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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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SUBCOMMITTEE ON RADIATION PROTECTION &

NUCLEAR MATERIALS

+ + + + +

WEDNESDAY

JUNE 23, 2021

+ + + + +

The Subcommittee met via Teleconference,
at 2:30 p.m. EDT, Ronald G. Ballinger, Chair,
presiding.

COMMITTEE MEMBERS:

RONALD G. BALLINGER, Chair

VICKI M. BIER, Member

CHARLES H. BROWN, JR. Member

VESNA B. DIMITRIJEVIC, Member

GREGORY H. HALNON, Member

WALTER L. KIRCHNER, Member

JOSE MARCH-LEUBA, Member

DAVID A. PETTI, Member

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JOY L. REMPE, Member

PETER RICCARDELLA, Member

MATTHEW W. SUNSERI, Member

ACRS CONSULTANT:

STEPHEN SCHULTZ

DESIGNATED FEDERAL OFFICIAL:

CHRISTOPHER BROWN

ALSO PRESENT:

KRISTINA BANOVA, NRC/NMSS

THOMAS BOYCE, NRC/NMSS

DARRELL DUNN, NRC/NMSS

MERAJ RAHIMI, NRC/RES

CHRISTOPHER REGAN, NRC/NMSS

SCOTT MOORE, NRC/ACRS

ROD MCCULLUM, NEI

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Adjourn 94

P R O C E E D I N G S

2:30 p.m.

CHAIR BALLINGER: Okay, let's, it's 2:30, let's get started. The meeting will now come to order. This is a meeting of the Metallurgy and Reactor Fuels and Radiation Protection and Nuclear Materials Subcommittee of the Advisory Committee on Reactor Safeguards.

I'm Ron Ballinger, chairman of today's subcommittee meeting. ACRS members in attendance are Vicki Bier, Charles Brown, Dave Petti, Greg Halnon, Jose March-Leuba, Walt Kirchner, Joy Rempe, Matt Sunseri, Vesna Dimitrijevic, and our consultant, Stephen Schultz.

During today's meeting, the subcommittee will review the staff's Regulatory Guide DG-3055, Implementation of Aging Management Requirements for Spent Fuel Storage Renewals. It's going to be the proposed new Regulatory Guide 3.76, which endorses with conditions NEI 14-03, Guidance for Operations Based on Aging Management for Dry Cask Storage Revision 2, dated December 2016.

The joint subcommittee will hear presentations by and hold discussions with the NMSS staff, NEI representatives, and other interested

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1 persons regarding this matter.

2 The ACRS has previously commented on spent
3 fuel storage issues via letter after review of the
4 NUREG-1927 Revision 1, Standard Review Plan for
5 Renewal of Specific Licenses and Certificates of
6 Compliance for Dry Storage of Spent Nuclear Fuel,
7 dated April 20, 2016.

8 One of the recommendations in that letter
9 was a future revision should be undertaken that places
10 a priority on the development of a risk-informed
11 approach, which includes analysis of event
12 consequences for aging management of dry storage
13 systems.

14 As far as we know, this recommendation has
15 not been acted on. It is likely that the consequences
16 of a leak caused by chloride stress corrosion cracking
17 would essentially be zero.

18 The rules for participation in all ACRS
19 meetings, including today's, were announced in the
20 Federal Register on June 13, 2019. The ACRS section
21 of the USNRC public website provides our charter,
22 bylaws, agendas, letter reports, and full transcripts
23 of all full and subcommittee meetings, including
24 slides presented there. The meeting notice and agenda
25 for this meeting were posted there.

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1 We have received no written statements or
2 requests to make an oral statement from the public.

3 The committee will gather information,
4 analyze relevant issues and facts, and formulate
5 proposed positions and actions as appropriate for
6 deliberation by the full committee.

7 The rules for participation in today's
8 meeting have been announced as part of the notice of
9 this meeting previously published in the Federal
10 Register. A transcript of the meeting is being kept
11 and will be made available as stated in the Federal
12 Register notice.

13 Due to the COVID pandemic, hopefully which
14 will be over soon, today's meeting is being held over
15 Microsoft Teams for ACRS, NRC staff, and NEI
16 attendees. There is also a telephone bridge line
17 allowing participation of the public over the phone.

18 When addressing the subcommittee, the
19 participants should first identify themselves and
20 speak with sufficient clarity and volume so that they
21 may be readily heard. When not speaking, we request
22 that participants mute your computer microphone or
23 phone.

24 We will now proceed with the meeting, and
25 I would like to call on, I think it's Chris Regan with

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1 NMSS staff for opening remarks. Chris? Chris Regan,
2 are you there?

3 MR. REGAN: I am here. Can you guys see
4 me and hear me?

5 CHAIR BALLINGER: I can certainly hear
6 you.

7 MR. REGAN: Okay, good.

8 CHAIR BALLINGER: And now, I can see you.

9 MR. REGAN: All right, very good. Thank
10 you very much. My name is Christopher Regan, I am the
11 deputy director for the Division of Fuel Management in
12 the Office of Nuclear Materials Safety and Safeguards.

13 Thank you, Mr. Chair and members of the
14 subcommittee. We're pleased to be here today. Staff
15 is going to present to you all our proposed final
16 guidance in Reg Guide 3.76 on Implementation of Aging
17 Management Requirements for Spent Fuel Storage
18 Renewals.

19 This Reg Guide endorses, with some
20 clarifications, the industry guidance in NEI 14-03
21 Revision 2, which is their Format, Content, and
22 Implementation Guidance for Dry Cask Storage
23 Operations Based Aging Management.

24 So, several years ago, staff began
25 updating our regulatory framework to look at lessons

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1 learned from reviews of storage renewal applications
2 and to get ready for a wave of storage renewal
3 applications that we had forecast based on the
4 expiration dates of previous licenses.

5 As part of this work, we received quite a
6 bit of input from our stakeholders, including
7 industry, the public, our national and international
8 counterparts, and also you all from the ACRS.

9 We interacted with the ACRS as part of our
10 updates to the SRP and Revision 1 to NUREG-1927, which
11 is our SRP for renewal of specific licenses and
12 certificates of compliance for dry cask storage
13 systems.

14 And also, in 2016, on the issuance of
15 NUREG-2214, which was our MAPS report, the Managing
16 Aging Processes and Storage. And we did that in 2019.
17 Sorry, the NUREG-1927 was 2016 and the MAPS report was
18 2019.

19 So, these updates streamlined our reviews
20 of renewal applications and improved our regulatory
21 stability and predictability greatly.

22 However, as I mentioned, aging management
23 is an area where we continue to learn. Operating
24 experience has been accumulating over the years.
25 We've also had some research activities. And we'll

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1 continue to use that as we update our regulatory
2 framework in this area.

3 As you pointed out to us, you sent us a
4 letter on NUREG-1927 that there are opportunities for
5 further risk-informing that framework as we gain
6 information and operating experience from our
7 inspection activities, as well as additional work in
8 research, when it comes to fruition and is completed.

9 So, this includes work on understanding
10 consequences and probability of the chloride-induced
11 stress corrosion cracking, which you referred to, the
12 CISCC, which staff will consider to risk-inform
13 canister inspections and the storage renewal
14 framework.

15 So, today, you'll hear from NEI. I see
16 Rod McCullum has flashed his camera on, so he's in hot
17 standby at the moment. You'll hear from us and NEI,
18 and another step in our ongoing updates to our storage
19 renewal framework.

