applies to passive plants --
5 because they are talking about seven days to -- 72 hours
6 to reach safe shutdown conditions, so the ultimate heat
7 sink design criteria is talking about initially 72 days
8 using passive systems, and another from 72 hours to
9 seven days use RTNSS systems and so forth, but it does
10 not require up to 30 days requirement, so it's not --
11 this Guide cannot apply to the -- those passive plants.

12 CHAIRMAN RAY: Well yes, and so ultimately
13 the issue is that because passive plants have a much
14 lower probability of core damage, they are in a
15 different world when it comes to how long they have to
16 achieve certain states, end states, and whether things
17 have to be safety-related or not and so on and so forth.
18 All of that arises from a fundamental difference in
19 design, which is that they don't depend on any active
20 components.

21 If you depend on active components, then
22 you are subject to this. If you don't depend on active
23 components, then you are subject to something that has
24 not been written yet in the totality.

25 Again, the issue John first raised, well

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1 there are things here that do apply, even, we believe,
2 to a passive plant. That is an observation. The
3 question that comes out of that is: is anybody doing
4 anything that will provide information to those who are
5 involved in the development of passive plants as to what
6 is acceptable to the staff for a passive plant?

7 MR. PURCIARELLO: We have to get back to
8 you on that --

9 CHAIRMAN RAY: We understand.

10 MR. PURCIARELLO: We will check with NRO
11 and see what they are doing as far as developing
12 regulatory guidance for passive plants and SMRs.

13 CHAIRMAN RAY: Yes, okay. With that
14 having been said again, let's move forward here. We are
15 doing fine on time, but we want to make some progress
16 here.

17 MR. LIN: I think we already touched on
18 this, but we -- in the revised Reg Guide, we provided
19 additional guidance for inspections, maintenance, and
20 testing of ultimate heat sinks.

21 CHAIRMAN RAY: Yes, and in that regard, let
22 me now raise a different question, which is -- it was
23 associated with the resolution of public comment.

24 And in that regard, there was a comment made
25 about the implication that the Maintenance Rule would

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1 apply to things that aren't under the control of the
2 licensee.

3 MEMBER CORRADINI: So can I ask a question
4 that we're debating?

5 So was Fukushima a failure of the ultimate
6 heat sink based on your definition or not?

7 Well, let's take an empirical check.
8 Based on your definition, which we all seem to like, at
9 least for the moment.

10 MR. PURCIARELLO: The ultimate heat sink
11 -- let me -- let me think about this question.

12 I know what we're doing -- what we're
13 requiring -- what we are requiring plans to do is to,
14 because of Fukushima, is to put in provisions for beyond
15 design basis events, but I think as I look back on it
16 that probably what happened should have been the design
17 basis events because they should have been designed for
18 that earthquake, they should have had a higher wall to
19 prevent a 40-foot tsunami, so I think --

20 MEMBER CORRADINI: So can I -- can I say
21 your answer differently, just so I am clear for the
22 record?

23 What you are saying, if it were in the
24 design basis, yes it was, but since it's outside of the
25 design basis, at least as entering the event --

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1 is that what I hear you saying?

2 MR. PURCIARELLO: Could you rephrase your
3 question?

4 MEMBER CORRADINI: Well I was going to say,
5 to me, based on your definition of the ultimate heat
6 sink, because it's not just where the energy goes, it's
7 the system that takes it there, which is the way you've
8 defined it --

9 MR. PURCIARELLO: Okay.

10 MEMBER CORRADINI: -- which is perfectly
11 fine.

12 MR. PURCIARELLO: No, it's not the system
13 that takes it there --

14 MEMBER CORRADINI: Well, that's what you
15 say. You say "The ultimate heat sink is the system of
16 structures and components and associated water supply
17 credited for functioning of the head sink to absorb the"
18 blah blah blah, that's the system.

19 MR. PURCIARELLO: Functioning as a heat
20 sink, not as the method to get the heat -- the energy
21 to the heat sink.

22 MEMBER CORRADINI: So --

23 MEMBER RICCARDELLA: Oh, so the diesel
24 generators then aren't part of --

25 MR. PURCIARELLO: The ultimate heat sink?

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1 No.

2 MEMBER RICCARDELLA: -- this ultimate heat
3 sink --

4 MR. PURCIARELLO: No.

5 MEMBER CORRADINI: But the pump to get it
6 there is?

7 MR. PURCIARELLO: That part, no, that's
8 part of the essential service water system.

9 MEMBER CORRADINI: Right, so what is the
10 system of structures -- give me an example then of a
11 system of structures and components and associated
12 water supply that's --

13 MR. PURCIARELLO: Cooling towers, manmade
14 lakes --

15 MEMBER CORRADINI: So it's just the place
16 where the energy is dumped, it's not how you got it
17 there?

18 MR. PURCIARELLO: That is correct.

19 CHAIRMAN RAY: Yes, and the -- and the
20 beyond design basis conditions interfere with that
21 getting it there.

22 MEMBER CORRADINI: Okay.

23 CHAIRMAN RAY: Now, can I go back and
24 resume what --

25 MEMBER CORRADINI: Sorry.

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1 CHAIRMAN RAY: -- I was saying? That is
2 all right.

3 So --

4 MR. PURCIARELLO: Can I clarify one thing,
5 though? He mentioned --

6 CHAIRMAN RAY: Yes.

7 MR. PURCIARELLO: -- before about
8 transferring heat to metal and such.

9 I said, you know, we would review it. I
10 know that the heat transfer to metal is taken into
11 account in containment analysis design, the peak
12 pressure and how much heat is being taken out in a
13 certain time. I have never seen it as far as an ultimate
14 heat sink is concerned because part of the requirements
15 that I have seen licensees do is they take the sensible
16 -- in their calculation, they take the sensible heat out
17 of the reactor and the containment, they take the heat
18 energy that's in the metal and in the vessel that is part
19 of the calculation.

20 I have never seem them -- granted, I have
21 not reviewed a lot of ultimate heat sink -- I mean,
22 design basis action analysis, but I am not aware of any
23 of them ever taking credit for where the heat goes to
24 the supports and the pipe beam, and that's part of the
25 ultimate heat sink, no, I have never seen that, and you

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1 asked me is that possible, and I said off the top of my
2 head, I said well I guess if they -- if they made the
3 case, you know, that they could do that, but that was
4 just my personal opinion at that point, and I am not
5 saying that that's -- that they have ever done that, or
6 even our reactor systems people would accept that.

7 MEMBER CORRADINI: But just to -- because
8 Harold is going to get after me for asking this, so just
9 to make it final, so that if it was a manmade lake, if
10 it was a cooling tower, wet or dry, if it was a lake
11 that's nearby, that's the ultimate heat sink, it's not
12 the system that takes the energy to that point?

13 MR. PURCIARELLO: That is correct.

14 MEMBER CORRADINI: Whether it be service
15 water, component cooling, or some combination.

16 MR. PURCIARELLO: Right.

17 MEMBER CORRADINI: So the assumption is
18 that it's always a water body?

19 MR. PURCIARELLO: Well, I can -- in a wet
20 cooling tower, I mean, the heat does get transferred to
21 the atmosphere, you know, through evaporation --

22 MEMBER CORRADINI: But just to pick your --
23 that is fair, but the AP1000, it's a cooling tower
24 sitting on top of the containment.

25 MR. PURCIARELLO: For all intents and

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1 purposes.

2 But it's not governed by safety-related
3 systems, it's not active, it's -- it's under a
4 different, different -- it's under --

5 MEMBER CORRADINI: Natural draft cooling
6 tower is not active.

7 MR. PURCIARELLO: Well, but Mike, Mike --

8 MEMBER CORRADINI: You see where I am going
9 with this. There's no natural draft cooling towers
10 that are ultimate heat sinks.

11 MR. PURCIARELLO: There are --

12 CHAIRMAN RAY: Let me grant what you say,
13 that it's a cooling tower sitting on top of the reactor:
14 it's passive, though, and what we said earlier was that
15 automatically changes the game in terms of --

16 MEMBER CORRADINI: No no, I am fine, but I
17 just wanted to make sure I understood it, but I get it,
18 I get it.

19 CHAIRMAN RAY: Okay. So now let's resume
20 the discussion up there that is focused on the word
21 maintenance in the last bullet.

22 So we have this guidance which we are now
23 providing that refers to the Maintenance Rule as one
24 means of assessing the adequacy of maintaining the
25 structures that are within the control of the licensee.

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1 In regard to those that are not, we have something I just
2 want to probe a little bit further.

3 We say, "However, it would be prudent for
4 the licensee, for these other structures not under their
5 control, to ensure other water controlling structures
6 affecting the safety of the site are being monitored
7 under another program."

8 Why do you choose the word prudent? It
9 seems to me that you could have said that the controls
10 that are being applied by whoever is in charge of these
11 other structures need to be described, for example, so
12 that if -- if somebody is maintaining a water-control
13 structure that falls under this category but they're not
14 the licensee, it's somebody else, it changes hands, they
15 change what they do, they -- it just seemed like the use
16 of the word prudent rather than saying something
17 stronger such as the measures being applied to these
18 other structures need to be described or addressed was
19 an alternative that you didn't choose here.

20 Why is it worded the way it is, which seems
21 so I guess strange? Yes.

22 MR. PURCIARELLO: I can answer that and say
23 that let us go back to our -- to our hydrology experts
24 and look for better words to say, instead of using the
25 word prudent which is a -- this is a guideline to

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1 regulations, so to say prudent means, you know, that the
2 reviewer, years from now when he is using this to review
3 a new application, would say well it's prudent that you
4 tell me how this dam or this SSC is going to be
5 controlled, even though it's not under your -- your
6 cognizance, you don't have control of it.

7 And I agree, that is very loose words. I
8 mean, maybe we should say something like tell us what
9 you are going to require the other governing body to
10 stipulate for this dam that is downstream, it's not
11 under your control, you know, Army Corps of Engineers
12 is controlling it.

13 You are saying that more specificity should
14 be in the application regarding structures that are not
15 part of -- that you don't -- that the applicant doesn't
16 have control of.

17 CHAIRMAN RAY: Yes, I think the licensee
18 needs to -- if they are going to rely on something, they
19 need to say on what basis they are relying on it, and
20 the Agency then, if they don't ensure that those
21 measures, whatever they may be, are kept in place and
22 used because they were the -- presumably the basis upon
23 which we agreed to grant the license, if they're not
24 maintained in that way going forward, that at least
25 there's something to point to to say well wait a minute,

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1 the licensing basis says --

2 MR. PURCIARELLO: Yes.

3 CHAIRMAN RAY: -- that this thing will be
4 maintained in such-and-so way, and it's no longer being
5 done so because the, you know, the funding for the
6 maintenance program was cut back or whatever the case,
7 it changed hands, the water-control structure went from
8 a federal agency to a county irrigation district, I
9 don't know.

10 It just seems like this is not a
11 sufficiently definite provision, so --

12 MR. PURCIARELLO: Why don't we go back and
13 talk to our hydrology people and see if we can come up
14 with some more -- we'll take that as your comment and
15 respond to it.

16 CHAIRMAN RAY: Well, of course, the
17 Subcommittee doesn't make comments, only individual
18 members do, and I am acting as an individual member here.

19 We will talk at the end whether or not we
20 need to -- to go and talk to the Full Committee, but that
21 is just one comment from me, and I hear your answer, and
22 that is fine.

23 MEMBER SCHULTZ: We will come to it again
24 on the slide where the public comment is addressed.

25 MR. PURCIARELLO: Yes. I don't know if I

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1 can say anything more than I just said though now, now
2 that it's --

3 MEMBER SCHULTZ: Understood, but the
4 language there is a little even more strong. It says
5 "prudent for the licensee to ensure other
6 water-controlling structures affecting safety are
7 being monitored under another program."

8 So it does place a high level of attention
9 to the licensee's responsibilities in the way it's
10 phrased in the NRC response.

11 CHAIRMAN RAY: Yes, I am not -- what I am
12 saying, Steve, is it seems like if this is a regulatory
13 guidance, it ought to cause whatever the measures are
14 in the licensing basis to be described.

15 MEMBER SCHULTZ: I agree.

16 MEMBER BALLINGER: So what you're saying
17 is don't even use the word "prudent," just take it out.

18 CHAIRMAN RAY: Well I would say describe
19 the measures that are being used by this other party,
20 and if they're considered acceptable, then fine, but at
21 least it's in the licensing basis.

22 And prudence implies, well, I am being
23 prudent as I go forward here, but I am not constrained
24 by what I said would be the case, and that is why I am
25 looking more for constraint on what is done rather than

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1 just you must be prudent and continue to be prudent, and
2 if we think you haven't been prudent 20 years from now,
3 we'll tell you so, or something like that.

4 MEMBER SCHULTZ: Yes, that is what I am
5 looking for also, a reassurance of consistency.

6 MR. PURCIARELLO: So if we removed the word
7 "prudence" and left out the discretionary aspect for the
8 applicants, that would be satisfactory to your comment?

9 CHAIRMAN RAY: Well yes, the more
10 important thing is describe what it is you're relying
11 on.

12 MEMBER BALLINGER: Yes, prudent is in the
13 eye of the beholder, right?

14 CHAIRMAN RAY: Yes.

15 MEMBER SCHULTZ: That is exactly it.

16 MEMBER BALLINGER: So --

17 CHAIRMAN RAY: Just say what it is, we'll
18 look at it. If it meets our requirements, fine, that's
19 what you said you would do -- or they would do, and it's
20 up to you to make sure that they continue to do it, and
21 if --

22 MR. LIN: Yes. Also, in the Reg Guide, we
23 referenced another reg guide, Reg Guide 1.127,
24 Inspection of Water-Control Structures, so it's in --
25 it is in the regulatory position, we also had that.

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1 CHAIRMAN RAY: Okay.

2 MEMBER STETKAR: I was going to ask you, in
3 the Reg Guide, this is -- I didn't go back and study many
4 other reg guides, but this one is a bit different than
5 my recollection because there is a long background
6 section that goes through many specific issues, and then
7 there's the regulatory position section that basically
8 regurgitates most of that stuff, which is a little
9 different than what I have seen in the past.

10 And this particular topic that we've been
11 discussing here appears in the background, this notion
12 of prudence, but it does not appear in the regulatory
13 positions, it is not mentioned in the regulatory
14 position.

15 Now, if I am a licensee or an applicant or
16 I am an NRC staff reviewer, how do I treat differences
17 between the background section, things that are stated
18 there, and things that are stated in the regulatory
19 positions? What is the Regulatory Guidance? Is it
20 only the -- if it's only the regulatory positions, then
21 this notion of prudence or the need to monitor those
22 other facilities is not mentioned at all in the
23 regulatory positions.