20 So, NEI developed NEI 14-03 in parallel
21 with the staff's efforts to update NUREG-1927. And
22 I'd like to say that they complement each other and
23 provide specific guidance to industry on the format
24 and content of spent fuel storage renewal applications
25 on the implementation of their aging management

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1 programs.

2 In addition, I should like to point out
3 that industry has developed an operating experience
4 database, hosted by INPO, called, I believe it's AMID,
5 this is the Aging Management INPO Database. We
6 support the industry's efforts in developing the
7 operating experience database and populating it using
8 experience from implementation of these programs and
9 inspection activities.

10 It's essential for us as a piece of our
11 operations-based learning on storage renewal
12 framework, to ensure we continue to store spent fuel
13 safely into extended periods of operations, which can
14 go as long as 40 years.

15 So, it's an important cornerstone of NEI
16 14-03, regarding operations based aging management,
17 through learning of the AMPs and sharing of operating
18 experience in the INPO database, which are included in
19 NUREG-1927.

20 However, to ensure our regulatory clarity
21 and predictability, staff has prepared a final Reg
22 Guide 3.76 to formally endorse the NEI guidance, as I
23 mentioned, with a few clarifications that you'll hear
24 from the staff's presentation.

25 So, we ask, as you take a look at our

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1 proposed final Reg Guide, please view it in the
2 context of our ongoing efforts to continuously
3 improve.

4 And because the industry guidance
5 complements 1927, that the staff previously discussed
6 with the ACRS, we don't feel we have a need for a
7 letter from the ACRS on this specific Reg Guide.
8 However, we do look forward to your input and your
9 feedback and the discussions today.

10 And with that, Mr. Chair, I will thank you
11 for the opportunity for the staff to present today and
12 I'll turn it back over to you. Thanks.

13 CHAIR BALLINGER: Thank you very much. I
14 think next up is Kristina.

15 MR. BROWN: Hello. Ron, it will be Rod
16 first.

17 CHAIR BALLINGER: Oh, I'm sorry. All
18 right.

19 MEMBER BROWN: Ron, can I ask a question
20 first?

21 CHAIR BALLINGER: Okay.

22 MEMBER BROWN: This is Charlie, could I
23 ask one question based on a comment he just made
24 during his warmup?

25 CHAIR BALLINGER: Sure enough.

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1 MEMBER BROWN: Yeah. You mentioned the
2 cask storage and this Reg Guide and all the management
3 programs and keeping it updated because these things
4 could be in storage for up to as long as 40 years.
5 Why did you calibrate that at 40 years? I didn't see
6 anything in the documents that talked about 40 years.

7 MR. REGAN: So, our regulatory framework
8 allows license renewals for that extended time period.

9 MEMBER BROWN: Okay, all right. So,
10 that's part of your -- is that in one of the, in 10
11 CFR 70, 42, or 24 or someplace like that?

12 MR. REGAN: Part 72.

13 MEMBER BROWN: Oh, 72, I'm sorry. Okay.
14 All right, thank you.

15 MR. REGAN: You're welcome.

16 CHAIR BALLINGER: This is Ron, a follow-up
17 on that. Am I correct in assuming there are words in
18 the document, actually in 1927 as well, which allows
19 for further renewals, right?

20 MS. BANOVA: This is Kris Banovac from
21 the NRC. Yes, there's currently no limitation on the
22 number of renewal periods in our regulations, in Part
23 72. So, there could be subsequent renewal periods.

24 MR. REGAN: Thanks, Kris.

25 MS. BANOVA: Thank you.

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1 MR. REGAN: I couldn't get off mute fast
2 enough.

3 MS. BANOVA: Sorry.

4 CHAIR BALLINGER: A recognition of
5 reality, I guess.

6 MS. BANOVA: Yes.

7 CHAIR BALLINGER: Okay. So, now, is it,
8 Kris, you're going to do the -- I'm confused about
9 who's going to go next, I guess.

10 MS. BANOVA: Rod McCullum from NEI --

11 CHAIR BALLINGER: Okay.

12 MS. BANOVA: -- will present next.

13 CHAIR BALLINGER: All right. Thank you.

14 MR. MCCULLUM: Thank you, Dr. Ballinger,
15 Kristina, and Chris. I agree wholeheartedly that NEI
16 14-03 is a complementary regulatory tool, guidance
17 tool for industry, that goes right along with Rev 1 of
18 NUREG-1927 and the MAPS report. I also think that the
19 key thing here is that this is about a learning
20 approach to aging management.

21 Referring to the recommendation Dr.
22 Ballinger mentioned at the outset about a consequence
23 analysis, there is a lot of work being done in this
24 area, but if we were to do a consequence analysis
25 today, we would base it on a lot of conservative

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1 assumptions.

2 I agree with the likelihood that it would
3 show the consequences of CISCC, should it occur, would
4 be likely zero. Again, but conservative assumptions
5 would not necessarily validate that. And the one
6 thing that is true about CISCC is in 25 years of dry
7 storage experience, now including several inspections,
8 we simply haven't seen it yet.

9 So, what we have constructed here is a set
10 of guidance, which is forward-looking. It is about
11 taking the information that we will get going forward
12 and maximizing our value and ensuring that we continue
13 to safely contain spent fuel.

14 I actually am taking the control of this
15 presentation, I thought I took control of the
16 presentation, yes, I did. And this, by the way, is
17 the first time -- I wasn't able to share my slides,
18 they shared my slides and taken control, first time
19 I've ever taken control of anything from the NRC, and
20 I promise I won't make it a habit.

21 But what we have here is quite a history
22 of successful containment. Again, we started this
23 journey back in 2013, when we realized that we were
24 going to be in the dry storage business for a lot
25 longer than we might have originally suspected. And

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1 we've developed a lot of tools here that I'll allude
2 to.

3 We've already renewed site-specific
4 licenses and CoCs that cover 32 sites. These are 40-
5 year renewal on top of 20-year initial licenses. The
6 rule Part 72 was changed in 2011 to allow that.

7 And NRC's continued storage rulemaking
8 concluded that the current systems would safe for at
9 least 100 years. They made the conservative
10 assumption in that Environmental Impact Statement
11 behind the continued storage rule that we did
12 repackage them every 100 years. They didn't say we
13 would have to, but they thought they would last at
14 least that long.

15 So, we have this substantial base of
16 experience with successful containment. What NEI 14-
17 03 is all about is how do we build on what we learned
18 going forward?

19 And this really is risk-informed and it
20 really is, I think as Chris mentioned, a streamlined
21 approach, how do we take what we learned going forward
22 and continue to build this confidence in what we all
23 believe to be true, what the experience is so far
24 telling us to be true?

25 But in a regulatory context, that's not

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1 good enough. In a regulatory context, you need data.
2 In a regulatory context, you need a lot of
3 information. So, how do we gather it? What do we do
4 with it as we continue to renew these licenses?

5 I don't know how long it will take the
6 United States to develop a repository program, but I
7 don't think I need to, because I know that every 40
8 years, we can renew these. And we're going to have to
9 go through all the things that are spelled out in our
10 guidance to do it. It just doesn't happen
11 automatically.

12 And so, what we see here is, again, we
13 started this back in 2013. Yucca Mountain program had
14 been defunded. We were realizing we were facing much
15 longer term dry storage, and we started to put things
16 in place.