24 So how -- how do -- how do I reconcile
25 differences between what is in the background

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1 discussion and what is in the regulatory position? And
2 this is just general curiosity. What is the regulatory
3 --

4 MR. PURCIARELLO: The entire Reg Guide is
5 guidance, I mean, not just the regulatory positions.

6 MEMBER STETKAR: Okay.

7 MR. PURCIARELLO: I can tell you, even the
8 explanation up-front on the background and the
9 introduction --

10 MEMBER STETKAR: Okay.

11 MR. PURCIARELLO: -- that's all part of --

12 MEMBER STETKAR: So if I am -- if I am an
13 applicant, the notion that it would be prudent for me
14 to have some --

15 MR. PURCIARELLO: There are --

16 MEMBER STETKAR: -- assurance that those
17 other structures are being monitored is part of this
18 Regulatory Guidance, and if I am a staff reviewer, I
19 would be looking for some sort of assurance of that
20 prudence.

21 (No audible response.)

22 MEMBER STETKAR: Okay, thank you. Just
23 curious that it was different.

24 CHAIRMAN RAY: Okay. We'll inch ahead.

25 MR. LIN: Okay. I think we already talked

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1 about this. The reason for revision, it's obviously --
2 it's outdated. It was last revised in January 1976, and
3 it has the "for comments" mark on it, so -- and we also
4 need to update the Reg Guide to support reactor
5 applications, to ensure that the guidance in the Reg
6 Guide is consistent with the more recent NRC guidance
7 such as the Standard Review Plan.

8 We also want to update the Reg Guide to
9 incorporate changes in regulations and lessons learned
10 from operating experience.

11 MEMBER CORRADINI: Not to pick on you, but
12 the first sub-bullet underneath update, but you're not
13 going to update it for new reactor update, yours is going
14 to say it isn't applicable. Is that updating it? Is
15 "never mind"?

16 MR. PURCIARELLO: No, no, just passive
17 plants. EPR is an active new reactor, and that would
18 apply, this would apply to EPR.

19 MEMBER CORRADINI: Okay, you got me.

20 MR. LIN: And -- and you realize, this Reg
21 Guide is a little -- because we also -- there is a
22 commitment from the staff to the Commission to update
23 the reg guides to go along with SRP updates associated
24 with new reactor applications, and we are committed to
25 update our reg guides on a regular basis.

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1 This is a really high-level summary of the
2 changes that were made to the Reg Guide.

3 In the introduction, we added -- included
4 all the applicable rules and regulations. We added
5 several other general design criteria that are
6 applicable to ultimate heat sinks.

7 And the discussion section was expanded to
8 incorporate an updated relevant design consideration
9 for ultimate heat sinks. The comments and a lot of the
10 discussions are repeated in the Regulatory Guidance, so
11 I am not going to go into too much detail on the changes
12 that were made to the discussion section because they
13 got carried onto sections of the Regulatory Guidance.

14 And basically, in the discussion section,
15 we expanded it, some discussion on challenging
16 analysis, added additional safety features that the UHS
17 must perform, we added some discussions with respect to
18 harmonization with international standards and
19 industry standards.

20 In the regulatory positions, we made
21 changes to the four existing regulatory positions,
22 primarily to clarify the positions that were confusing,
23 and we added other design considerations, and we added
24 the two new regulatory positions to provide guidance on
25 protections and water control for ultimate heat sinks.

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1 I am going to turn it over to Jerry to
2 discuss the changes that were made to the Regulatory
3 Guidance.

4 MR. PURCIARELLO: Thanks.

5 This slide shows an itemization of the
6 topical headings of the regulatory positions for the two
7 Reg Guides in question here.

8 The first one shows four regulatory
9 positions associated with the 1976, that's the current
10 version of the Reg Guide. And on the column on the
11 right, it shows the proposed regulatory positions for
12 this current 2015 version of the Reg Guide.

13 As you can see, the first four regulatory
14 positions have the same -- they deal with the same
15 topics. In regulatory positions 1 and 2, we clarified
16 the positions, we improved them, and we added some new
17 guides that I'll get into later on in the next slide.

18 In regulatory positions 3 and 4, a defense
19 in depth of technical positions. There was no real
20 change in content. We made some minor editorial
21 changes.

22 And then we added regulatory positions 5
23 and 6, and I will now go on to explain these more in
24 detail.

25 Next slide, please, number 9.

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1 Okay. In regulatory position 1(a), we
2 added the term "cooldown." This is not a new
3 requirement. In the first section, in the guidance
4 section, it did mention that the UHS had to be capable
5 of shutdown and cooldown of the remaining units.

6 We want it to be -- the regulatory position
7 to be consistent with the background information, and
8 this shutdown and cooldown requirement for remaining
9 units after it mitigates the design basis accident in
10 one unit, this is for a multi-unit site, that this is
11 in consistency with GDC 5 --

12 MEMBER STETKAR: Is it really? Does GDC 5
13 require cooldown?

14 MR. PURCIARELLO: It said "An orderly
15 shutdown and cooldown of the non-accident units," yes.

16 MEMBER STETKAR: Cooldown.

17 MR. PURCIARELLO: Yes.

18 MEMBER BLEY: Not the cold shutdown.

19 MEMBER STETKAR: Not the cold -- okay, not
20 the cold shutdown.

21 MEMBER BLEY: It comes up in BTP 5-4, which
22 they'll get to in a while here.

23 MEMBER STETKAR: Is there some thought --
24 last I knew, in March of 2011, there was multiple
25 accidents at a multiple-unit site that occurred, for all

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1 practical purposes, within a short time of one another.
2 Is there any thought to changing this notion of the fact
3 that at a multi-unit site, by definition, only one of
4 those units can have an accident, and therefore the heat
5 removal requirements shall be determined only by a
6 single unit's accident and the other unaffected units'
7 heat removal?

8 MR. PURCIARELLO: Well, are you asking the
9 question on a multi-unit site, would you have a loss of
10 coolant if you had an accident on two units at the same
11 time?

12 MEMBER STETKAR: Not talking about loss of
13 coolant accidents, that I -- I could have an earthquake
14 and a tsunami, for example, that could cause core damage
15 at three units. It might be called Fukushima. It
16 might be a multiple-unit site in the United States that
17 would have another, different type of event occur where
18 I could have within short time of one another multiple
19 units affected.

20 Do we need to think now in 2015 about that
21 possibility, or do we stick with the definition that
22 according to the lawyers, only one unit can have an
23 accident?

24 You said you're updating the guidance from
25 lessons learned. One of the lessons learned is that at

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1 a multi-unit site, you can have more than one unit
2 involved in an accident coincidentally.

3 Go ahead and ask your question.

4 MR. PURCIARELLO: Yes, I am thinking of it,
5 this has kind of caught me off guard --

6 CHAIRMAN RAY: While you are thinking
7 about it, I guess John my reaction to that is, is that
8 by definition a beyond-design-basis condition, where
9 you have an external event of some kind that causes an
10 accident at more than unit?

11 I am thinking about it in terms of a single
12 failure.

13 MEMBER STETKAR: I don't know.

14 CHAIRMAN RAY: Okay. That is the --

15 MEMBER STETKAR: Because I am being
16 careful about what I am calling an accident.

17 MR. PURCIARELLO: Yes. I think Fukushima
18 --

19 CHAIRMAN RAY: This is -- go ahead, you
20 first.

21 MR. PURCIARELLO: I think we have
22 classified Fukushima as a beyond-design-basis --

23 MEMBER STETKAR: Okay.

24 MR. PURCIARELLO: -- event because, you
25 know, they had their tsunami wall, which I believe was

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1 only ten feet high, and so they were assuming that they
2 wouldn't get a tsunami any higher than that, and if they
3 got one higher than that, I think it was a
4 beyond-design-basis event.

5 Theoretically, if the plants are designed
6 seismically, then an earthquake should not even cause
7 a design basis accident. It shouldn't cause a main
8 steam line break, it shouldn't cause a loss of coolant
9 accident.

10 It could cause a multi-unit loss of offsite
11 power, so that could happen, but that is more considered
12 an anticipated operational occurrence, a loss of
13 offsite power.

14 But if it's designed correctly, the -- for
15 the most logical or the most probable seismic event or
16 flooding event, the -- the loss of coolant accident is
17 really a non-mechanistic, no particular cause, it just
18 happens because it happens for some unknown reason.

19 I think the reg guides and the guidance is
20 saying that is not going to happen at two units at the
21 same time from a probability standpoint. I am not sure
22 if that answers your question, but --

23 MR. CASTO: Yes, this is Greg Casto, and I
24 am not in JLD, but I believe that is being addressed
25 within the JLD framework in looking at -- at the

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1 near-term activities, maybe under the mitigating
2 strategies rulemaking, I think this is a question we
3 probably ought to bring back to you if you're looking
4 at --

5 MEMBER STETKAR: This is --

6 MR. CASTO: -- multi-unit --

7 MEMBER STETKAR: This is design of an
8 ultimate heat sink, though, and I haven't seen anything
9 in the JLD stuff that, unless FLEX is going to fly in
10 big tanker airplanes and dump them into pre-designed,
11 you know, basins or something like that, that is -- I
12 haven't seen anything address that, that looks at the
13 capacity of the ultimate heat sink.

14 MR. CASTO: Okay.

15 MEMBER STETKAR: I have looked at, you
16 know, given you're out in the post-72-hours or
17 post-seven-days or whatever, you know, the different
18 phase is, what alternatives do you have? But
19 primarily, from pumping water from an existing body of
20 water into the plant, not --

21 MR. CASTO: Yes.

22 MEMBER STETKAR: -- not some of the issues
23 that are being --

24 MR. CASTO: Okay.

25 MEMBER STETKAR: -- addressed here.

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1 MR. CASTO: This is a multi-unit accident
2 analysis, is -- is currently under JLD, but --

3 MEMBER STETKAR: Right.

4 MR. CASTO: -- we'll bring this question up
5 to --

6 MEMBER STETKAR: But I think here the key
7 from what I hear you saying may be that you're strictly
8 in this guidance limited to design basis accidents, and
9 in a design basis accident, the maximum heat release
10 would be from something like a steam line break or a LOCA
11 perhaps.

12 On the other hand, I am a risk assessment
13 guy, and I haven't done the risk assessments about can
14 you get multiple events going on from something -- from
15 some external hazard within the design basis.

16 MR. PURCIARELLO: This should be design
17 basis because it implements regulations, Commission
18 regulations, and so there are guidelines for
19 implementing those, and the regulations are within the
20 design basis.

21 And then in regulatory -- going on to
22 regulatory position 1(b), we had a clarification that
23 for cooling towers, that if there was multiple cooling
24 towers, that the design of the cooling towers had to take
25 into effect the effects of recirculation and

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1 interference of one cooling tower with another.

2 The regulatory position 1(c), we added the
3 -- we clarified the concept that the meteorological
4 conditions for maximum water cooling loss over the
5 30-day period had to be the worst 30-day combination of
6 controlling meteorological parameters.

7 In regulatory position 1(d), we clarified
8 it and changed that the meteorological conditions
9 associated with the maximum intake water temperature as
10 opposed to the -- what it previously said was "minimum
11 water cooling," because we're interested in peak
12 temperature because this is the water that comes in and
13 cools safety-related components like diesel generators
14 and such, and you're concerned about peak temperature
15 because it's equipment like diesel generators, you've
16 got to be concerned about peak temperature.

17 And then in regulatory position 1(e), we
18 clarified the basis for how to select the meteorological
19 data, and we used the term "critical" -- defined the term
20 "critical time," which was really actually defined in
21 the background basis, we redefined what that really
22 means, so we changed that.

23 Next slide, please.

24 CHAIRMAN RAY: Before you go on, let me --
25 I don't know whether this belongs with meteorological

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1 conditions or not, but in talking about natural
2 phenomena and site hazard, you say, "The potential for
3 adverse environmental conditions such as icing should
4 be considered in determining for performance. If
5 applicable, the potential for water freezing in the
6 ultimate heat sink water storage facility should be
7 analyzed. The maximum accumulated degree that is below
8 freezing recorded in the site region during the winter
9 or during the worst case freezing spell in warmer
10 climates may be a reasonably conservative site
11 characteristic for evaluating this potential."

12 Again, I am drawn to the sort of weak
13 suggestion it may be reasonable. Why was that wording
14 chosen?

15 MR. PURCIARELLO: Mike, you want to
16 address that?

17 MR. MAZAIKA: This is Mike Mazaika from
18 NRO. Can you refer me to that specific wording?

19 CHAIRMAN RAY: Well, it's on page 13 of the
20 printout I have here. It's item 2(c), I guess it is,
21 yes, 2 being Natural Phenomena Site Hazard Designs of
22 the Ultimate Heat Sink, and this is paragraph c.

23 MR. PURCIARELLO: Regulatory position
24 2(c).

25 MEMBER STETKAR: It is actually, I mean,

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1 the index here, slide 12 of your slides.

2 CHAIRMAN RAY: Okay. I was premature I
3 guess in associating it with meteorology, but anyhow,
4 it just struck me as odd to say it "may be a reasonably
5 conservative site characteristic" without any
6 elaboration.

7 Maybe it is, maybe it isn't, I don't know,
8 but usually we are more specific, such as by saying it
9 should be used unless there is some good reason shown
10 for using something else, or you know, I just am asking
11 the question of why are we hedging a position as much
12 as that?

13 MR. MAZAIKA: Part of -- part of that
14 wording talked about resolving redundancies amongst the
15 group that was updating the Reg Guide was based on
16 removing some redundancy in the Standard Review Plan.
17 2.3.1, the Regional Climatology, addresses freezing
18 conditions, and I believe Section 2.4.7 under Hydrology
19 addresses that as well, so we recognized that it was
20 something that needed to be considered.

21 As to the specific wording, I can't speak
22 to that right now, but since it was -- since it was
23 addressed in both places of our review guidance, the
24 topic needed to be discussed within this Regulatory
25 Guide.

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1 CHAIRMAN RAY: Well, for what it's worth --

2 MR. MAZAIKA: Does that answer --

3 CHAIRMAN RAY: -- this member, anyway,
4 would comment that you ought to reconsider such wording
5 because it I don't think is helpful.

6 If there is -- if there are different
7 alternatives that should be considered, fine, say what
8 they are, but it implies to me that this is much more
9 of an ad hoc decision than it ought to be.

10 MR. PURCIARELLO: Okay, slide 10.

11 And then to regulatory -- going on to slide
12 10, in regulatory position 1, we added the following
13 design considerations: (h) through (k), (h) dealing
14 with fire protection criteria of construction
15 materials; in regulatory position (i) we added that --

16 MEMBER STETKAR: Jerry, let me stop you
17 there because -- rather than bouncing all over the
18 place.

19 (h), if I can find my notes here, is -- it
20 says that I can use fiberglass reinforced thermosetting
21 resin piping as long as it meets other criteria, and then
22 there's a parenthetical note saying at the time this --
23 of this Reg Guide revision, the NRC staff has not
24 approved American Society of Mechanical Engineers Code
25 Case N-755-1 and the use of high density polyethylene

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1 materials.

2 This seems to be another instance of staff
3 delays in approving ASME code cases getting folded into
4 regulatory guidance, which then requires applicants
5 later to take exceptions to that regulatory guidance
6 which places a burden on them, places a burden on the
7 staff, and so forth.

8 So I did a little homework. I don't know
9 when ASME Code Case N-755-1 was submitted. I did find
10 a poster session in the 2011 RIC, that being four years
11 ago, that said that the staff was reviewing it and had
12 not accepted it at that time, so we are at least four
13 years into the staff review process. What is the
14 current status of the staff review of that ASME code
15 case?

16 MR. LIN: I am not aware of the current
17 status, but I know there is ongoing research in this
18 area, in this particular area, so --

19 MR. BURKE: This is John Burke, I am Branch
20 Chief in Research.

21 Bruce is right, that code case is still
22 under review by both Research and NRR, and there is
23 active research in the Office of Research looking at the
24 use of HDPE piping. It is in a different group than the
25 group I am in, but I believe the concern is the welding,

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1 as they call it, the joining the sections together, and
2 then NDE of the material, so that's why that code case
3 has not been approved yet.

4 MEMBER BALLINGER: But plants have been
5 using that stuff with exceptions for at least ten years.

6 I mean it is wholesale conversion when they
7 redo their service water systems.

8 MEMBER RICCARDELLA: Yes, there are
9 several plants that have done this with fitted piping.

10 MEMBER STETKAR: Right, and it's used
11 other places in the world.

12 MEMBER RICCARDELLA: In other places in
13 the world as well.

14 MEMBER CORRADINI: So, I'm sorry, so those
15 are the facts, so what is it that's the --

16 MEMBER STETKAR: Well my question --

17 MEMBER CORRADINI: -- what's the --

18 MEMBER STETKAR: Why does the Reg Guide --
19 first of all, it's really annoying that it takes the
20 staff many, many, many, many years to review these code
21 cases, I mean, if you're not going to approve it, you
22 ought to just say we're not going to approve it and be
23 done with it, if you're going to approve it, you ought
24 to do it in a timely fashion, but that's a different
25 issue.

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1 Why did we need to write the reg guides this
2 way such that it's written negatively? Basically, now,
3 I could -- can I write a reg guide that says continent
4 on staff approval of this code case, you can use it?

5 See, that -- that says after the code --
6 this just says it's not approved.

7 Exceptions are approved, and exceptions
8 have been approved.

9 MR. PURCIARELLO: That would seem to be a
10 better way to do it, yes, saying that when approved or
11 it's under -- well, how did you phrase that terminology?

12 MEMBER STETKAR: Contingent on approval
13 would be -- I don't know how to write it because I don't
14 know how the regulatory guidance is developed this way.

15 MEMBER POWERS: I've spoken a little bit
16 about the concerns. The applicant can do anything he
17 wants to, but what they write in the Reg Guide is what,
18 if you do this, and we expect you to do it, you can expect
19 approval here.

20 What we're saying is that right now, you
21 can't ipso facto expect approval on high density -- on
22 piping right now, you're going to have to write a
23 justification on that. I mean, I think that's kind of
24 a factual statement.

25 MEMBER RICCARDELLA: Well, in terms of

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1 this Reg Guide, I mean, wouldn't it be sufficient just
2 to say buried piping and spray pond piping may be
3 constructed of non-fireproof materials or something of
4 that sort? And that way you get around whether it's
5 fiberglass or HDPE.

6 I mean, that's the intent of that
7 statement, isn't it, that if it's buried, it doesn't
8 have to be --

9 MEMBER STETKAR: And that the applicant
10 would --

11 MEMBER RICCARDELLA: -- fireproof.

12 MEMBER STETKAR: -- have to justify the
13 material that is being used.

14 MEMBER BALLINGER: That's a much more
15 definitive thing that --

16 MEMBER STETKAR: The problem is we get reg
17 guides that are updated once every 25 to 30 to 40 years,
18 and -- and in that Reg Guide, there is a specific
19 material that's approved, a material that is sort of in
20 limbo, and other materials that might come along in the
21 next 25 to 30 years that aren't even listed in here.

22

23 MEMBER POWERS: Well, of course they can't
24 be --

25 MEMBER STETKAR: Well no, they can't, but

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1 my point is why, at this snapshot of time, need -- of
2 necessity, does the Reg Guide have to be very specific
3 about one and only one material, nebulous about another
4 named material, and silent on, you know, the other
5 materials that we don't know about.

6 MEMBER POWERS: Well, we know absolutely
7 why it has to be silent on the materials we don't know
8 about.

9 MEMBER STETKAR: Exactly, but --

10 MEMBER POWERS: Okay. If it is -- I mean,
11 it seems to me it's saying if you're coming in here with
12 a fire-resistant material, I am going to approve this,
13 okay?

14 Now, if you come in with something else,
15 that heretofore I haven't examined, don't expect to be
16 approved without a justification.

17 I mean, that strikes me as what the Reg
18 Guide -- the Reg Guide is doing what it is supposed to.
19 It is saying do this and you have every reason to expect
20 to get approved. Do something different and I am going
21 to ask for justification. Now, that justification may
22 vary depending on the status of approval of --

23 MEMBER STETKAR: Right.

24 MEMBER POWERS: -- code cases. The
25 justification may be a one-liner in the case of approved

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1 code cases --

2 MEMBER STETKAR: Yes.

3 MEMBER POWERS: -- and may be a minor topic
4 for a treatise on the case of unapproved code cases, but
5 I mean otherwise, the Reg Guide seems like it's doing
6 what it's supposed to.

7 MEMBER BALLINGER: But it doesn't exactly
8 say that.

9 MR. BURKE: This is John Burke again.

10 MEMBER POWERS: But it doesn't have to say
11 that. I mean, it seems to -- I really don't understand
12 what you're objecting to.

13 MEMBER BALLINGER: Well, using the words
14 "should" and "prudent" and those kinds of things.

15 MEMBER POWERS: I mean, I don't see what is
16 wrong with that.

17 CHAIRMAN RAY: We had a comment from the
18 audience here.

19 MR. BURKE: Just to remind you, the -- not
20 on the HDPE, but on the fiberglass pipe, that is in the
21 current Reg Guide also, and there is a separate reg guide
22 on the use of fiberglass pipe that we continue to accept.
23 It's just -- the only change in here is that the -- the
24 phrase about the code case for the high density
25 polyethylene pipe.

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1 CHAIRMAN RAY: Any further discussion,
2 John, you --

3 MEMBER STETKAR: No.

4 CHAIRMAN RAY: All right. Given the
5 pause, we're going to, rather than resume and then stop
6 again shortly, we'll take a 15 minute break until 10
7 minutes after 10:00.

8 (Whereupon, the meeting went off the record
9 at 9:52 a.m. and resumed at 10:10 a.m.)

10 CHAIRMAN RAY: We are back on the record,
11 and we are resuming the discussion where we left off at
12 the break, so please proceed.

13 MR. PURCIARELLO: Okay. We are on slide
14 10 discussing regulatory position 1(i). In 1(i), we
15 added the guideline that the Applicant should include
16 the thermal load from the spent fuel pool in addition
17 to the accident and non-accident units.

18 MEMBER SKILLMAN: Jerry, let me -- let me
19 move in here just for a second.

20 Looking at your draft guide, you have
21 introduced under (c) (1) (a) the fission cooling for 30
22 days, on your staff guidance (c) (1) (a), you have
23 introduced 30 days. That is fine, I've got no problem
24 with that, sounds like a good place to start.

25 But then you add on (i), (i) as in indigo,

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1 small (i), heat loads that are important in safety or
2 must be cooled during the 30 day recovery period by the
3 UHS should be included in determining the UHS thermal
4 performance, such as the heat loads from the spent fuel
5 pool and operating pumps.

6 You have introduced a term "recovery
7 period." Where did you define that? That is the first
8 place that word is used. I think it really is what
9 you're referring to in (c)(1)(a) --

10 MR. PURCIARELLO: Correct, that is the
11 intent.

12 MEMBER SKILLMAN: But I would suggest to
13 you that at least in the sampling of one, I know where
14 the -- it took over a year to back out of the recovery
15 period, and that was at TMI-2.

16 So recovery period means something, and I
17 think what you really mean is the design basis duration
18 or the licensing basis period or the required duration
19 -- recovery period seems to mean something.

20 MR. PURCIARELLO: Well, we use -- I think
21 maybe the --

22 MEMBER SKILLMAN: Or delete "recovery."

23 MR. PURCIARELLO: -- or as we defined it in
24 1(a), we call it the sufficient cooling for 30 days, or
25 at least 30 days --

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1 MEMBER SKILLMAN: Then repeat those words.

2 MR. PURCIARELLO: -- you can call it the 30
3 day sufficient cooling period.

4 MEMBER SKILLMAN: That would be fine.

5 MR. PURCIARELLO: Right, I could see -- if
6 that clarified the case, I don't see any problem with
7 it.

8 MEMBER SKILLMAN: Yes, well recovery has a
9 unique meaning if you're in site area emergency or
10 general emergency, because to get out of a general, you
11 have to have a recovery plan.

12 MR. PURCIARELLO: Okay.

13 MEMBER SKILLMAN: So recovery can't -- it
14 has a --

15 MR. PURCIARELLO: I agree.

16 MEMBER SKILLMAN: -- it has an item.

17 MEMBER STETKAR: Jerry, obviously I -- you
18 know, I stumbled over that too, and if you look at (k),
19 you just call it the 30 day period down in (k).

20 You know, people know what you're talking
21 about with the 30 day period.

22 MR. PURCIARELLO: Yes.

23 MEMBER STETKAR: So just say 30 day period,
24 and that even -- it's what you call it in (k), it's what
25 you call it elsewhere --

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1 MEMBER SKILLMAN: It is what you put in
2 1(a).

3 MR. PURCIARELLO: Okay. Any other
4 comments on that issue?

5 MEMBER SKILLMAN: Thank you, no.

6 MR. PURCIARELLO: Okay, we will proceed on
7 to regulatory position 1(j). There we stated that the
8 UHS active mechanical components should automatically
9 activate --

10 MEMBER STETKAR: Jerry, you -- that is the
11 first sentence in (j). The second sentence in (j) says
12 "If the active UHS mechanical component does not
13 automatically start, operator actions are required to
14 support its intended safety function."

15 And I got confused by the second sentence.
16 There, do you mean if it has an automatic start feature
17 and that automatic start feature doesn't work, then the
18 operators need to start it manually, or do you mean if
19 the thing was never provided with an automatic start
20 feature, then operators will need to start it manually?
21 Those are two different things.

22 MR. PURCIARELLO: The latter.

23 MEMBER STETKAR: The latter, okay. Well,
24 let me tell you that the sentence could be interpreted
25 either way.

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1 If the latter applies, even in some cases
2 the former, just saying that operator actions are
3 required in many cases doesn't give me much guidance.
4 It doesn't say, well, if you're going to require
5 operator actions, do we expect the applicant to
6 demonstrate the feasibility and reliability of those
7 actions, and their methods to do that?

8 MR. PURCIARELLO: There's human factor
9 criteria, and I would interpret this to -- I would
10 interpret this to mean that if you don't have -- if your
11 active components are components that you need to
12 actuate to mitigate the design basis exit, if it's not
13 automatically featured, then operator action would be
14 required that would call the attention to the human
15 factors review, saying -- and we have human factor
16 guides, like there can be no operator reaction within
17 the first -- this is just a guideline -- in like the first
18 ten minutes of the casualty.

19 A case in point would be some of the
20 Westinghouse plants, when it goes on -- when a plant goes
21 on recirculation, sometimes it happens automatically
22 when the RWST level reaches a certain level, and in some
23 plants, the older plants, it requires operator action
24 to actually make that switch over. You know, that's
25 been -- both cases have been approved by the staff --

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1 MEMBER BLEY: Jerry, can I interrupt you
2 and your response here?

3 What it reads like is what your response to
4 comments looked like, and it looked like this started
5 out as just being automatic, and some folks objected,
6 and you said oh, well, we're going to keep it automatic
7 because that is what we want, but if it doesn't start,
8 you should do it by operator action.

9 Now, most other reg guides that come to this
10 point of saying you can have operator actions tell us
11 some of the stuff you were just telling us, or at least
12 it refers you to the right place to see how to justify
13 your operator actions.

14 This looks like it was a response to a
15 comment, you stuck in a sentence, and you should have
16 stuck in more than a sentence.

17 Think about that.

18 MEMBER BROWN: I would have -- I would have
19 actually made one other thought process. Instead of
20 saying "operator actions are required," I would have
21 phrased it that the ability to manually start these
22 components should be provided, and then refer to the --
23 whatever else, you know, the stuff you're talking about.

24 But saying they're required, you just
25 really want to make sure you can start them, that

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1 somebody can go push a button, and then you've got other
2 requirements that says they've got to be able to do it
3 within a timely manner and refer them to that.

4 MEMBER BLEY: That's a way they could edit
5 it.

6 MEMBER BROWN: Yes, I don't like this
7 "operator actions are required," because to me, it's --
8 it ends up as a confusion.

9 I -- just saying that they should be able
10 to be manually operated is -- and then refer to your
11 human actions, human factors, to get them in the right
12 -- that was my point.

13 MEMBER SKILLMAN: Sorry to -- and another
14 way to address that is that the emergency operating
15 procedures, or the operating procedures, should be
16 followed, because those are the ones that will guide you
17 into those actions.

18 MEMBER BROWN: Yes, but you have got to
19 make sure that -- that that pump or that valve or those
20 things can actually, somebody can go out and punch a
21 button --

22 MEMBER SKILLMAN: Got to be --

23 MEMBER BROWN: -- I presume that is --

24 MEMBER SKILLMAN: They have got to be
25 capable of responding.

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1 MEMBER BROWN: That is why I thought that
2 ought to be more explicitly stated.

3 MEMBER BLEY: And that's the way most --

4 MEMBER BROWN: Yes, exactly --

5 MEMBER BLEY: -- do it, yes. At least the
6 ones I have looked at.

7 MEMBER STETKAR: I will make a note,
8 there's a NUREG-1852 that provides guidance, where it's
9 written in the context of fire actions, but it's --
10 it's applied generally to demonstrate the feasibility
11 of operator actions.

12 MR. PURCIARELLO: How about if we say the
13 words "If active UHS mechanical components are not
14 designed to automatically start, operator actions in
15 the course of human factor standards are required to
16 support --" --

17 MEMBER BLEY: If that's what you mean, your
18 response to the comments said we want it to be automatic,
19 so I don't know if you meant what you said in the response
20 --

21 MR. PURCIARELLO: Well we want --

22 MEMBER BLEY: -- so this is -- this would
23 be okay with me, but I -- you know, that's -- we're just
24 individuals here.