17 We've built on our experience. We had a
18 good regulation. I think Part 72 is a very strong
19 performance-based regulation. NUREG-1827, the review
20 plan, was updated as we were developing NEI 14-03.

21 It's important to note that NEI 14-03,
22 we've revised it twice, because we've been doing this
23 thing with the NRC where we work with them and they
24 work back with us, and it's been a great
25 collaboration.

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1 We've engaged with the IAEA and others,
2 there's a lot of international experience out there.
3 And Kristina and I are currently part of an IAEA
4 collaborative research project that is compiling this
5 document, compiling some of this experience into
6 another international document that will reference 14-
7 03, 1927, and all the experience we have in the United
8 States.

9 A lot of science has gone into this, all
10 the National Laboratories. We first looked at CISCC
11 when it first came to the forefront as the (audio
12 interference). Somebody's got a phone in the
13 background, so perhaps somebody needs to mute.

14 We engaged in a Regulatory Issue
15 Resolution Protocol to address it, which informed the
16 development of these tools.

17 The tollgate concept, there's really two
18 key things that are laid out in NEI 14-03, the
19 tollgate concept and AMID. I think Chris talked about
20 AMID. This is the database we created, there's
21 already about three dozen entries in it as we continue
22 to do inspections and do renewals.

23 And I think one of the things that the
24 endorsement of 14-03 does is take AMID from something
25 that's nice to do and makes it part of the regulatory

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1 framework. In an industry where we're trying to pare
2 down and become more efficient, doing just what we
3 need to do, making AMID part of the regulatory
4 framework is important.

5 The tollgate concept is not just about,
6 okay, we're going to look forward and we're going to
7 learn, we're going to apply what we're going to learn,
8 and, yes, eventually that will lead us to a
9 consequence analysis. Again, a lot of R&D going on at
10 the labs, at EPRI, elsewhere.

11 But these are commitments to specific
12 points in time, to looking at specific information
13 about specific aging management issues. It's really
14 a sense of making sure that we will always -- right
15 now, I'm very confident we're ahead of the rate at
16 which these canisters will age. This is all about
17 making the commitments at very specific points in time
18 to ensure we will be there.

19 And we've also developed an ASME code case
20 to guide our inspection program. So, all these pieces
21 are in place and they've been developed in parallel
22 with 14-03.

23 So, we're already putting tollgates in
24 place. I was just talking to one of my member
25 companies this morning and they were saying, hey, I'm

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1 writing my first tollgate. Great.

2 And as I say, we already have entries in
3 AMID. These things are referred to in NUREG-1927.
4 The framework is already working, what you're really
5 doing by endorsing NEI 14-03 through Reg Guide 3.76
6 is, as this graphic illustrates, you're putting in
7 place the last piece of the puzzle.

8 This assures that what NRC sees from
9 industry will be consistent and will continue to be in
10 the philosophy and, really, the letter of this
11 learning approach that we've laid out.

12 It really, since 2014, and again, that's
13 why it's NEI 14-03, because we started it in 2014 and
14 here we are in 2021. It has been quite a journey and
15 has been a very successful journey.

16 So, I commend my counterparts at the NRC,
17 and I really think all the people in industry, EPRI,
18 the National Labs, who put this in place so that we
19 can continue to renew these licenses and the continued
20 safe containment of used nuclear fuel really stays a
21 no-nevermind.

22 So, I think Chris may have referred to the
23 cornerstones. First of all, consistent format and
24 content of license renewal applications. It's very
25 important that NRC knows what to expect. We know from

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1 experience, but if we submit something completely
2 different, and when you're forward-looking, there's
3 always that possibility, hey, I'm going to look at the
4 future differently than the last guy, that you've
5 become inefficient. So, this is an important aspect
6 of it.

7 Again, we've talked about the learning
8 aging management, based on what we know, continue to
9 build on this experience, continue to incorporate it
10 into our renewal applications. And then, when we
11 actually find things through our corrective action
12 program, building back the mitigation and repair
13 strategies.

14 And then, learning from what we've done on
15 mitigation and repair, although, based on what we're
16 seeing so far, I've got to imagine it will be quite a
17 few years, many decades before we start to have
18 substantial mitigation and repair experience.

19 So, we put all this in AMID. And AMID is
20 unique. It was developed by INPO, it certainly meets
21 INPO standards. It is now run under contract by
22 Certrec, but that's a distinction without a
23 difference.

24 It's unique amongst databases. Normally,
25 when we enter operating experience, we're talking

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1 about, okay, what went wrong and how did we fix it?
2 Here, we enter positive experience.

3 When we get an inspection that does not
4 find CISCC or when we open the used fuel demo cask and
5 we find that the fuel is in the same condition it went
6 into the cask, just as when we opened the first lower
7 burnup demonstration cask, we found that, we share the
8 positive experience.

9 We can share international experience. We
10 can share information we collect from scientific
11 efforts having nothing to do with used fuel or even
12 nuclear, but are relevant to our journey here. So,
13 all of this goes in there.

14 And, again, the tollgates are, you got to
15 pay for the road as you go along. And we will, and
16 there already are several tollgates in these renewals
17 and there will continue to be more. As I said, I just
18 heard this morning of one that's being written as we
19 speak.

20 And these are commitments that we're going
21 to say, okay, at this point in time, what did we learn
22 about CISCC? What did we learn about high burnup
23 fuel? We're going to build that back into not only
24 under the currently 40-year framework we've
25 established, but these things will also set up the

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1 next renewal, should they be needed, should we not
2 have a repository 40 years from now.

3 And I'm becoming more optimistic that we
4 might, but that's not the subject of this meeting.
5 So, moving on to the next slide.

6 MEMBER REMPE: Rod, this is Joy, could I
7 interrupt you for a minute?

8 MR. MCCULLUM: Sure.

9 MEMBER REMPE: It's been a while since we
10 talked about AMID and tollgates and I've forgotten
11 some of the details. I know that in the documentation
12 we were provided to this meeting, they said that AMID
13 would provide periodic reports --

14 MR. MCCULLUM: Right.

15 MEMBER REMPE: -- to the regulator. Does
16 the regulator need to request those reports to get
17 access to them?

18 Likewise, what's the way that you
19 integrate or you interact with the regulator with the
20 tollgate assessments? Do they have to request them,
21 are they automatically submitted to the NRC, or how
22 does that interaction take place?

23 MR. MCCULLUM: Well, it is by request. We
24 very purposefully put AMID in the control of the CoC
25 holders, because there's a lot of proprietary

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1 information. But, of course, NRC knows how to deal
2 with that.

3 I would view this as a forward-looking
4 element of NRC's inspection program. Certainly, if
5 NRC approves a license with a tollgate in it, when
6 that tollgate is reached, NRC should ask, well, okay,
7 was it performed? Some of the tollgates, by the way,
8 do indicate that information will be shared with NRC
9 at that point, information will be made public at that
10 point.

11 So, I would say, this is an innovative and
12 forward-looking part of the inspection program.
13 You're not just inspecting looking backwards, you're
14 inspecting our ability to look forward. And I look
15 forward to the continued engagement.

16 I see Kristina has come on board, so
17 perhaps she has something to say.

18 MS. BANOVA: You got to it, Rod. I was
19 going to mention the NRC's inspection program. That's
20 really where we're going to look at AMID, what
21 licensees are entering into AMID, and making sure
22 they're considering the operating experience that's
23 getting reported and aggregated there, as they
24 implement their AMPs.

25 And I will get into that a little bit more

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1 in my presentation, but I think, Rod, you got to it,
2 so that's why I turned on my video there. So, I'll
3 let you get back to it.

4 MR. MCCULLUM: All right, no problem. And
5 this is one of the efficiencies we've gained overall
6 in dry storage, not just specific to renewal or aging
7 management, the idea, what information gets looked at
8 in the inspection program, what gets looked at at the
9 time of licensing?

10 And if everything has to be looked at as
11 part of the licensing review, well, then that becomes
12 very highly inefficient licensing process. If you
13 review a license application to make sure it's set up
14 to assure safety, then you inspect, and NRC's done a
15 great job of enhancing its inspection programs.

16 So, again, I think this is going to work
17 very well going forward. I should never, on behalf of
18 my industry, say, we look forward to being inspected,
19 but I think this really is the case here, because we
20 have consistent guidance on both sides, we have
21 consistent expectations, and we have a consistent
22 commitment to learning aging management.

23 So, here's the structure that 14-03 lays
24 out, the general information. What do we need to look
25 at to determine that we can continue to safely contain

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1 used fuel? And then, what safety systems and
2 structures and components do we need to look at with
3 respect to that information.

4 And then, how would it potentially be
5 affected? Obviously, the big player here is how will
6 CISC affect stainless steel canisters, and so, that
7 is definitely, I would say that's the lion share of
8 what we'll be looking at going forward, but we will be
9 looking at it in a very structured way.

10 Time limited aging analyses, these go for
11 40 years. Okay, what assumptions are you going to
12 make about what happens over those 40 years? Right
13 now, we're making very conservative assumptions.

14 To get to Dr. Ballinger's point at the
15 outset, I think over time, we'll be able to make less
16 conservative assumptions, we'll have more experience,
17 we'll have more data, and we will have evaluated that
18 through AMID and through our tollgates.

19 So, what assumptions, what consequences,
20 what conclusions do you draw? And, of course, if
21 you're going to go for a second renewal, so, right
22 now, the first renewals take us out to a total of 60
23 years, if you're going to go from 60 to 100, which,
24 again, I would hope we don't, but if we do, then
25 you're going to have to do another time limited aging

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1 analysis that looks at the next 40 years.

2 The Appendix A defines the aging
3 management program, it address the ten elements of
4 NUREG-1927 Section 3.6.1. And so, very consistent in
5 terms of we have to address all those things with our
6 programs. Are there exemptions in play? Is there
7 something in the license renewal application that
8 would result in a need to amend the license or CoC,
9 and/or supplement the UFSAR?

10 So, we're able to consistently, and I
11 think consistency is important in assuring we're
12 efficiently, we're able to consistently integrate the
13 information through this tool. And, again, NEI 14-03
14 was done as a complement to 1927 and they both evolved
15 along with the MAPS report and everything else in that
16 puzzle piece together.

17 So, then, that was Chapter 2 of NEI 14-03,
18 was the format and content. Chapters 3 and 4 are
19 summarized, really, here in one statement, it's
20 everything we've been talking about, which is the
21 ability to efficiently change your approaches based on
22 feedback from operating experience, research,
23 monitoring, inspections.

24 The research will continue. I'm going to
25 be leading an industry meeting with DOE coming up.

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1 Again, we do this annually, where industry says,
2 here's our dry storage research priorities, and DOE
3 says, here's what we're doing, and we make sure those
4 are the same thing.

5 Of course, EPRI has a very robust research
6 program. EPRI recently took in a number of full-sized
7 casks that they're going to be doing some research
8 with. Still to be determined what that is.

9 And, again, all of this stuff will inform
10 consequence analyses, will inform NRC's inspection
11 programs. It'll be visited through AMID and it'll be
12 visited through the tollgates.

13 So, you see in Chapters 3 and 4, really,
14 this idea of recognition, evaluation, and then, of
15 course, if we ever do find anything, then it goes back
16 through the corrective action program.

17 The idea that we would spell out now,
18 based on what we know in 2021, what we will do in
19 2087, when we find corrosion on a cask at Site X,
20 would then deny us the benefit of everything that's
21 learned in the intervening 76 years.

22 Certainly, had we tried to define that
23 stuff back in 2014, when we first started this
24 journey, we would have been disadvantaged in terms of
25 not having had the benefit of all the knowledge we've

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1 gained since.

2 It really has been a very fulfilling
3 journey we've taken down this. You can talk about
4 what hasn't happened on the disposal front, but this
5 is a strong example of the triumph of science,
6 engineering, a strong regulator, and a determined
7 private sector in overcoming a problem that was not
8 anticipated when we first began discharging used fuel.

9 So, that's what we have. There's one
10 opportunity that we're leaving on the table here in
11 14-03, this notion of surrogate inspections.

12 Kristina noted, and I think she'll talk
13 about them, there's 13 clarifications in the Reg Guide
14 3.76, but most of these are just simply a useful
15 extension of the dialogue. NRC has come in and made
16 a point on top of the point we've made and they tend
17 to be complementary and reinforcing. So, we welcome
18 those clarifications.

19 And the one on surrogate inspections is a
20 thing where we have provisions in here, because we did
21 do a susceptibility analysis, EPRI did that, that we
22 do have the ability to say that this environment over
23 here is more corrosive than that environment, so if I
24 inspect the exact same canister here, shouldn't that
25 tell me something that I can take for the other one?

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1 I know, I've had the good fortune of being
2 able to spend most of the pandemic working remotely,
3 very close to the ocean, and I'm noticing a lot of
4 things in my life are corroding and rusting at rates
5 they didn't use to. Hopefully, my mind is not one of
6 them. But nothing stainless steel is in that
7 category. My appliances are fine and not as thick as
8 the casks. But that's a worthless digression.

9 The point there is, I think we will be
10 able to, at some point in the future, start using
11 surrogate inspection results. But NRC has in their
12 clarification that that's not something they're
13 endorsing. That's the main reason this is a partial
14 endorsement.

15 We exchanged letters back and forth, NEI
16 agrees with that, we're saying we are willing to
17 accept a partial endorsement at this time. And as we
18 gain more, as we learn more, we hope to perhaps, at
19 some point, whether it's five, ten, 15 years down the
20 road, re-engage on surrogate inspections.

21 But that's really, if your questions are
22 why is this a partial endorsement, that's really the
23 central reason. But I also think it's an opportunity
24 to get even smarter going forward. It certainly would
25 be informed by a consequence analysis as well, if the

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1 consequences are better understood.

2 CHAIR BALLINGER: I think we have, Greg
3 Halnon, you have a hand up?

4 MR. MCCULLUM: Oh, I just --

5 MEMBER HALNON: Yeah, I do.

6 MR. MCCULLUM: That's my last slide.

7 MEMBER HALNON: Thanks, Rod. It's good to
8 hear you, Rod, appreciate it. Hey, could you discuss
9 a little bit, and maybe you've already answered the
10 question, I just clicked in a little bit into the
11 conversation, about these tollgate assessments,
12 whether or not they'll be public. If not public, how
13 will they be informed?

14 I know it's through the inspection
15 process, but I can see a thirst for information from
16 both the shutdown plants that may have a long-term
17 CAP, like a Citizen Advisory Panel or something to
18 that effect, or even the operating plants for the
19 annual assessment meetings.

20 Did you have any internal discussion about
21 that and how that might work out?

22 MR. MCCULLUM: Yeah. I think they will be
23 open to the public. Again, I think you want to go
24 through the CoC holders, because of the proprietary
25 information considerations.