25 MR. PURCIARELLO: We want it to be

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1 automatic, but you know, it's --

2 CHAIRMAN RAY: Well it's ambiguous as a
3 stance, so it's up to you devise -- it's ambiguous in
4 the sense that I think was stated, which is it sounds
5 like maybe the operator action is due to a failure to
6 automatically start --

7 MR. PURCIARELLO: Yes, it does sound that
8 way, yes.

9 Okay, going on to position 1(k), we added
10 the UHS inventory, the 30-day inventory, should take
11 into account if it's a pond or a lake or a cooling tower,
12 it should take into account evaporated losses, tower
13 drip losses, and boundary leakage.

14 We specifically added boundary leakage
15 later on in the process because there was a licensee that
16 came in that had a 20 percent reduction in their UHS,
17 and they said well you didn't say we had to account for
18 boundary leakage, you didn't say it was valve leakage,
19 you didn't say we had to account for that, so even though
20 we didn't accept that --

21 MEMBER BLEY: Could we have missed
22 something here? Shouldn't you say all sources of -- all
23 losses, I think?

24 You've been very specific here, and maybe
25 we forgot something, and then they would say well you

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1 didn't tell us we had to look for -- you have to look
2 for all the ways this water might go away is what you're
3 really saying, right?

4 MEMBER SCHULTZ: All losses such as --
5 including in that phrase --

6 MEMBER BLEY: Just said --

7 MEMBER SCHULTZ: -- leakage because it was
8 forgotten.

9 MR. PURCIARELLO: Okay, all losses --

10 MEMBER BLEY: This might be a complete set,
11 but it might not be.

12 MR. PURCIARELLO: Okay, we can rephrase
13 that to take in the cases we haven't considered.

14 Okay, slide 11.

15 This is on regulatory position 2. We --
16 this is on the capability to withstand natural phenomena
17 and site hazards. In position a(1), we describe the
18 terminology GDC 2 just to be explicit that that's the
19 natural phenomena that we're referring to. It is
20 really no change in the position.

21 In regulatory position a(4), we expounded
22 upon manmade failures to include reservoirs, dams, and
23 any type of water-retaining structure, both upstream
24 and downstream of the site, including the potential for
25 any blockage that that may cause, that that's a -- the

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1 position previously just said "other manmade failures."

2 And regulatory position a(5) is a new
3 position, and it talks about any changes in the notion
4 that lake level caused by climatological conditions
5 that result from human or natural causes -- this is sort
6 of a way of referring to, in a way, possible global
7 warming, when it talks about human or natural causes,
8 and we just felt that it had to take that into account.

9 MEMBER BROWN: How do you expect them to do
10 that? They're supposed to project out 30 years when
11 nobody else knows what they're doing right now.

12 MR. PURCIARELLO: Well, we made a
13 statement about --

14 MEMBER BROWN: The life of the license or
15 whatever it is?

16 MR. PURCIARELLO: We made a statement in
17 regulatory position (c) (1) (e) that current literature
18 on possible changes in climatological conditions in the
19 site region should also be reviewed to be confident that
20 the methods used to predict weather extremes are
21 reasonable, so we are asking them to review current
22 literature, which we don't know what it is going to be
23 like five, ten years from now. I mean it's --

24 MEMBER BROWN: I mean it just seemed kind
25 of vague for the licensees. I am just thinking of the

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1 licensees, how in the world do you comply with that?

2 That was my thought.

3 CHAIRMAN RAY: Well, the -- I guess,
4 Charlie --

5 MEMBER BROWN: Oh, well you've got more
6 experience with that, I just --

7 CHAIRMAN RAY: I would respond that they
8 would just do their best. The point is, do you include
9 recognition of climate change or do you exclude it? And
10 this is just an effort to include it.

11 MR. PURCIARELLO: Right, exactly. It
12 says it needs to be included, but we don't know what that
13 is going to be in the future.

14 MEMBER BROWN: Okay.

15 CHAIRMAN RAY: You can say we're
16 addressing it by saying we don't believe there is such
17 a thing, therefore we haven't included it, so --

18 MEMBER BROWN: Well no, I am not implying
19 one way or --

20 (Laughter.)

21 MEMBER STETKAR: For the record, this is a
22 Subcommittee meeting, and we speak as individuals.

23 MEMBER BROWN: I was not trying to make a
24 claim one way or the other, I just was thinking about
25 it's kind of a -- you know, everybody is arguing about

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1 it, and it varies from place to place, so -- so anyway,
2 that is fine, go ahead.

3 MEMBER STETKAR: Jerry, before you go to
4 the next slide, you did not include (a) (2) and (a) (3),
5 which I had a couple of questions about those.

6 (a) (2) says that you need to account for the
7 site-related events that "historically have occurred or
8 that may reasonably be expected to occur during the
9 plant lifetime," and (a) (3) says you need to account for
10 "reasonably probable combinations of less severe
11 natural phenomena or site-related events."

12 And there are also several other places in
13 the guidance, the background especially, that use these
14 terms like "reasonably expected performance,"
15 "reasonably expected to occur." What is "reasonably
16 expected to occur during the plant lifetime"? Is it a
17 90 percent chance that something might occur? Is it a
18 10 percent chance? Is it a 1 percent chance? Is it a
19 10⁻⁵ chance? Is it -- what is "reasonably expected"?

20 MR. PURCIARELLO: Well, I think case in
21 point, let's say like there's a refinery across the
22 river from a plant, what's the chances of having a fire
23 and explosion there? Well, I mean, you know, I don't
24 know, but that would have to be discussed at the time
25 of licensing, you know, if that's reasonable or not.

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1 It's -- can it happen? Well, you know,
2 that would have to be discussed then. I agree, it's --
3 it's very subjective, it's not precise, but I don't know
4 how to make it precise. You know, it's telling the
5 applicants that they have to look at what's around them
6 and to make a reasonable assessment of what might happen
7 based on what's there, and then discuss it with the staff
8 in their application, and then it would have to be
9 resolved at that point.

10 MEMBER STETKAR: How does the staff know
11 what is reasonable?

12 MR. PURCIARELLO: Well, it's a judgment
13 call.

14 MEMBER STETKAR: Okay. I note that 10^{-7}
15 per year exceedance frequency for high winds is
16 considered reasonably small, 10^{-6} isn't, 10^{-4} exceedance
17 frequency for a design-basis earthquake is considered
18 reasonably small. That's a factor of a thousand
19 difference in someone's interpretation of what might be
20 reasonable. How do we resolve this, this vague notion
21 that keeps permeating this stuff about "reasonable
22 probability" and "reasonably expected" and just leaving
23 it up to your judgment versus my judgment and two other
24 individuals' judgment for a different site at a
25 different time?

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1 MR. PURCIARELLO: Maybe we should talk to
2 our PRA people and see how they would reword this, if
3 it needs to be reworded.

4 MEMBER STETKAR: Okay, because --

5 MR. PURCIARELLO: We can do that, we can
6 talk to our PRA people and say this is what we -- this
7 is what we've said, is this statement reasonable?
8 Well, we wouldn't say that, but --

9 (Laughter.)

10 MEMBER STETKAR: But you see, there's part
11 of this -- we have regulatory guidance that has been
12 developed over a long period of time stretching back
13 into the -- in this case, the 70s, and there is
14 terminology that has been used, and there's a developing
15 set of notions that are just being perpetuated in many
16 cases, and it does result in things like well, we have
17 to design against a 10^{-7} three-second maximum gust wind
18 speed, but we only have to design against a 10^{-4}
19 design-basis earthquake, or maybe 10^{-5} , we're not quite
20 sure, somewhere in that decade where that design-basis
21 earthquake is. And both of those apparently are
22 considered reasonably probable events because we're
23 requiring people to design against them.

24 CHAIRMAN RAY: John, are we at a point
25 where we're asking the question should this Reg Guide

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1 be transitioned other, deterministic terminology --

2 MEMBER STETKAR: Not necessarily, I am
3 just challenging the staff that we ought to try to get
4 away from this vague concept that's left up to the
5 judgment of the individuals of what is reasonably
6 probable.

7 CHAIRMAN RAY: Yes --

8 MEMBER STETKAR: I am not necessarily
9 advocating a specific number.

10 CHAIRMAN RAY: The thing that I applied to
11 it in my review was, well, this is still in the
12 deterministic world where we don't attempt to get beyond
13 --

14 MR. PURCIARELLO: We can take out the word
15 "reasonably" and just say "probably combinations."

16 MEMBER STETKAR: 10^{-30} is probable, there's
17 a probability. Meteorite strikes are -- I can
18 calculate the frequency of meteorite strikes.

19 MEMBER SCHULTZ: "Reasonable" is good, but
20 there needs to be something attached to it so that any
21 individual will see it the same way as another.

22 MEMBER STETKAR: Some individuals would
23 argue --

24 MEMBER BLEY: And we've done that.

25 MEMBER STETKAR: That -- and we've done it

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1 in the past -- some individuals would argue that no, 10⁻⁷
2 design-basis wind speed is a reasonably probable event,
3 and you need to consider it.

4 MR. PURCIARELLO: Couldn't that
5 discussion happen at the time of application? If we
6 wrote it like this, and that discussion you're talking
7 about, that could happen at the time of application?

8 MEMBER BLEY: Well the problem that
9 happens then is every application comes up with a
10 different judgment about that, and --

11 CHAIRMAN RAY: Well --

12 MEMBER BLEY: -- and we're regulating
13 people differently.

14 CHAIRMAN RAY: We are, in accordance with
15 Commission policy, seeking to move out of the world that
16 I thought this Reg Guide was still in, which is the
17 deterministic world in which we use this kind of
18 terminology for design-basis earthquakes, not for
19 safe-shutdown earthquakes anymore.

20 But so in the area of seismology, we've
21 moved into probabilistic terminology and
22 meteorological conditions associated with design, wind
23 speeds and so on.

24 I just assumed you hadn't done that here,
25 but if the point is -- it seems to me like there ought

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1 to be a consistent policy if we're updating reg guides
2 to make that transition where it's practical to do, and
3 I guess then the question should be left to you, well,
4 was that deliberately not done here for some reason?

5 MR. PURCIARELLO: Well I mean we're
6 talking about site-related events which are not -- which
7 can be unique to each site. I mean, we can't say we're
8 talking about an earthquake or anything. We're talking
9 about a refinery, we're talking about a dam breaking,
10 we're talking about, you know, something that is unique
11 to that position.

12 MEMBER STETKAR: That's true. It's
13 absolutely true. I don't think anybody is arguing with
14 that.

15 But in some sense, if I go back to my
16 original question, what is, in the Staff's judgment, a
17 reasonably probable event? Is it something that has
18 got a 90 percent chance of occurring during the lifetime
19 of the plant, the expected lifetime of the plant? Is
20 it 10 percent? Is it 1 percent? Is it 1/100th of 1
21 percent?

22 You know, what -- what is that notion of
23 reasonably probable? And I am -- and there, you know,
24 whether I am looking at a refinery explosion or whether
25 I am looking at an earthquake or whether I'm looking at,

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1 you know, some other phenomenon, manmade or natural,
2 that at least gives me some sense of what you mean by
3 "reasonably expected to occur."

4 MEMBER BLEY: We had concepts like that
5 years ago, and you talked about transients and some
6 abnormal operating occurrences and accidents, and they
7 had to do with whether you expect to see them routinely
8 or maybe once in the life of the plant, or you don't
9 expect to see it. Something at least puts some bounds
10 on what we're talking about, and that is kind of where
11 we're pushing, so --

12 MR. PURCIARELLO: Yes. Maybe we can look
13 for other guidance on --

14 MEMBER BLEY: And if we're talking about
15 something here that takes out the ultimate heat sink,
16 then that is a pretty important thing, so it ought to
17 be --

18 MR. PURCIARELLO: Yes.

19 MEMBER BLEY: -- not very likely at all.

20 MEMBER STETKAR: Not very likely to occur
21 during the life of the plant, but even then, that's not
22 -- I don't know what "not very likely" because some
23 people's --

24 MR. PURCIARELLO: Maybe our -- this is just
25 a maybe -- maybe our PRA people have some data on -- they

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1 have a document that lists probabilities of certain
2 events happening, and then we can just refer them to that
3 document. I am not sure how to handle, I am not sure
4 --

5 MEMBER STETKAR: You don't want to do that
6 because every site and every hazard is different,
7 especially if you're talking about manmade hazards that
8 could affect pipelines that are delivering water or what
9 have you.

10 MR. PURCIARELLO: Do you have a suggestion
11 how we should reword this?

12 MEMBER STETKAR: I -- I have suggestions,
13 but --

14 MR. PURCIARELLO: We'll take your
15 suggestions.

16 MEMBER STETKAR: Hmm?

17 MR. PURCIARELLO: We'll take your
18 suggestions.

19 MEMBER STETKAR: I -- we ought not to be
20 writing your guidance, and again, this is just
21 individual members of the Subcommittee, so there's a
22 real danger of individuals on a Subcommittee proposing
23 verbiage.

24 CHAIRMAN RAY: Well again, I think this is
25 more of a -- a policy question than it is a pointing at

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1 some particular use of the term "reasonably probable."

2 Are we -- because that is the deterministic
3 terminology we've used in the past, right? Okay.

4 MEMBER STETKAR: Well, but even in the
5 deterministic world, there are certain screens that are
6 applied.

7 CHAIRMAN RAY: I --

8 MEMBER STETKAR: There is a screen that is
9 applied that says for high winds, I can screen out things
10 if -- if the frequency is less than 10^{-7} per year. That
11 is in the reg guide.

12 MEMBER BROWN: Even on a deterministic
13 basis of terminology?

14 MEMBER STETKAR: That is part of -- it is
15 part of the term.

16 MEMBER BROWN: Okay.

17 MEMBER STETKAR: I don't need to consider
18 something that is -- I don't need to consider the
19 once-in-500-billion-year something extrapolated, so
20 even in the deterministic world, there are elements of
21 screening frequencies introduced in the guidance.
22 They are not introduced -- in my opinion they're not
23 introduced consistently, which is why I always come up
24 with winds and the seismic events, but those notions do
25 appear even in the deterministic world.

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1 MEMBER BROWN: So it's not above them
2 taking the approach of looking for that screening type
3 level effect --

4 MEMBER STETKAR: It --

5 MEMBER BROWN: -- and put it into the Reg
6 Guide for consideration.

7 MEMBER STETKAR: That's right --

8 MEMBER BROWN: I am just --

9 MEMBER STETKAR: -- except all I am warning
10 is that you have to be careful about not using specific
11 -- you know, saying well if you have a refinery located
12 within, you know, two kilometers of the plant, the
13 frequency of that refinery exploding needs to be less
14 than x, and if you have something else, that isn't the
15 notion I am after here.