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1 But the fact that the tollgate inspections
2 are being done are public, because they're in the
3 license renewal application. So, I think it's a very
4 smart communication strategy that if you have
5 something you publicly committed to, you in fact
6 publicly announce what you find when you get there.

7 That's going to be incumbent on us. And,
8 certainly, NRC's inspection results also become
9 public. So, NRC will inspect those, that will become
10 public. But I think we need to be more proactive than
11 that and I think we've already got one great example
12 out there.

13 San Onofre, Southern California Edison,
14 they, in order to get California Coastal Commission
15 approval of the decommissioning of that site, they
16 committed to a monitoring, inspection, and repair
17 program, where they had to, well ahead of any
18 tollgates, they had to go ahead and demonstrate repair
19 technologies and mitigation technologies to the
20 satisfaction of the California Coastal Commission,
21 which voted ten-to-nothing to approve the plan that
22 would lead to decommissioning of the plant.

23 And so, I would cite that example as a
24 proactive way of getting this information out in the
25 public. But I think, Greg, you've also given me a

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1 challenge here, so that we need to continue to do
2 that.

3 I, for one, if I was a utility, would not
4 be happy with waiting for NRC inspection results to
5 come out, I would expect that I would be putting
6 things in AMID and I would be sharing that widely.

7 There are a number of industry venues,
8 including conferences, that could be open to the
9 public, where we talk about these lessons learned,
10 what's in AMID, and --

11 MEMBER HALNON: Right, I agree. I think
12 that it proactively is, you're right on on that. You
13 might consider the Citizen Advisory Panel charters
14 that your members have, maybe start discussing that
15 amongst those, that decommissioning group, to talk
16 about. It's not just decommissioning, obviously, I
17 know that there's some operating plants that will go
18 on beyond 40. So, anyway, just a thought, maybe put
19 that in the back of your head.

20 MR. MCCULLUM: Making a note of that now,
21 because, yeah, that sounds like another thing that
22 should be on. And I know you're very familiar with
23 this group, the decommissioning working group. So,
24 thank you for that.

25 CHAIR BALLINGER: Walt, I think you have

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1 your hand up?

2 MEMBER KIRCHNER: Yes, thank you, Ron. It
3 took a while to find the mic. Rod, just a
4 clarification. This acronym AMA, is that really AMP?
5 Or what is the AMA?

6 MR. MCCULLUM: I think it means aging
7 management approaches. It probably should have been
8 -- well, it's broader than AMP, because it includes
9 the AMPs. This was --

10 MEMBER HALNON: I think the other A is
11 analysis, aging management analysis?

12 MR. MCCULLUM: Yeah, analyses, yeah, yeah.

13 MEMBER KIRCHNER: Okay, thank you.

14 MS. BANOVA: Or activities?

15 MR. MCCULLUM: I think it -- well, the way
16 I said it, when I brought this slide back to life, it
17 was an old slide, I meant it to be all-encompassing.

18 MEMBER KIRCHNER: Yeah, yeah. Okay, fine.
19 I just wanted to make sure I didn't miss something.
20 But while I've got the microphone unmuted, I know
21 there's a focus on, always in the nuclear industry,
22 when you use stainless steel, there's always concerns
23 about chloride stress corrosion and cracking.

24 But put that aside for the moment. Are
25 there other likely things that should be inspected,

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1 like thermal fatigue of welds, or things like that,
2 with or without the presence of chlorides? Is that
3 part of these aging management activities --

4 MR. MCCULLUM: Yes. I mean, we're --

5 MEMBER KIRCHNER: -- or the inspection
6 programs? Yeah, so we're not looking just at one
7 single potential failure mechanism and obsessing on
8 it, but also looking that the cask is, over its
9 lifetime, is actually meeting its performance
10 requirements?

11 MR. MCCULLUM: Yeah. The inspection
12 technologies that we've deployed already while bring
13 a comprehensive look. There's multiple corrosion or
14 degradation mechanisms and they've all been addressed
15 through various DOE gap analyses. And it keeps coming
16 back to CISCC is the one we focus on most. But these
17 are going to be comprehensive programs.

18 And if we learn new information about
19 something that we should be more concerned about than
20 we are, because we find something different than CISCC
21 that we want to learn more about, then this program
22 allows us to get that in a corrective action program,
23 address it, and get it out to industry.

24 MEMBER KIRCHNER: Good, thank you.

25 CHAIR BALLINGER: Okay. Are there any

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1 other questions for Rod? Well, thank you, again. I
2 guess we now need to go to Kristina?

3 MS. BANOVA: Okay.

4 CHAIR BALLINGER: There you are.

5 MS. BANOVA: Thank you, Dr. Ballinger.
6 And please give me a moment to pull up my slides.
7 Okay. Can you all see that slide presentation?

8 MEMBER REMPE: Yes.

9 CHAIR BALLINGER: Yes.

10 MS. BANOVA: Okay, great. And I will
11 say, before I get started, so when I do the slide
12 show, it takes up my full screen, so I can no longer
13 see the Teams link. And so, I can't see if somebody
14 has their hand raised.

15 So, I would just ask Dr. Ballinger to
16 please let me know if any of the members have any
17 questions, or if any of the members, please jump in at
18 any point during my presentation to ask your
19 questions.

20 So, thank you so much for the opportunity
21 to present to you today on the proposed final Reg
22 Guide 3.76. I'm happy to present this on behalf of
23 the NRC team that reviewed NEI 14-03 and prepared the
24 Regulatory Guide.

25 I'm now on Slide 2. Slide 2 provides an

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1 outline of my presentation. I'm going to give some
2 background information to get us started. I'm going
3 to talk a little bit about updates to the storage
4 renewal framework, both updates that we have completed
5 and also updates that are ongoing and work that is
6 ongoing.

7 I'll then get into NEI 14-03 and the Reg
8 Guide, which is the subject of the meeting today.
9 I'll talk about the public comment we received on the
10 Reg Guide.

11 And then, I'll wrap up by talking about
12 how the framework is flexible and risk-informed and
13 how we're going to continue to risk-inform the
14 framework going forward. And then, finally, our path
15 forward, both for the Reg Guide and for our storage
16 renewals framework.

17 I'm now on Slide 3. So, in terms of
18 background for storage renewal requirements, as we've
19 already discussed, the regulations in 10 CFR Part 72
20 do allow for us to renew specific licenses for
21 independent spent fuel storage installation and
22 certificates of compliance for dry storage system
23 designs, for a period not to exceed 40 years.

24 The regulations do specify that renewal
25 applications must include time limited aging analyses

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1 and those consider the effects of aging on structures,
2 systems, and components, or SSCs, important to safety,
3 and the capability for those SSCs to continue to
4 perform their intended safety functions for the period
5 of extended operation.

6 Renewal applications must also include
7 aging management programs, and those are for
8 management of aging issues that could adversely affect
9 the performance of our structures, systems, and
10 components important to safety.

11 And so, in order for the NRC to approve a
12 storage renewal application, applicants must
13 demonstrate that any aging effects on our dry storage
14 systems can be addressed in the period of extended
15 operation, so that those systems continue to perform
16 safely.

17 Any questions on that slide before I go
18 on? Okay. I'm now on Slide 4.

19 A little bit more background on updates to
20 our storage renewal framework. You've already heard
21 from Chris and Rod a little bit about our experience
22 with the previous storage renewals. They did indicate
23 a need for some expanded guidance in the area of spent
24 fuel storage renewals and aging management.

25 We did have some inefficiencies in our

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1 past reviews. And also, as Chris alluded in his
2 opening remarks, we had this wave of storage renewal
3 applications that were coming, we were expecting 15
4 renewal applications over several years.

5 And so, we really wanted to be ready to
6 review those applications, and we wanted industry to
7 also prepare quality applications for us to review.
8 So, we did reflect on the lessons we learned from
9 those reviews.

10 We looked at the reactor renewal
11 experience. We looked at the research that had been
12 done, industry and DOE initiatives, research and
13 development. And we considered all those things as we
14 determined what we need to do and change in the
15 framework.

16 As Chris mentioned in his opening remarks,
17 we did receive extensive stakeholder feedback as we
18 went through this process from public, industry, ACRS,
19 our national and international counterparts. NRC did
20 not do this alone, it was really in collaboration with
21 all of our stakeholders, and we thank them for sharing
22 their perspectives over the years to help us get to
23 where we are today.

24 And as you've heard from Chris, and Rod
25 got into a little bit more detail, our focus was

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1 really ensuring this operations-focused aging
2 management and the idea that we're learning as we go.

3 So, as we conduct these AMP inspections,
4 as we get operating experience, as we do complete
5 additional research and develop new technologies, that
6 we learn from that and we update our aging management
7 programs as we go, to make sure that they continue to
8 be effective at managing those aging effects in the
9 period of extended operation.

10 I'm sorry, let me pause there. Any
11 questions on Slide 4 before I go on? Okay. I'll go
12 on to Slide 5.

13 So, in terms of updates that we've already
14 made to the storage renewal framework, we started our
15 work with the update to NUREG-1927, as you've already
16 heard, and, of course, discussed that with the ACRS
17 back in 2015 and 2016. We also met with the ACRS back
18 in 2016 on the draft MAPS report, the Managing Aging
19 Processes and Storage report.

20 And in addition to those two items that we
21 did coordinate with the ACRS, we also completed this
22 temporary instruction, or TI for short. And the TI
23 really focused on inspection of licensees' programs
24 and procedures to implement AMPs. And since issuance
25 of that TI in 2018, we have completed several

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1 inspections under the TI.

2 And so, with that work that we have
3 already completed, we actually have realized
4 efficiencies in our review process, in terms of the
5 total time that it takes to review these renewal
6 applications, and also, the NRC staff resources that
7 we use in those reviews. So, we actually have already
8 seen some efficiencies with these updates that we've
9 made.

10 Any questions before I move on? Okay.
11 I'm now on Slide 6.

12 So, even though we have completed those
13 improvements and we've already seen some efficiencies,
14 our work is not done, so our work continues. And this
15 slide just lists some examples of our ongoing work to
16 continue to improve our framework going forward.

17 So, we're actually currently developing an
18 inspection procedure for licensees' AMP
19 implementation, some questions already came up in this
20 regard. As part of this inspection procedure, we'll
21 be looking at how licensees are inputting the
22 operating experience from their aging management
23 programs into AMID, and also, how they're using AMID
24 to learn from operating experience that other sites
25 and other licensees are gaining.

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1 We're also going to look, going forward,
2 the idea is to have a learning aging management
3 program that constantly responds to operating
4 experience and sort of evolves with time to be able to
5 make sure that that program remains effective.

6 We're also going to be looking at how
7 licensees change those aging management programs and
8 how they use their change control processes under 10
9 CFR 72.48 to make those changes to AMPs.

10 So, those are all things that we're going
11 to be looking at in that inspection procedure. And we
12 currently plan to issue that later this fall.

13 We're also planning a future update to Reg
14 Guide 1.147, and this would be to endorse the ASME
15 Code Case N-860. I think Rod already mentioned this
16 code case. This is for inspection of canisters and
17 the protocols for that.

18 So, we are planning a future update.
19 There is a current update to Reg Guide 1.147, we
20 didn't get a chance to get in that, we didn't have
21 enough time to get in that update, so that will be a
22 future update to that Reg Guide.

23 And in addition to those updates, we're
24 also continuing our active involvement in many other
25 areas. I think Rod alluded to some of these already.

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1 There's the Extended Storage Collaboration Program
2 that's coordinated by EPRI.

3 We're working with our international
4 counterparts. As Rod mentioned, there is some active
5 development of IAEA guidance on aging management for
6 dry storage systems, so we're actively involved in
7 that.

8 We're, of course, following the DOE and
9 industry initiatives and advancements in technologies
10 and techniques for inspections and, ultimately, repair
11 and mitigation if it's needed.

12 And also, research continues. So, we're
13 following the research, in terms of fuel performance,
14 degradation mechanisms. And also, there's currently
15 the high burnup fuel demonstration, led by DOE and
16 EPRI, that's ongoing, and so, we're continuing to
17 follow that.

18 And then, finally, I know this has come up
19 a few times already, based on the ACRS letter that we
20 received on NUREG-1927, but we continue to look at the
21 risk of aging effects on canisters.

22 And things that we're looking at, or that
23 industry is looking at, and I use the industry with a
24 capital I, we're looking to understand the deposits on
25 canisters. So, what's the chemical makeup of the

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1 deposits on the canisters?

2 And to look at CISCC probability, take a
3 further look at that. And then, if cracking does
4 occur, looking at crack growth rates, understanding
5 those better and how the crack could propagate.

6 And then, as has been mentioned a few
7 times already, the consequence analysis. That work by
8 EPRI is ongoing. It will be coming, I believe a
9 couple more years still until there will be a report
10 that we can look at, but we know that work is ongoing
11 and we will follow that and welcome that.

12 Any questions on this slide before I go
13 on?

14 CHAIR BALLINGER: I think Steve Schultz
15 has his hand up. And --

16 MS. BANOVA: Sure.

17 CHAIR BALLINGER: -- I think Walt as well.

18 DR. SCHULTZ: Kristina, this is --

19 CHAIR BALLINGER: Go ahead.

20 DR. SCHULTZ: -- Steve Schultz.

21 MS. BANOVA: Hello.

22 DR. SCHULTZ: Hi, how are you? The
23 question I have is, you've mentioned a few times now
24 efficiency improvements that have been noted, I
25 presume efficiency and effectiveness. Could you

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1 provide some examples or some quantification of the
2 efficiencies that have been observed --

3 MS. BANOVA: Absolutely.

4 DR. SCHULTZ: -- or some examples of
5 improvements that have been developed as a result of
6 the program and its oversight?

7 MS. BANOVA: Yes, absolutely. So, in
8 terms of efficiencies, so what we've done is we've
9 looked at a baseline.

10 So, we looked at the hours that we spent,
11 which ultimately are dollars that are charged to our
12 applicants, for the renewal applications before we
13 made these improvements, so the issuance of NUREG-1927
14 and MAPS, and then, we looked at the renewals that
15 we've done since then. And so, we compared the
16 numbers. And we've actually cut our review costs in
17 half, so we've very happy to say that.

18 And also, the time, the total time to
19 review the applications, we've almost cut that in
20 half. I think it's from about 48 months to 26 months.
21 And as we continue with our renewals, we're learning
22 as we go, and so, that time is shrinking even more.

23 So, we actually have been able to cut both
24 the resources that are spent on those reviews and the
25 time in half. And so, we're happy to report that.