16 The notion is what, for this particular
17 function, do we consider a de minimis risk? So it's
18 that below that, it's not considered reasonably
19 probable, and I don't need to consider it.

20 MR. PURCIARELLO: You think we should put
21 a number in there? Am I understanding --

22 MEMBER STETKAR: That is -- you know, that
23 is up to you guys.

24 MR. PURCIARELLO: I mean, are you hinting
25 at putting a number in there? Is that kind of what

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1 you're --

2 MEMBER STETKAR: That's -- I --

3 CHAIRMAN RAY: Well, it couldn't be a
4 number that you just picked just to satisfy the need for
5 a number. I mean, it's got to -- to me, at least, it's
6 got to reflect some consistent policy approach to, in
7 this case, external hazards.

8 And you're saying if -- if they're less than
9 the -- they're less severe natural phenomena, then we've
10 got to consider combinations of them.

11 I mean, these -- this is more of a policy
12 decision than it is let's just pick a number and move
13 on.

14 MEMBER STETKAR: I'll give you an example.

15 In the natural hazards area, you say that
16 the structures need to be designed against wind loading
17 or something like that. There's guidance on wind
18 loading that says I don't need to worry about things that
19 has an exceedance frequency less than 10^{-7} per year.

20 So in principle, you know, you say well I
21 need to design my structures for the ultimate heat sink
22 against that type of wind load, and yet in these other
23 areas, I am left to negotiate over what is reasonably
24 expected to occur.

25 So there -- you know, what I am saying is

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1 there are implications in other parts of the guidance
2 here that do tie into numbers if you look at other
3 regulatory guidance that are out there for those
4 phenomena, whether I am talking about seismic events or
5 whether I am talking about high winds and tornadoes or
6 things like that. We don't have numbers like that for
7 flooding yet.

8 MEMBER SCHULTZ: Since we are asking the
9 staff to determine an approach here, taking what you
10 have written and talking with the PRA team would be a
11 good place to start, to see how that might be
12 appropriately redesigned in terms of --

13 MEMBER STETKAR: I know that the PRA folks
14 are looking at -- they have told us, anyway, that they
15 are looking at the overall Regulatory Guidance and
16 screening criteria from a risk assessment perspective
17 of what are reasonable screening criteria for external
18 hazards.

19 I have been told they're doing that. I
20 don't know where they are in that process. Because they
21 are aware of these discrepancies in terms of even in the
22 PRA world of things that say well this is -- is an
23 approved screening number.

24 So I know that they're thinking about it.
25 I don't know where they are.

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1 MR. LIN: Okay, because we'll -- next,
2 we'll talk to the PRA.

3 MEMBER SKILLMAN: Before you move out of RP
4 2, I'd like to ask a question, please.

5 MR. PURCIARELLO: Sure.

6 MEMBER SKILLMAN: This natural phenomenon
7 and size hazards design for the UHS, where have you given
8 consideration to security?

9 MR. PURCIARELLO: We haven't in this Reg
10 Guide. I mean, we -- the front part, we talk about GDC
11 2, 4, 44, 45, and 46. That is the regulations that this
12 is giving guidance for. There is no guidance here in
13 regards to security.

14 MEMBER SKILLMAN: Should there be?

15 MR. PURCIARELLO: Well there should be
16 somewhere, I mean, some points that should be in this
17 Reg Guide are not --

18 MEMBER BROWN: Is the ultimate heat sink
19 within -- well, I guess if it's a lake, it's not within
20 the plant boundaries, you've got to fight going out to
21 it, so --

22 MEMBER SKILLMAN: It isn't just the lake,
23 it's getting --

24 MEMBER BROWN: No, I am just -- I am just
25 trying to understand or question about how you apply

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1 this. I guess for, you know, towers and/or mechanical
2 draft, whatever it is, or the big reservoir that would
3 be -- that you build like, depending on which plant it
4 is, you'd have it -- it would be within the protected
5 physical, which is covered by

6 MEMBER BLEY: It can be either one, yes.

7 MEMBER BROWN: So it could be outside?
8 Okay, that's the reason I thought of it. I don't know
9 how to address that, just that you've got to do it
10 somehow.

11 MEMBER SKILLMAN: It seems to me that there
12 are -- it might be beneficial to simply be clear that
13 security-related issues are covered elsewhere.

14 MR. PURCIARELLO: Greg, would you say
15 something?

16 MR. CASTO: I didn't really want to.

17 (Laughter.)

18 MR. CASTO: Again, just by --

19 CHAIRMAN RAY: Your name?

20 MR. CASTO: Greg Casto.

21 CHAIRMAN RAY: And --

22 MR. CASTO: Oh, I am sorry, Balance of
23 Plant, DSS.

24 CHAIRMAN RAY: Thank you.

25 MR. CASTO: Thanks, sorry.

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1 I am on a working group right now with NSIR,
2 and not specific to ultimate heat sink, but one of the
3 areas we're looking at are what are the established
4 requirements and systems covered for definition of
5 vital equipment and designation of vital areas?

6 So this would be one example that would be
7 included under that, and there are -- there's
8 security-based regulations, guidance, and documents
9 that define that and -- and discuss that criteria and
10 how to determine it.

11 So I think this is captured elsewhere, but,
12 you know, I'll listen to your comments, and if we've got
13 questions we need to get back to you, then we can do that.

14 MEMBER SKILLMAN: Thank you for that
15 explanation.

16 My comment would be that this member would
17 suggest that there be a line that says security is
18 covered elsewhere, and here's where it's covered, and
19 I would leave it at that.

20 CHAIRMAN RAY: Okay.

21 Okay. As a check, we've got an hour and
22 twenty minutes to finish all of the things we need to
23 do, so please proceed.

24 MR. PURCIARELLO: Okay, slide 12.

25 These regulatory positions 2(c), (d), and

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1 (e) are all new guidelines that weren't in the previous
2 Rev that are in there now, and in regulatory position
3 2(c), we mention that the applicant should take into
4 account the possibility of icing, which includes
5 freezing of any storage facility like the bottom of a
6 wet cooling tower or, you know, there's things like
7 frazil ice that's happened at some sites, and that's
8 taken into account -- that should be taken into account
9 by the licensee or the applicant.

10 Then in regulatory position 2(d), we --
11 we're telling the licensees to take into account the
12 dynamic effects associated with GDC 4, which are things
13 like energy line breaks, pipe whip, anything that may
14 possibly damage the ultimate heat sink, that has to be
15 taken into account in accordance with GDC 4.

16 And then regulatory position 2(e) tells the
17 applicants to take into consideration operating
18 experience including things such as the clogging of the
19 suction bays by any type of silt or aquatic, fish,
20 biological growth. There's cases where flooding has
21 caused -- it has washed up the debris from the banks into
22 the ultimate heat sink and caused the loss of service
23 water, loss of ultimate heat sink, so we're telling the
24 applicants to take the operating experience of the last
25 four years into account.

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1 Next slide.

2 MEMBER STETKAR: Jerry, before you leave
3 this, (b), this is -- Dr. Bley mentioned this earlier
4 in terms of adding specificity that may indeed
5 inadvertently omit things. In (c) (2) (b), it says "UHS
6 features constructed specifically for normal operation
7 and shutdown of nuclear power units that do not provide
8 a post-accident safety function and are not required to
9 be designed to withstand the SSE, tornadoes, or the
10 probable maximum flood," and it goes on.

11 What you did between the previous version
12 and the current draft is to add tornadoes. Well, that's
13 good, except for the fact that I know there are sites
14 in the United States where the wind loading is driven
15 by hurricanes. So does that mean that I don't need to
16 consider hurricanes?

17 This is an example of where you try to add
18 specificity, if you're not careful, you can
19 inadvertently exclude things, and as an applicant, say
20 well, okay, I considered tornadoes, they're not a big
21 deal at my site. I didn't have to consider hurricanes.
22 They didn't tell me I had to consider hurricanes.

23 Now just, you know, just adding hurricanes,
24 does that solve the problem? Well, maybe. But
25 sometimes adding a lot of specificity inadvertently

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1 omits things.

2 MEMBER SKILLMAN: John, we reviewed the
3 draft guide. It was intended to include high winds,
4 straight winds, tornadoes, hurricanes. So perhaps
5 that would be --

6 MEMBER STETKAR: The wind -- the wind guide
7 does --

8 MEMBER SKILLMAN: The wind guide.

9 MEMBER STETKAR: -- that is right. But
10 this one B- it pulls out -- you know, and they added
11 tornadoes specifically because they weren't -- the
12 previous version just said safe shutdown, earthquake,
13 or the probable maximum flood, whatever that probable
14 maximum flood is.

15 MEMBER BALLINGER: But does the -- even,
16 the rationale for doing that, does probable maximum
17 flood cover hurricanes in effect?

18 MEMBER STETKAR: No. Hurricanes have
19 water related to them, and they have wind related to them
20 --

21 MEMBER BALLINGER: Okay, okay.

22 MEMBER STETKAR: -- and the wind loading at
23 some sites, most notably along the Gulf Coast in the
24 southeastern U.S., is determined by straight-line
25 hurricane winds, not by tornadoes.

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1 Just think about it. It's just a comment,
2 but it's something I stumbled across because we've been
3 following this. There are differences in the way
4 people treat hurricanes and tornadoes that we've been
5 commenting on for a couple of years now, and they seem
6 to be coming together.

7 MR. PURCIARELLO: Actually, if we took out
8 all those terms, SSE, tornadoes, and probable maximum
9 flood, and just said events associated with GDC 2, then
10 that would be everything.

11 MEMBER STETKAR: That might be a way of
12 doing it, but again, I don't think it's appropriate for
13 --

14 MR. PURCIARELLO: I think that would be --

15 MEMBER STETKAR: -- individuals in a
16 Subcommittee meeting to necessarily propose language.

17 MR. PURCIARELLO: Okay, thank you.

18 Page 13. Page 13, like I said before, reg
19 positions 3 and 4 were just minor clarifications, we
20 really didn't change the regulatory positions, so I am
21 going on to regulatory position 5.

22 This is a new -- a new regulatory position.
23 We added words about that we needed routine inspection
24 and a maintenance program for the UHS, all the SSC
25 associated with it for detection of corrosion, erosion,

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1 and other problems that happen over time in the use.

2 And in regulatory position 5(b), we added
3 that the pre-service inspection and these period test
4 programs should also include the heat exchangers that
5 are connected to the UHS.

6 In regulatory position 5(c), we said that
7 these heat exchangers should be -- the testing of it
8 should be performed in accordance with that manual
9 listed there, OM-2012, the Operation and Maintenance
10 Manual.

11 And in (d), we said -- this is what we
12 discussed a little bit earlier about these -- about dams
13 that are within the -- that are within the jurisdiction
14 of the applicant or licensee should be in the
15 Maintenance Rule, and we added that, and for components
16 or for SSC that's not within the -- not within the
17 jurisdiction, I believe we are going to come up with a
18 more specific statement on that -- so that's how we're
19 going to handle that.

20 CHAIRMAN RAY: Yes, I mean the one about if
21 it's not within your jurisdiction is a comment that we
22 -- that several of us have made, anyway.

23 MR. PURCIARELLO: Right.

24 MEMBER BALLINGER: With respect to item
25 (c), since we only revise these things about every 40

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1 years, in this case, using the word ASME OM-2012 might,
2 after 20 years, be not appropriate. So can -- can we
3 think about using terms like "appropriate ASME
4 procedures" or "related to Operation and Maintenance"
5 or something like that? Because otherwise --

6 MEMBER BLEY: They promised that this
7 won't --

8 MEMBER BALLINGER: There's a bunch of
9 stuff there that --

10 MEMBER BLEY: -- that this won't -- that it
11 won't go this way in the future, right? These are going
12 to be reviewed --

13 MR. LIN: Well, there's a Reg Guide Program
14 that --

15 MEMBER BLEY: Some current version or
16 something like that, but --

17 MEMBER STETKAR: Let's let Bruce get that
18 on the record clearly.

19 MR. LIN: Right. There's a Reg Guide
20 Program that we're committed to at least review the reg
21 guides every five years, whether we determine whether
22 it needs to be revised or feels good as is, and then we
23 have -- it would be in the record, every five years, we
24 review all the reg guides.

25 So if we issue this in 2015, then in 2020,

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1 we will revisit this Reg Guide and determine we need to
2 revise it or the Reg Guide is good as is.

3 MEMBER RICCARDELLA: Why don't you say
4 "the latest approved version of ASME" --

5 MR. LIN: Yes, we can do that.

6 MEMBER RICCARDELLA: "2012" --

7 MEMBER BALLINGER: Something like that,
8 yes. Because there's an ANSI guide on flooding which
9 is referred to in all of the flooding stuff, dam failures
10 and stuff, which doesn't exist anymore, you can't find
11 it.

12 MR. PURCIARELLO: Maybe we should say the
13 "latest approved" because the latest may come out and
14 may not be approved yet --

15 MEMBER BLEY: I think the "approved"
16 language does it. I mean, there are other standards
17 that no longer exist that are still part of the
18 regulation here, and they still have to use them.

19 MR. PURCIARELLO: Slide 14, please.

20 And we added regulatory position 6 on water
21 chemistry and microbiological control, these are new
22 positions.

23 We stated that the quality of water in
24 cooling towers, ponds, and heat exchangers should be
25 considered in the design of the UHS, and that there

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1 should be a chemical provision, or the limit of
2 microbiological growth or macrobiological growth, and
3 corrosion, any type of age-related scaling associated
4 with the UHS.

5 And then we -- if there's any infrequently
6 used loops, that they should be flushed and tested
7 periodically.

8 Okay --

9 MEMBER BLEY: I just have a curiosity
10 question.

11 MR. PURCIARELLO: Yes.

12 MEMBER BLEY: Do you know what they're
13 using these days? You used to use chromium, but you
14 can't use that anymore.

15 MEMBER BALLINGER: You would get arrested
16 for that.

17 MEMBER BLEY: Right.

18 MR. PURCIARELLO: You mean for corrosion
19 control, or --

20 MEMBER BLEY: Yes. Biofouling, that sort
21 of stuff.

22 PARTICIPANT: Hypochlorite.

23 MEMBER BLEY: Hypochlorite?

24 PARTICIPANT: Some modification.

25 MEMBER BALLINGER: Or ozone, hydrogen

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1 peroxide, something that --

2 MEMBER SKILLMAN: Yes, it is chlorite or
3 peroxide, that's environmentally acceptable.

4 MR. PURCIARELLO: Next slide, please.

5 We're on slide 15 right now, and this -- the
6 draft Reg Guide was issued in 2013. We received public
7 comments from NEI, the general public, and some
8 anonymous comments.