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1 In terms of effectiveness, I will say
2 effectiveness, I think going forward as we implement
3 the AMPs, we are going to make sure, and this is going
4 to be in our inspection program, that licensees are
5 responding to what they're finding, to the operating
6 experience, that they're changing their AMPs to
7 respond to it, to make sure those continue to be
8 effective.

9 So, in terms of effectiveness, that's
10 more, I think, a future goal is to make sure we remain
11 effective. But we're very pleased with the
12 efficiencies that we've realized so far.

13 DR. SCHULTZ: Are there consistencies in
14 the corrective action programs as you see it across
15 the industry that are associated with the spent fuel
16 storage?

17 MS. BANOVA: So, that is a focus of our
18 inspection program. So, the corrective actions
19 programs and the quality assurance programs at
20 licensees, we do inspect those independently.

21 So, even besides the AMP implementation
22 and aging management, we do conduct our inspections to
23 make sure that those programs, the quality assurance
24 programs and corrective action programs, are
25 effective, that they are correcting issues as they

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1 arise.

2 And so, yes, we inspect that now and we
3 will continue to inspect that going forward.

4 DR. SCHULTZ: Rod, do you have a comment?
5 It looks like you might. If you're unmuted?

6 MR. MCCULLUM: I came on with my video,
7 but not my audio, isn't that stupid? But, yeah, no,
8 that is a specific feature of NEI 14-03, there is
9 guidance in there on how to enter aging management
10 findings into your corrective action program. And by
11 endorsing this, then NRC understands how we'll be
12 doing that and we should have a consistent and
13 effective process going forward.

14 DR. SCHULTZ: Yeah. That's the
15 collaborative process that you mentioned earlier. I
16 appreciate that. Thank you.

17 CHAIR BALLINGER: Walt, you still have
18 your hand up --

19 MEMBER KIRCHNER: Yes.

20 CHAIR BALLINGER: -- I think?

21 MEMBER KIRCHNER: Yes, thanks, Ron.
22 Kristina, this is Walt Kirchner, good afternoon. With
23 regard to inspections, to date, without identifying
24 any sites or operators, have you found any significant
25 problems with dry cask storage that would perhaps

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1 threaten the integrity and/or have there been
2 significant repairs of any, and when I say
3 significant, a significant problem and hence, a
4 significant repair program, of dry casks? Have there
5 been any incidents such as that in the dry casks that
6 are deployed so far?

7 MS. BANOVA: Good question. And I'll
8 kind of start with a response and I'll also invite my
9 NRC colleagues to jump in if they have anything they
10 want to add.

11 So, we have seen a couple things. We
12 actually published a information notice. We saw some
13 degradation because of environmental moisture with
14 cask seals. So, the sealing system for the metal
15 casks. And then, also, some freeze-thaw degradation
16 of concrete, of the horizontal storage modules for a
17 canister-based system.

18 And so, we actually did issue a generic
19 communication, it's in an information notice, the
20 number escapes me, a number that's coming into my
21 mind, I don't know if this is correct, I want to say
22 like 2017-20, but please don't quote me on that.

23 But we do have an information notice that
24 we did put out as a generic communication to alert
25 industry as to what we were seeing. But besides that,

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1 nothing else is coming to mind, in terms of
2 degradation and aging that we've seen.

3 And, of course, and I think a question
4 came up, I can't remember who asked that before, I
5 apologize, but a question came up, as we go forward
6 and we get this operating experience, we're going to
7 be doing these AMP inspections, we're going to be
8 learning a lot more about the condition of these
9 systems, how are we going to share that? How is that
10 information going to go out there?

11 And besides the things that Rod had
12 mentioned, in terms of AMID and the tollgate
13 assessments, NRC, we believe we absolutely have a role
14 to share operating experience, just as industry does,
15 NRC has its programs as well.

16 And so, just as we did with that
17 information notice on the environmental moisture and
18 some of the degradation that we were seeing because of
19 that, we would continue to do that going forward. So,
20 if we saw any issues or trends going forward, we have
21 our generic communications process.

22 And then, also we have, if there are any
23 issues with the licensee's implementation of AMPs, we
24 obviously have our inspection program and our
25 enforcement program as well.

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1 But that's what immediately comes to mind.
2 And I'll ask my NRC colleagues if anybody has anything
3 that they wanted to add to that?

4 MR. MCCULLUM: While we're waiting, I'll
5 just point out that information notice is 2013-7, and
6 that does pertain to bolted systems that represent
7 less than ten percent of the U.S. fleet.

8 MS. BANOVA: Yeah. And then, it also has
9 the concrete degradation for --

10 (Simultaneous speaking.)

11 MR. MCCULLUM: Yeah.

12 MS. BANOVA: Yeah, yeah. Thank you, Rod.

13 MR. DUNN: Yeah, this is Darrell Dunn.
14 Can you hear me?

15 MS. BANOVA: Yes.

16 MR. DUNN: Yeah. So, you are correct
17 about the horizontal systems and the freeze-thaw
18 issues. There were also some vertical cask systems
19 that have had exposed concrete on the outside that
20 have had aging effects and necessitated repairs to
21 those systems.

22 And then, in addition to that, there has
23 been some coating-related issues for some of the
24 carbon steel components. For example, the inside of
25 the vertical cask that have a carbon steel shell on

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1 the inside of the concrete surface.

2 That was not necessarily evaluated as an
3 aging effect, but more as a coating application
4 problem, but it was still something that was
5 identified in an inspection and noted in the
6 inspection report.

7 And that's, in addition to the things you
8 said, that's about all the things I can think of.
9 Certainly, no indications of corrosion or chloride
10 induced stress corrosion cracking on any of the
11 stainless steel canister inspections that I am aware
12 of.

13 MEMBER KIRCHNER: Thank you very much,
14 that was a good survey, I appreciate it. And that you
15 do the information notices, thank you.

16 MS. BANOVA: Thank you. Any further
17 questions on this slide before I move on? Okay. Now,
18 moving on to Slide 7.

19 So, with this slide, I'm not going to
20 spend much time here, I think you've already heard
21 this from Chris and Rod. We did include the key
22 aspects or cornerstones of NEI 14-03, we did already
23 reference those in NUREG-1927.

24 However, to have the regulatory stability
25 and predictability, and I'll even say a durable

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1 guidance document going forward, we are making sure to
2 do the formal endorsement of NEI 14-03 through the Reg
3 Guide.

4 So, even though some of these ideas and
5 the important ideas from NEI 14-03, we already have
6 referenced in the SRP, we still feel it's important to
7 go through the process of the endorsement through the
8 Reg Guide.

9 And so, I'll stay there, I think we've
10 talked about that already. Now --

11 MEMBER REMPE: So, Kristina, I'm sorry,
12 this is Joy, again.

13 MS. BANOVA: That's okay. Hi, Joy.

14 MEMBER REMPE: Hi. You mentioned you
15 would go a bit more into AMID and tollgates and how
16 the regulator interacts or gets access to the, I guess
17 they said they give periodic reports on AMID, what's
18 coming in. Do you --

19 MS. BANOVA: Yes.

20 MEMBER REMPE: -- actually have -- I would
21 bet you don't have access to this database, or do you
22 actually get access to the full database or are you
23 limited to the reports?

24 MS. BANOVA: That's a good question. And
25 our inspector, our main SME in this area, Marlene

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1 Davis, he's actually on inspection this week, on an
2 AMP inspection looking at a licensee's AMP
3 implementation, which is why he's not here. So, we
4 talked before the meeting.