9 We addressed all the comments. Most of
10 them were minor. Any significant comments, I will just
11 talk about now in the next slide.

12 Slide 16. This statement came from NEI,
13 and they said that our discussion of the UHS was too
14 prescriptive, that we're talking about
15 beyond-design-basis considerations, we're talking
16 about Fukushima-related issues.

17 And our response, we agreed in part and
18 disagreed in part. We -- basically, we're not talking
19 about anything about beyond-design-basis events, we're
20 leaving that to the Fukushima Task Force, but we did take
21 out any type of statement associated with the -- I think
22 we were using the term "global warming" then, or
23 possibly change, so we took that out, and we added these
24 -- we toned down that language and put down these two
25 statements you see in red here that into account

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1 possible climatological conditions resulting from
2 human or natural causes, that they should look at
3 current literature associated with that in the future.

4 Next slide, please. This is the one on the
5 Maintenance Rule, and I think we've talked about this
6 before, about -- about structures within the
7 jurisdiction of the licensee and structures not within
8 the jurisdiction of the licensee, and this has already
9 been addressed, we've talked about this one before.

10 Next slide, please. This slide came in --
11 this comment came in talking about the possibility of
12 a sea level rise due to storm surge and possible clogging
13 debris and saying that the sea level may rise two meters
14 by 2080, that must be considered.

15 And we agreed in part with this comment.
16 We actually included the language about sea level
17 changes in this Reg Guide even before this comment, and
18 that comment is in there already, and we added that reg
19 position 5 under 2(a) saying that potential changes in
20 ocean, river, or lake levels as a result of severe
21 natural events or possible changes in climatological
22 conditions in the site region resulting from human or
23 natural causes, that takes into account the possible
24 global warming issue, that may be reasonably expected
25 to occur during the plant lifetime.

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1 Next slide, please. This comment on page
2 19 referred to the fact that we -- or referred to the
3 statement that we should include that in the -- for the
4 UHSes that require transient analysis, after the worst
5 critical time period, that we should include an
6 additional 24 hours after that, and we disagreed with
7 that. We didn't relax any considerations. We
8 redefined the term "critical heat load," or, I mean, I
9 am sorry, "critical time period," and we -- including
10 the additional 24-hour worst period, those are only
11 examples used in the existing Reg Guide. They used the
12 term as an example "five days after the accident," "one
13 day after the accident," "thirty days after" -- that was
14 meant to be an example.

15 We changed the language such that the
16 critical time period should be calculated for each
17 design of the ultimate heat sink, whether it's two
18 hours, like in a cooling tower design, or a day, like
19 in a cooling lake design, that they had to figure out
20 what that critical time period is. There's two
21 critical time periods, one associated with the peak
22 temperature of the water going into the plant to cool
23 components, and the other critical time period
24 associated with loss of evaporation, the loss of water
25 due to evaporation, and will you have enough for 30 days?

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1 And this doesn't -- for lakes and oceans,
2 large lakes and oceans and rivers, it's a -- it's a moot
3 point because it doesn't -- you're not worried about
4 evaporation, you're not worried about a critical time
5 period because water is not recirculating back into the
6 plant, being changed by the plant during the first few
7 hours of the accident, so --

8 MEMBER BROWN: Is drought thought about in
9 terms of the manmade lakes?

10 I only made that a question because I know
11 in some of my travels, you see some of these manmade
12 lakes that have turned into recreational facilities,
13 and now they're -- the water levels over a five-year
14 period are now 20 or 25 feet or more lower than they were
15 before, and I didn't -- I guess I didn't understand
16 whether this -- I understand the natural stuff, but the
17 manmade ones are somewhat more susceptible.

18 MR. PURCIARELLO: Yes. Well, like I think
19 LaSalle for example, there is a manmade lake there and
20 a submerged UHS, and they pump water in from a river
21 that's nearby to fill the lake if the lake level goes
22 down.

23 MEMBER BROWN: Okay, so there is some
24 consideration -- there's something already in place --
25 but that just means they have taken that into

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1 consideration. But is there a requirement? I mean, is
2 there a position relative to that for these types of
3 sources?

4 Whether somebody actually did something,
5 because it was a possibility doesn't mean it's
6 necessarily highlighted for consideration in the
7 future.

8 MR. PURCIARELLO: That gets into the
9 weather and hydrology area, and there certainly is a
10 hydrology analysis done in chapter 2 of the FSAR, and
11 I can't speak to that as far as -- drought is taken into
12 consideration, I know they take that into account, but
13 I don't feel I can answer your question in more detail
14 than that.

15 MEMBER STETKAR: If you search the
16 document, it is mentioned in the background, it is --

17 MR. LIN: Yes, in the Standard Review Plan
18 --

19 MEMBER STETKAR: "Because of the
20 importance of the UHS, the safety of these functions
21 should be ensured during the following design-basis
22 events postulated for the site: for example, a
23 safe-shutdown earthquake, design-basis tornado,
24 hurricane, flood, or drought." So it is -- there is no
25 further guidance on treatment. Yes, that is on page 5

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1 of the document.

2 MEMBER BROWN: Okay. I obviously missed
3 it.

4 MEMBER STETKAR: There is no further
5 discussion about, you know, how you do --

6 MEMBER BROWN: No, I just --

7 MEMBER STETKAR: -- it does at least
8 highlight --

9 MEMBER BROWN: -- as long as the term is
10 provided in there, that is fine. I just wanted to make
11 sure we covered the unusual situation, because the
12 manmade stuff tends to get hit harder by that than some
13 of the other sources. At least that's my thought
14 process anyway.

15 MR. PURCIARELLO: Can we go to slide 20?

16 This was a comment dealing with the -- the
17 cooling margin that's supposed to be designed into the
18 ultimate heat sink, and this comment stated that the way
19 the guidance was worded, that we allowed for significant
20 delays in cooling of a non-accident unit to gain
21 transient analysis margin.

22 And we partially agreed with that comment.
23 We added the requirement for the -- I should say the
24 guideline that they should take into account spent fuel
25 pool heat, but looking at other guidance that we had,

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1 in GDC 5 and Branch Technical Position 5-4, that the
2 non-accident units were required to be cooled down in
3 an orderly way, the branch technical position on the RHR
4 system says that the -- again, we get into the term
5 "reasonable," I am not sure that is going to be
6 acceptable here, but it says "Within a reasonable period
7 of time following shutdown assuming the most limiting
8 single failure."

9 This particular commenter was saying that
10 the non-accident unit should be brought to cooldown --
11 that the design of the UHS should be allowing the
12 non-accident units to be brought to cooldown
13 immediately and not have any margin about holding any
14 of the non-accident units in, let's say, a hot standby
15 state, and allowing the capacity to happen as decay heat
16 went down for the non-accident units.

17 And so we partially agreed with this
18 comment, but we didn't get more prescriptive than in our
19 requirement for -- other than what is already in GDC 2
20 and Branch Technical Position 5.4. Any comments on
21 that?

22 CHAIRMAN RAY: Now we have recently looked
23 at Watts Bar II, for example, which shares a system and
24 may even have to return Mode 4 to Mode 3 in order to --

25 MR. PURCIARELLO: Yes, we are not going to

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1 allow that by the way, but that's okay.

2 CHAIRMAN RAY: Okay. I mean, that is the
3 case there. So I think we had that in mind as we read
4 through this.

5 MEMBER BLEY: Just a -- two curiosities for
6 me here.

7 BTP 5-4 is -- I was going to ask you, as you
8 make these revisions, I thought we were rolling the BTPs
9 into the more formal guidance, but I see that BTP 5-4
10 is actually part of the SRP, so it is formal. Do you
11 know where the requirement to go to cold shutdown came
12 from? I think it's just an expedience thing. It is
13 certainly not GDC 5.

14 MR. PURCIARELLO: Well I think GDC 5 does
15 say go to cold --

16 MEMBER BLEY: No, it says "cooldown," and
17 it doesn't force you to cold shutdown, and in fact that's
18 come up in some of the newer -- in the passive plants,
19 which don't go to cold shutdown.

20 CHAIRMAN RAY: But when that debate
21 occurred, Dennis, my recollection was that it had to do
22 with we're not going to require -- it was some position
23 the Commission had taken.

24 MEMBER BLEY: Well, it was linked to a
25 position the Commission had taken, but it was also in

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1 the -- in BTP 5-4.

2 MR. PURCIARELLO: Well I think the
3 question is what is safe shutdown? You know, do you
4 have to be cooled down, or it can be on standby?

5 MEMBER STETKAR: I believe the Commission
6 has determined that safe and stable shutdown does not
7 require cold shutdown.

8 MEMBER BLEY: Yes, they have.

9 MR. PURCIARELLO: Yes, we have several
10 different guidances on that, and a plant can stay in hot
11 standby and still remove decay heat, although they run
12 out of fresh water, and, you know, they need fresh water
13 to pump into their steam generators, and when they run
14 out of fresh water, then they have to pump seawater in
15 or UHS water and service water, so I mean, it's an
16 economical thing there, destroying the plant.

17 MEMBER BLEY: TMI ran on the hoggers for a
18 year and a half or two years, and it stayed nice and cool
19 down for the whole time.

20 MR. PURCIARELLO: I am sorry, TMI ran on
21 what?

22 MEMBER BLEY: On the hoggers, they just
23 sucked the vacuum on the -- on the main condenser and
24 that kept them 180 degrees or something like that for
25 a couple of years.

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1 Anyway, you don't have to push this any
2 further --

3 MR. PURCIARELLO: Well, the hoggers were
4 maintained acting in the condenser, and you still had
5 to have water going through the condenser, I would
6 think, all the steam from your steam generator in the
7 condenser, you still have to have some cooling water.

8 But any further questions on this issue,
9 comments?

10 (No audible response.)

11 MR. PURCIARELLO: Okay, last slide.

12 CHAIRMAN RAY: Before you move on, because
13 you didn't discuss one item of curiosity more than
14 anything else, at least in my case.

15 There was this debate about indispensable
16 consideration versus essential consideration to apply
17 the forward fit concept to the application of this reg
18 guide. Can you elaborate some more?

19 I mean, some of us aren't that familiar with
20 forward fit. We understand backfit reasonably well,
21 but tell us about this.

22 MR. PURCIARELLO: I think all the reg
23 guides have language on forward fit, and it's standard
24 boilerplate language.

25 CHAIRMAN RAY: Well, it references this

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1 2010 General Counsel, and it's characterized as a
2 concept, "the forward fit concept to new or different
3 positions contained in Revision 3."

4 And I take it it's not on the top of your
5 list of -- of issues.

6 MR. PURCIARELLO: Under implementation --

7 CHAIRMAN RAY: What?

8 MR. PURCIARELLO: -- under implementation
9 -- I mean, I am not sure I understand your question. I
10 mean --

11 CHAIRMAN RAY: The question is tell us some
12 more about forward fit as a concept because according
13 to what we read here, if it was something that was
14 detailed in a 2010 General Counsel letter and, like I
15 said, we don't normally talk about forward fit as a
16 concept, maybe one of my colleagues here can say that
17 they're familiar with it, but --

18 MEMBER BLEY: Information for us, it's
19 something we don't know.

20 CHAIRMAN RAY: We've got time here, and I
21 wanted to ask you about it.

22 MR. PURCIARELLO: Yes. Forward fit as I
23 understand it now, I am not sure if this is answering
24 your question, it may be saying something you already
25 know. Forward fit is when a new regulation comes out,

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1 and then you have a reg guide possibly associated with
2 that regulation, and then -- then you would require
3 existing licensees then to implement that reg guide
4 because it's on a new regulation.

5 But if we write -- there is no new
6 regulation associated with this particular Reg Guide.
7 I mean, GDC 2, 4, 44, 45, and 46 do not change if we as
8 a guideline -- if we as an Agency come up with a new
9 guideline on how we're interpreting those regulations,
10 we can't forward fit that into an existing licensee
11 because we're not -- we're not changing any regulation.

12 We can't change a new -- we can't forward
13 fit a new -- we can't backfit, I should say, a new
14 interpretation of a regulation onto a licensee, but if
15 it's a new regulation, then they -- all licensees have
16 to comply with new regulations. If Fukushima should
17 become a new regulation, then we have to forward fit,
18 and they would be required to be forward fit.

19 CHAIRMAN RAY: Well this goes to the issue
20 of -- let me just read from the response to the comment
21 which was NEI 10.

22 And first, the response says
23 "Specifically, NEI stated that the essential
24 consideration criteria should limit application of the
25 forward fit concept to new or different positions

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1 contained in Revision 3 that are indispensable in order
2 for the NRC staff to approve the voluntary license
3 request at hand."

4 So we're talking about a license request of
5 some kind from a licensee. And the issue surrounded,
6 it says "The staff concluded that an indispensable
7 consideration was an unnecessarily higher standard than
8 an essential consideration, and NEI failed to show why
9 the less stringent test would be insufficiently
10 protected. The higher standard would unduly limit the
11 NRC's capability to make regulatory decisions that are
12 defensible and have public confidence."

13 So the upshot is we're talking about an
14 applicant coming in wanting to amend their license, the
15 issue of should requirements in this Revision 3 apply,
16 given that they're making this application, and the
17 standard is well if the -- if the positions in reference
18 3 are indispensable in order for the NRC to approve the
19 license request as opposed to being merely essential,
20 indispensable versus essential.

21 And if it's -- we concluded that if it --
22 it just had to meet the essential test, and then the
23 requirement could be applied to the application, the
24 response to the application, as opposed to being
25 indispensable, which is a higher standard according to

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1 what we've said here.

2 So I -- I perceive that the forward fit
3 concept as it's characterized is you are -- if you want
4 to amend your license, you are subject to the
5 then-applicable requirements in the area, and the only
6 issue is are those newer requirements indispensable or
7 essential? That is what I read out of this.

8 MR. PURCIARELLO: I think -- now I
9 understand your question.

10 CHAIRMAN RAY: Yes.

11 MR. PURCIARELLO: And you're asking what
12 is the difference between those two definitions of those
13 two words?

14 CHAIRMAN RAY: Well, I am -- I am also
15 asking -- I am just not familiar with the term "forward
16 fit concept," but I am asking do I have it right? And
17 I guess you are acknowledging that I do understand what
18 --

19 MR. PURCIARELLO: Forward fit is when
20 you're working and -- yes, you are forward fitting a new
21 interpretation of a regulation or a regulation itself,
22 and the two terminologies that you use, how do you
23 distinguish between the two, I don't know.

24 CHAIRMAN RAY: Okay. All right. But
25 anyway, it has to do with some action taken by the

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1 licensee to amend their license, and is this new
2 requirement essential or indispensable is the
3 difference that was being debated here.

4 MR. LIN: I see the response to this
5 comment actually came from the General Counsel --

6 CHAIRMAN RAY: No doubt, I can figure that
7 out too.

8 MR. LIN: Okay.

9 CHAIRMAN RAY: But I thought maybe you guys
10 had some insight to it.

11 MR. LIN: I just wanted to --

12 CHAIRMAN RAY: Yes. No, I -- I understood
13 that was the case. All right. Enough of that. Go
14 ahead.

15 MR. PURCIARELLO: We are down to the last
16 slide.

17 So in conclusion, we've revised Reg Guide
18 1.27 to address the current regulations and the lessons
19 learned in the last 40 years, last 39 years, and Reg
20 Guide 1.27 provides the necessary guidance such that
21 applicants, licensees, will -- will design their plans
22 in accordance with NRC rules and regulations.

23 We received public comments and we
24 addressed those comments, and up until this meeting, I
25 thought we were ready for publication. Maybe not quite

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1 yet.

2 CHAIRMAN RAY: Okay. Now we will go to any
3 public comments in a moment, but first, let me ask if
4 the members have any questions, further questions for
5 the staff.

6 MEMBER BALLINGER: I have one sort of maybe
7 naive question, and that is the most recent COL that was
8 approved, has somebody taken this Reg Guide and then go
9 to that most recently approved license and say is what
10 we say here consistent with what the licensee or the
11 applicant has given us?

12 CHAIRMAN RAY: The only one would be --

13 MEMBER SKILLMAN: The EPR.

14 MEMBER BALLINGER: EPR?

15 MEMBER STETKAR: No. The most recently
16 approved COL was ABWR --

17 MEMBER SKILLMAN: Oh no no no, I am not
18 suggesting EPR was approved.

19 MEMBER STETKAR: Oh.

20 MEMBER SKILLMAN: This would apply to an
21 EPR is all I am saying.

22 MEMBER STETKAR: This would apply for EPR,
23 that is right.

24 MEMBER SKILLMAN: Yes.

25 MEMBER STETKAR: ABWR.

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1 MEMBER BALLINGER: It is kind of a gut
2 check.

3 MEMBER CORRADINI: No, ABWR wouldn't
4 apply. ABWR has got a passive containment design that
5 wouldn't apply.

6 MEMBER SKILLMAN: Exactly.

7 MEMBER STETKAR: The only thing that's not
8 in ESBWR is the pumps inside, and that's ABWR, ABWR.

9 MEMBER CORRADINI: I understand.

10 CHAIRMAN RAY: Ron, do you want to question
11 further?

12 MEMBER BALLINGER: No.

13 MEMBER SKILLMAN: I've got one or two
14 comments if I could, Mr. Chairman.

15 It seems to me that because of the very
16 clear distinction you're making that this is not
17 applicable to the passive plants, its title ought to say
18 "For Non-Passive Plants." It seems to me that that
19 ought to be part of this document. The title ought to
20 clarify exactly what this applies to.

21 CHAIRMAN RAY: Well it is in the second
22 paragraph.

23 MEMBER SKILLMAN: It's in the second
24 paragraph. But the title -- I guess I've worked with
25 reg guides for so many years, there are reg guides and

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1 then there are reg guides. There are some that are
2 junior varsity reg guides, and then there are some that
3 really define the essential characteristics of the
4 facility.

5 And this is one that I would say is a
6 cardinal regulatory guide. And so if the thought is
7 this is only applicable to the active plants, then its
8 title should communicate that, and if there will be a
9 new one in the future for passive plants, then it should
10 have its own title.

11 Let me make one or two more comments.

12 In the background, which is on page 3, this
13 is (b), and it's the second major paragraph, you
14 identify that the function of the UHS is to absorb
15 reactor decay heat and essential station heat loads.

16 Then, in the next paragraph, instead of
17 using the term "reactor decay heat," you use the term
18 "dissipation of residual heat."

19 MR. PURCIARELLO: Can you point, where is
20 that again?

21 MEMBER SKILLMAN: Yes, I am on your page 3
22 of the Draft 3 --

23 MR. PURCIARELLO: Okay.

24 MEMBER SKILLMAN: -- and I would like to
25 contrast the term "reactor decay heat" with your use of

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1 the term "residual heat."

2 MR. PURCIARELLO: We should be consistent.

3 MEMBER SKILLMAN: It should be consistent,
4 and "residual heat" is probably the correct term because
5 the residual heat is probably the sum of the time point
6 heat generation rate plus the sensible heat.

7 And you touched on this a while ago, and I
8 will tell you, your shutdown analysis, say for a
9 six-hour shutdown, is the sum of the decay heat
10 generation rate plus the heat in the water, the heat in
11 the tubes, the heat in the steam generators, the heat
12 in the reactor coolant pumps, the heat in the steel, you
13 know, all of that has to square in your heat balance.
14 And for the 24-hour shutdown, it's got to do the same.

15 So in that context, the residual heat is
16 really the sum of the sensible in all the metal plus the
17 inventory of decay heat that has been generated at that
18 point and to the point when you end the period.

19 So the terms, at least this member would
20 suggest, are very important.

21 MR. PURCIARELLO: Okay, so we should use
22 the -- be consistent and use the word "residual."

23 Again, is that -- that is in the second
24 paragraph from the bottom?

25 MEMBER SKILLMAN: Yes. It is on Rev 3,

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1 page 3, and it's the -- the pair of paragraphs that's
2 following background, the first paragraph after
3 background, the second paragraph after background.

4 MR. PURCIARELLO: Okay.

5 MEMBER SKILLMAN: And I'll be happy to give
6 you my mark-up notes if that will --

7 MR. LIN: I have it.

8 MEMBER SKILLMAN: Okay.

9 I have one other question. On your page 5,
10 you're giving examples of UHSes that the staff has found
11 acceptable, and at the bottom of that list, you identify
12 a cooling lake with a submerged pond.

13 A cooling lake with a submerged pond. So
14 if my colleagues and I considered that, should we see
15 this, if you will, as a reservoir, and embedded deep
16 within that reservoir, a second reservoir?

17 MR. PURCIARELLO: Yes, well LaSalle has
18 that. What they have is, you know, they have a cooling
19 lake for their condensers, and that's a manmade lake,
20 and it's only about five feet -- it isn't deep, five feet
21 deep.

22 And then on the bottom of that, more close
23 to the plant, it gets excavated even further, goes into
24 the intake of the plant. That's a safety-related
25 structure, so now if the lake should go away based on

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1 an earthquake and the dikes break and the lake drains
2 out into the field, that reservoir is left, and that is
3 enough to -- it is supposed to be enough to mitigate and
4 accident and bring the other unit to a cold shutdown
5 condition.

6 MEMBER SKILLMAN: Well, I appreciate that
7 explanation. That is what I thought you meant, and
8 that's why I asked the question about security, and
9 that's really all I want to say.

10 MR. PURCIARELLO: So you think that
11 statement should be changed to --

12 MEMBER SKILLMAN: Nope.

13 MR. PURCIARELLO: Okay.

14 MEMBER SKILLMAN: Thank you.

15 CHAIRMAN RAY: Any other questions for the
16 staff?

17 (No audible response.)

18 CHAIRMAN RAY: Peter, would you make sure
19 the phone line is open please? Any questions from the
20 audience?

21 Phone line is open, we understand. Is
22 there anyone on the lines? If so, please acknowledge.

23 MR. LEWIS: Marvin Lewis.

24 CHAIRMAN RAY: Hi Marvin, good to hear from
25 you, thank you. Is there anyone who wishes to make any

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1 comment?

2 (No audible response.)

3 CHAIRMAN RAY: Hearing none, then we will
4 go to the final part of our meeting, which is a
5 discussion among the members.

6 And we'll -- I'll introduce it before
7 asking for input by saying I think the main thing, at
8 least to my mind, to understand, is whether there is any
9 need for us to have a presentation at Full Committee,
10 the purpose for which in my view would be if we thought
11 there was some likelihood that the Committee would wish
12 to write a letter on this. Otherwise, there is good
13 attendance here at the Subcommittee, and I'm skeptical
14 than we would need otherwise to take it to Full
15 Committee.

16 So, but whatever comments you wish to make,
17 but I would like you to address that question as well.
18 And I will start with Pete.

19 MEMBER RICCARDELLA: I -- it doesn't seem
20 to me that we need a Full Committee meeting on this
21 subject, but --

22 CHAIRMAN RAY: Speak up please, Pete.

23 MEMBER RICCARDELLA: It doesn't seem to me
24 that we need a Full Committee meeting on the subject,
25 but just sort of an editorial comment on your slide

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1 number 10, we've discussed this already, I just want to
2 -- I think on the item (h), it doesn't show there, but
3 you mentioned that the document includes some reference
4 to Code Case 755 not being approved, on HDE piping. I
5 think it would be a mistake to memorialize that issue
6 with Code Case 755 in a document that is liable to be
7 applicable for the next 30 or 40 years if history is any
8 indication.

9 I think -- and it has nothing to do with the
10 issue. The issue is fire-resistant versus
11 non-fire-resistant. So I think you can do -- address
12 that in a more general method that wouldn't get into that
13 Code Case.

14 CHAIRMAN RAY: Okay. Anything else?

15 (No audible response.)

16 CHAIRMAN RAY: I'll note, of course, that
17 the staff's intent is to update reg guides every five
18 years going forward.

19 Mike.

20 MEMBER CORRADINI: I don't think there is
21 a need for a letter. Given that everybody except for
22 a couple of us are here, they have gotten all our
23 informal comments, so assuming they understand them, I
24 think this is good enough.

25 CHAIRMAN RAY: Thank you.

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1 Steve?

2 MEMBER SCHULTZ: I agree with what has been
3 stated. I think the presenters have been receptive to
4 the comments of the Subcommittee, and I think that
5 should be sufficient to allow them to move forward.

6 CHAIRMAN RAY: Dick?

7 MEMBER SKILLMAN: I don't think a letter is
8 required. And I commend you, this is a good solid
9 update of a very critical Regulatory Guide.

10 I still believe as an individual member
11 that it would not be difficult to make this applicable
12 to passive plants with the right text, maybe another
13 sub-portion that says here is how this is applied,
14 functionally, to the passive plants.

15 I agree with my colleague Harold Ray. If
16 it is identified as functional, then there may be a basis
17 to do that.

18 But I commend you on a really good job.
19 Thanks.

20 CHAIRMAN RAY: Thank you, Dick.

21 Dana?

22 MEMBER POWERS: I -- I think the staff has
23 done a good job on this Reg Guide.

24 However, I think that because we have
25 invested time in the Subcommittee meeting, and that we

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1 have made comments on this, that are obligated to bring
2 this to the Committee and have a letter on it.

3 CHAIRMAN RAY: Anything else?

4 MEMBER POWERS: That is it.

5 CHAIRMAN RAY: Okay.

6 Dennis?

7 MEMBER BLEY: I think I agree with Dana. I
8 don't think we have anything major to say, but we've had
9 a long discussion, and then lots of things were raised,
10 so it's probably worth it.

11 And I appreciate the presentations and
12 discussions. Thank you.

13 CHAIRMAN RAY: John?

14 MEMBER STETKAR: Yes, I have been torn
15 about the notion of Full Committee, and I -- I tend to
16 be persuaded that we do speak as a Full Committee, we
17 don't speak as individual members in the Subcommittee
18 meeting, and that if -- we have made numerous comments.
19 Individually, they might seem small, but part of what
20 we do as a Full Committee is sort through what we think
21 might be important enough for consideration by the
22 staff, and in that sense, I think it probably would be
23 worthwhile to bring it to the Full Committee.

24 CHAIRMAN RAY: Okay.

25 Mike?

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1 MEMBER RYAN: I come down on the side of a
2 short briefing, concise letter would be helpful for the
3 record going forward. You know, you never know when
4 that might come in handy or how that might evolve over
5 time. I think it's good to capture the quality of the
6 conversation at this point.

7 Thank you.

8 CHAIRMAN RAY: Ron?

9 MEMBER BALLINGER: I think I agree with
10 everybody, the presentation was great as far as it goes.

11 But I also really agree with Dick that there
12 may be a golden opportunity here to short-circuit the
13 production of another reg guide, if you will, and expand
14 this to include passive plants.

15 So that is one person -- so --

16 MEMBER POWERS: Well, I know we're valuing
17 the time in discussion, but I think I agree with the
18 staff that compartmentalizing the reg guides as much as
19 possible is a net virtue, that it's better to have more
20 reg guides than to have one that is all-encompassing.

21 With the attendant capacity you can use to
22 misinterpret, to confound, I don't think I would go to
23 great lengths to make reg guides very generic. I would
24 prefer to keep them as focused as humanly possible so
25 that you just don't run into so many difficulties.

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1 I look at this reg guide, I don't look at
2 this other reg guide.

3 MEMBER BALLINGER: I'll yield to Dick's
4 expertise in that at least I am hearing that in his
5 opinion, it's not a big deal to --

6 MEMBER POWERS: I don't care what kind of
7 a deal it is. I would keep them -- I would have a reg
8 guide for active plants and one for passive plants, one
9 for BWRs, one for PWRs.

10 I would focus them down as much as I could
11 just because 90 percent of our difficulties seem to be
12 when things are taken from column A and column B
13 inappropriately, or when there has been a
14 misinterpretation of language that's inapplicable in an
15 area --

16 CHAIRMAN RAY: And as somebody who was
17 licensed plants before, I agree with Dana, more
18 specific, and also I believe there is a big difference
19 between passive and active plants for reasons that we
20 won't go into now. It is a profound and big difference,
21 and trying to write anything that applies to both of them
22 is a challenge that we have the consequences, I think,
23 Dana is speaking to.

24 Anything else on it?

25 MEMBER BALLINGER: I think we should write

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1 a letter.

2 CHAIRMAN RAY: Okay.

3 Charlie?

4 MEMBER BROWN: Number one, I learned
5 something in the slide in the presentation even on down
6 to electrical gas, so it was an interesting meeting to
7 attend for somebody like me who is not familiar with the
8 plants.

9 Relative to the active versus passive, I
10 totally agree with Dana. I don't -- I think you ought
11 to separate these out.

12 I read the Reg Guide, and like 80 percent
13 of it wouldn't -- that is a speculative number, but a
14 lot of it would not even apply to the passive plants and
15 could lead to confusion, and so I think a separate guide
16 would be best.

17 Relative to a letter, it's a mixed bag. I
18 mean, I -- it's probably not a bad idea because there
19 are a number of new positions that have been
20 established. It might be a decent idea to do a letter.
21 You have to write it, so -- draft it.

22 If we make it five to five, then you can
23 vote.

24 MEMBER POWERS: I think this is an example
25 of the regulatory process, and it's well done, activity

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1 -- and it all will allow the Committee to exercise its
2 philosophical muscles, and --

3 MEMBER BLEY: And the discussion of the
4 last five minutes argues for having a Committee position
5 rather than 12 positions.

6 CHAIRMAN RAY: That's why we have this part
7 of the Subcommittee process, to find out how everybody
8 feels.

9 Anything else, Charlie?

10 MEMBER BROWN: Nope. You get to vote too,
11 so --

12 CHAIRMAN RAY: Well, I do, but I think it's
13 clear that we will ask you to come back to a Full
14 Committee at a date that is yet to be decided.

15 There will be a meeting a noon today to
16 review what's called Planning and Procedures, and there
17 will be perhaps some information out of that.

18 Perhaps when you do come back, when you're
19 asked to return, you'll have some other information that
20 you've indicated you'll be looking for responses to
21 comments that you've heard today from members, and then
22 whether we write a letter or we don't write a letter,
23 that will be a decision that will be made at the Full
24 Committee meeting.

25 MEMBER STETKAR: One thing that might help

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1 us, you know, you've heard our input this morning,
2 obviously you need to go back and caucus and think about
3 your plans going forward, I think it would help us, if
4 you decide that you should make changes, and if those
5 changes require you to go out for new public comments,
6 that would probably influence the timing of when we came
7 to the Full Committee again.

8 If you think you can make -- if you think
9 you need to make changes and that you can do that without
10 going for public comments, that is a different influence
11 on our time, so we'll probably be in contact with you,
12 you know, over the next week or so to -- to get some
13 feedback on that perspective.

14 CHAIRMAN RAY: Anything else?

15 (No audible response.)

16 CHAIRMAN RAY: We're off the record and
17 adjourned.

18 (Whereupon, the meeting went off the record
19 at 11:29 a.m.)

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Regulatory Guide 1.27

Ultimate Heat Sink for Nuclear Power Plants

Bruce Lin
RES/DE/CIB

Jerry Purciarello
NRR/DSS/SBPB

ACRS Subcommittee Briefing
March 4 2015

Agenda

- Overview of RG 1.27
- Reasons for Revision
- Summary of Revisions
- Technical Revision
- Public Comments & NRC Responses
- Conclusions

Overview of RG 1.27

- The ultimate heat sink (UHS) is the system of structures and components and associated water supply credited for functioning as a heat sink to absorb reactor decay heat and essential station heat loads after a normal reactor shutdown or a shutdown following a design basis accident (DBA) or transient
- The UHS performs three principal safety functions:
 - Dissipation of residual heat after reactor shutdown
 - Dissipation of residual heat after a DBA such as a loss-of-coolant accident
 - Dissipation of maximum expected decay heat from the spent fuel pool

Overview of RG 1.27

- RG 1.27 describes methods and procedures acceptable to NRC staff to satisfy rules and regulations that are applicable to the ultimate heat sink (UHS) features of plant systems
- This guide applies to active plants that use water as the ultimate heat sink
- Related Guidance:
 - Standard Review Plan (SRP) Section 9.2.5 Ultimate Heat Sink
 - SRP Section 2.3.1 Regional Climatology
 - SRP Section 2.4.11 Low Water Considerations

Overview of the RG 1.27

- Describes applicable rules and regulations related to UHS
- Contains systems design considerations for UHS
- Provides meteorological conditions considered in the design of UHS
- Contains natural phenomena and site hazards design for the UHS
- Provides guidance for inspection, maintenance and system performance testing

Reasons for Revision

- Outdated
 - Last revision: January 1976
- Need to update RG 1.27
 - New reactor applications
 - Revisions in regulations
 - Lessons learned from operating experience
- NRC Staff Commitment to Commissioners in 2006 (ML060760667)
 - Update RGs where appropriate to go along with the SRP update associated with new reactor applications
 - Commitment to update RGs on a regular basis

Summary of Revisions

- The introduction section was revised to include applicable rules and regulations
- The discussion section was revised to incorporate/update relevant design considerations for UHS
- Changes to the 4 existing regulatory positions and added two new regulatory positions

Summary of Revisions

Regulatory Position (1976)	Regulatory Position (2015)
1. System design and meteorological conditions	1. System design and meteorological conditions
2. Natural Phenomena-hazards	2. Natural Phenomena-hazards
3. Defense-in-depth	3. Defense-in-depth
4. Technical Specifications	4. Technical Specifications
	5. Inspection, maintenance, & testing
	6. Water Chemistry and Micro-bio controls

Technical Revision

Regulatory Position (RP)1 – System Design Considerations for the UHS

- a, clarified that the UHS should provide sufficient cooling to permit safe shutdown and cooldown of remaining units
- b, added clarifications regarding transient analysis for UHS cooling towers performance and potential effects of recirculation and interference
- c, the meteorological conditions resulting in maximum cooling water loss should be the worst 30-day combination of controlling parameters
- d, the meteorological conditions resulting in the maximum intake water temperature to the plant from the UHS should be the worst combination of controlling parameters (daily variations for the critical time period)
- e, clarified the bases and procedures used to select and develop critical meteorological data

Technical Revision

RP1 – System Design Considerations for the UHS

- Added the following system design considerations:
 - h, construction materials should be fire resistant (buried piping and spray pond piping may be constructed of fiberglass-reinforced thermosetting resin)
 - i, heat loads that are important to safety or must be cooled during the 30-day recovery period by the UHS should be included in determining the UHS thermal performance (spent fuel pool)
 - j, UHS active mechanical components should automatically start and open/close as appropriate to support DBA heat loads
 - k, UHS inventory to support the 30 day period for UHSs where the water supply may be limited, (e.g., ponds, lakes, cooling towers) should account for evaporation losses, tower drift losses and boundary leakage

Technical Revision

RP 2 – Natural Phenomena and Site Hazards

- a(1) clarified that the most severe natural phenomena expected at the site in accordance with GDC 2
- a(4) failure of reservoirs, dams, and other manmade water retaining structures both upstream and downstream of the site including the potential for resultant debris to block water flow
- a(5) potential changes in ocean, river, or lake levels as a result of severe natural events, or possible changes in climatological conditions in the site region resulting from human or natural causes

Technical Revision

RP 2 – Natural Phenomena and Site Hazards

- Added the following site hazard design considerations:
 - c, the potential for adverse environmental conditions, such as icing, should be considered in determining UHS performance (includes freezing of UHS water storage facility)
 - d, the UHS complex should be designed to accommodate the effects of missiles effects of pipe whip, jets, energy line breaks, and dynamic effects (i.e., water hammer) during normal plant operation as well as upset or accident conditions in accordance with GDC 4
 - e, operating experience from other similarly designed and sited power plants should be used as appropriate. For example, potential clogging of suction flow paths from silt, aquatic fauna such as fish, and biological growth such as seaweed (see IN 2004-07)

Technical Revision

RP 5 –Inspection, Maintenance, and Performance Testing (new)

- a, a routine inspection and maintenance program should be established for the UHS system piping, structures, and components (detection of corrosion, erosion, protective coating failure, silting, and bio-fouling)
- b, both the initial pre-service test program and the periodic test program should encompass safety-related heat exchangers that are connected to the UHS
- c, performance testing of the UHS heat exchangers should be performed in accordance with ASME OM-2012, “Operation and Maintenance of Nuclear Power Plants”
- d, dam or other water-controlling structure and connecting piping systems within the jurisdiction of the licensee should be included in the Structures Monitoring Program in accordance with RG 1.160, the Maintenance Rule and RG 1.127, “Inspection of Water-Control Structures Associated with Nuclear Power Plants”

Technical Revision

RP 6 –Water Chemistry and Microbiological Control (new)

- a, the quality of the water used in cooling towers, spray ponds, and heat exchangers should be considered in the design and operation of the UHS because it can greatly affect the thermal performance of the UHS. Chemicals or other preventive measures may be needed to treat microbiological growth, macrobiological growth, corrosion, suspended solids fouling and scaling in nuclear power plant water systems that are part of the UHS.
- b, redundant and infrequently used cooling loops should be flushed and flow tested periodically at the maximum design flow to ensure that they are not fouled or clogged

Addressing Public Comments



- The draft RG (DG-1275) was published for public comment September 2013
- Comments received from:
 - NEI (10), General Public (1) & Anonymous (2)
- All comments addressed - Majority of comments led to several minor clarifications to draft RG
- Significant comments (those that led to revisions) summarized on following slides with NRC responses

Public Comments & NRC Response

Public Comment	NRC Response
<p>Background discussion regarding design considerations for UHS is too prescriptive, with some elements that may not have an established or NRC endorsed mechanism to evaluate, and new design inputs that may belong to 'beyond design basis' considerations, a process still in regulatory development.</p> <p>For example, "consider the effects of climate changes that might occur over the design life of the facility", etc. What would be the criteria & methodology to quantify? Moreover, the Fukushima Flooding Task Force is working with NRC on various guidance on dam failures, etc. and language here is duplicative of other guidance.</p>	<p>The staff partially disagreed with this comment. In Rev 3 of draft RG 1.27, the staff added discussions on system design considerations for the UHS, clarified the meteorological conditions to be considered and considerations for natural phenomena and site hazards. The staff disagreed that these discussions represent beyond design basis scenarios.</p> <p>Regarding the example cited, the intent of this statement was to ensure that long-term possible environmental changes are considered in the design of the UHS. Staff has revised the sentence to read:</p> <p style="color: red;">"For natural sources, historical experience indicates that river blockage (e.g., ice dams or flood debris) or diversion may be possible, as well as potential changes in ocean, river, or lake levels as a result of severe natural events, or possible changes in climatological conditions in the site region resulting from human or natural causes."</p> <p>The staff also added the following in Regulatory position C.1.e:</p> <p style="color: red;">"Current literature on possible changes in the climatological conditions in the site region should also be reviewed to be confident that the methods used to predict weather extremes are reasonable."</p>

Public Comments & NRC Response

Public Comment	NRC Response
<p>The guidance for scoping of SSC's in the Maintenance Rule is in NUMARC 93-01 Rev. 4a, and endorsed by R.G. 1.160. Further, in many cases, the water controlling structures are not in the jurisdiction of the licensee, but other entities. Reference to the Maintenance Rule should be removed, as it is an arbitrary inclusion as written.</p>	<p>The staff partially agreed with this comment that not all water control structures affecting a plant site would be within the jurisdiction of the licensee/applicant. The discussion of the Maintenance Rule has been revised to clarify that only those structures within the jurisdiction of the licensee should be monitored in accordance with the Maintenance Rule and RG 1.160. However, it would be prudent for the licensee to ensure other water controlling structures affecting the safety of the site are being monitored under another program such as the US Army Corps of Engineers National Dam Inspection Program.</p>

Public Comments & NRC Response

Public Comment	NRC Response
<p>Missing from this is any consideration of how sea level rise may impact the reliability of the UHS during the license period. Pond banks that were initially safe may be washed away by enhanced storm surge for example leaving no cooling water supply. Cooling water that was initially fresh may become brackish and damage equipment not designed for the changed water chemistry leading to failure of critical cooling systems.</p> <p>Changed tidal flow patterns may lead to accumulation of clogging debris where the original design prevented this. If the effects of subsidence on ground water are to be considered, then surely the effects of sea level rise up to at least 2 meters by 2080 must be considered as well.</p>	<p>The staff agreed in part with this comment.</p> <p>The staff agreed that these are important considerations for the design of the UHS systems. In fact, the potential change in sea level was included in the discussion section of proposed Revision 3 to RG 1.27, which states: "For natural sources, historical experience indicates that river blockage (e.g., ice dams or flood debris) or diversion may be possible, as well as changes in ocean or lake levels as a result of severe natural events".</p> <p>The staff has added a new regulatory position under section C.2.a to further address this comment:</p> <p style="color: red;">"(5) potential changes in ocean, river, or lake levels as a result of severe natural events, or possible changes in climatological conditions in the site region resulting from human or natural causes, that may reasonably be expected to occur during the plant lifetime."</p>

Public Comments & NRC Response

Public Comment	NRC Response
<p>Concern: Revision 2 of the RG 1.27, required transient analysis to include the worst 24-hours following the initial critical time period. This analysis period should remain part of the design basis analysis because peak heat loads from a realistic or conservative analysis may occur several hours after the start of the initial accident.</p> <p>Suggested Revision: Following the site specific UHS critical time period the worst 24-hour period should be maintained as a requirement for transient analysis for peak cooling water temperature.</p>	<p>The proposed revision did not relax considerations for the transient analysis. Instead, the proposed revision specified that the meteorological conditions resulting in the maximum intake water temperature to the plant should be the worst combination of controlling parameters for the critical time period(s) unique to the specific design of the UHS.</p> <p>Depending on the UHS design, the critical time period (i.e., the time interval after a DBA to when the intake water to the plant from the UHS reaches its maximum value) varies.</p> <p>In practice, the 24-hour, post-accident time period has, in many cases, been looked upon as a default time period. Now rather, the proposed revision clarifies that the responsibility for defining and justifying the time period(s) critical to the UHS design lies with the applicant or licensee.</p>

Public Comments & NRC Response

Public Comment	NRC Response
<p>Concern: The existing guidance allows flexible to defer cooling of the spent fuel pools to gain transient analysis margin. Requirements discussing cooling of spent fuel pools should be clarified. Also, the existing guidance allows for significant delays in cooling the non-accident unit to gain transient analysis margin. Emergency procedures direct operates to cool the units to ensure safety margin. Limiting the cooling capability for the UHS structure is inappropriate for a shared safety system (e.g. a cooling pond). Reducing UHS cooling capacity in this manner restricts operational flexibility and reduces plant safety margin.</p> <p>Suggested Resolution: The guidance should prescriptively discuss cooling requirements and the treatment of the associated heat loads in transient analysis to ensure that safety margin is adequately maintained.</p>	<p>The staff partially agreed with the comment.</p> <p>An additional safety function was added to the Background information to further clarifies spent fuel pool cooling: “The UHS performs three principle safety functions: (1)..... and (3) dissipation of maximum expected decay heat from the spent fuel pool to ensure the pool temperature remains within the design bounds for the structure,” This addition concurs with the SRP 9.1.3, “Spent Fuel Pool Cooling and Cleanup System.”</p> <p>No specified time was included for cooling the non accident unit because neither GDC 5 nor BTP 5-4 specify a cooldown time. GDC 5 specifies an orderly shutdown and cooldown of the accident unit and BTP 5-4, “Design Requirements of the Residual Heat Removal System,” Section B 1.D, specifies the RHR system must be capable of bringing the reactor to a cold shutdown condition, with only offsite or onsite power available, within a reasonable period of time following shutdown, assuming the most limiting single failure.</p>

Conclusions

- RG 1.27 has been revised to address current regulations and lessons learned from operating experience since the guide was last revised in 1976
- Revised RG 1.27 provides necessary guidance for nuclear power plant licensees and applicants to use to establish UHS features of plant systems required by NRC rules and regulations
- Public comments received and addressed
- RG 1.27 ready for final publication