5 He had mentioned that, currently, the plan
6 is that when we go to the sites to do the inspections
7 of the licensee's AMP implementation, we'll access
8 AMID through the site. So, we'll be there, we'll be
9 able to search on the database.

10 There's multiple tools to search on the
11 database and to find the information that you're
12 looking for based on materials, the type of system,
13 the aging effect. So, we'll have access to that when
14 we're at the site.

15 And, also, I do know that some of our --
16 early on, it was possible for the NRC to be able to
17 also get access to the AMID. And I think, for that to
18 have, I'll say access at NRC headquarters rather than
19 through the licensees, we just need to make sure that
20 we have the infrastructure in place there, so in terms
21 of nondisclosure of proprietary information and things
22 like that.

23 So, we would just want to make sure that
24 we had that framework in place with INPO to be able to
25 access that. But, absolutely, our inspector, as we

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1 speak, is access AMID at a licensee's site, to see the
2 operating experience.

3 And then, also, the tollgate reports or
4 assessments, I believe this is discussed in NEI 14-03,
5 where that assessment itself, so this will be
6 something that's going to be recorded, summarized, and
7 then, that tollgate assessment and report itself will
8 also be entered into AMID. So, once again, that would
9 be available for industry use.

10 Does that address your question, Joy?

11 MEMBER REMPE: That helps a whole lot. It
12 wasn't clear to me, and, again, I know we discussed
13 this a lot several years ago and I probably have just
14 forgotten that you had access to the actual database,
15 so that's great.

16 And then, I assume that the inspectors are
17 well-versed, so they know to request these tollgate
18 assessments, that it's a system that's been working.
19 Since some of these assessments are being done, that
20 has happened and there's not a chance for the
21 inspector to miss that they need to request that.

22 MS. BANOVA: Correct. And, actually, in
23 the AMP itself, and with the renewal applications that
24 we've approved so far with the tollgates, so there
25 will actually be something in the aging management

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1 program itself that says when those tollgate
2 assessments will be conducted.

3 And so, that's making its way, it's in the
4 aging management program that's ultimately approved as
5 part of NRC's issuance of that renewal. And then,
6 that's ported over into the licensee's programs and
7 procedures, to actually implement that aging
8 management program.

9 And so, the inspectors will have access to
10 the aging management program itself, and then, also to
11 the licensee's procedures for the AMP implementation.
12 And so, they'll be able to review those procedures,
13 see, okay, oh, you've had a tollgate assessment that
14 you conducted last year, please show me the results of
15 that and, essentially, how you responded to what you
16 found.

17 So, that is absolutely the thought for how
18 we're going to address that in inspection.

19 MEMBER REMPE: Great. Thank you very
20 much.

21 MS. BANOVA: Thank you. Any other
22 questions on this slide before I move on? Okay. I'm
23 going to move on to Slide, I'm on Slide Number 8 now.

24 So, in terms of what's in Reg Guide 3.76,
25 so you've heard, we do make some clarifications to NEI

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1 14-03 in the Reg Guide. And I just provide a couple
2 examples here on this slide to illustrate.

3 I think the one that you've heard about
4 already, it's sort of the big one, I think, the
5 surrogate inspections. And this is the idea that a
6 licensee, instead of conducting their own AMP
7 inspection, they would rely on another site's
8 inspection results to sort of use as their own.

9 And the staff's position on surrogates was
10 originally presented in NUREG-1927, where we said you
11 can use surrogates as long as you have some operating
12 experience to back it up and provide a basis for their
13 use.

14 And NEI 14-03 did a nice job of expanding
15 on this area, thinking ahead to how would we use
16 surrogates, how could this be done appropriately and
17 safely going forward?

18 NEI 14-03 did reference the work that EPRI
19 had done, industry and NRC had done, through the
20 Regulatory Issue Resolution Protocol on CISCC, and
21 that resulted in EPRI's development of susceptibility
22 criteria and rankings for sites. And so, NEI 14-03
23 does go into that.

24 And so, the clarification that we provide
25 in the Reg Guide was that we need to understand, at

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1 this point, we're starting to get the operating
2 experience, it's starting to come in, but we really
3 need to understand what the inspection results, the
4 canister inspection results look like for those
5 difference susceptibility rankings, to be able to
6 compare, to see, okay, who can rely on whose
7 inspection?

8 And so, really understanding how that
9 susceptibility assessment is applied across the ISFSI
10 fleet, that's what we think we need to work on next.

11 As Rod had mentioned in his presentation,
12 industry is absolutely looking forward to re-engaging,
13 once we have that understanding of how the inspection
14 results are comparing for the different susceptibility
15 rankings, to be able to re-engage and apply this
16 condition of surrogates going forward. So, we did
17 make that clarification in the guidance.

18 And then, also, with this second bullet
19 here under surrogate inspections, there was also a
20 mention in NEI 14-03 that the concept of surrogates,
21 as it was laid out in NEI 14-03, for how you can use
22 that for canister inspections, there was a mention
23 that this could be used for other SSCs and materials,
24 such as concrete.

25 And so, we did want to make a

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1 clarification in the Reg Guide that if surrogates are
2 to be used for SSCs and materials other than stainless
3 steel canisters, there would just need to be a
4 methodology and some guidance for how you would do
5 that.

6 With the canister inspections, we had all
7 this really nice work we could rely on, that happened
8 through the CISCC RIRP, we had those susceptibility
9 rankings and assessments, we had that work that was
10 done by industry, and it laid out the methodology for
11 how you could do a canister surrogate going forward.

12 And so, if industry wanted to apply that
13 to other materials and components, NRC wanted to make
14 the clarification in the Reg Guide that there would
15 need to be a methodology for how to do that before we
16 apply surrogates. So, just something that we wanted
17 to make clear in the Reg Guide in terms of surrogates.

18 MEMBER KIRCHNER: Kristina?

19 MS. BANOVA: Yes?

20 MEMBER KIRCHNER: This is Walt Kirchner,
21 again. On the surrogate inspection, could you just
22 give us a feeling for roughly the number of different
23 design type canisters that are certified out there and
24 in service?

25 MS. BANOVA: By number, like --

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1 MEMBER KIRCHNER: I mean --

2 MS. BANOVA: -- the number of designs?

3 MEMBER KIRCHNER: Where I'm going with
4 this is, it would seem to me surrogate inspections
5 would make sense for the same vendor canister. So,
6 I'm just curious, how many different canister types
7 are out there and vendors?

8 MS. BANOVA: Yeah, so, and that's a great
9 question. So, it's really -- and, actually, this was
10 part of our second clarification that we made there.
11 If you're going to apply surrogates, you absolutely
12 have to understand variability.

13 It kind of comes down to the material,
14 I'll say the material and the service environment that
15 it's in, as the first piece. So, the variability in
16 the materials and the service environment it's in, and
17 also, if there's any operating parameters.

18 So, concrete, I think of concrete
19 sometimes, I think that would be a tough one to do
20 surrogates on, just because there is, I think, a lot
21 of variability in terms of concrete, because it
22 depends on the aggregate that's used, which is usually
23 a local product, the water that's used.

24 And so, we really need to consider the
25 variability, I think, in the materials of construction

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1 and also, differences in environmental and operational
2 parameters to use the surrogate. So, I --

3 MEMBER KIRCHNER: Well, my --

4 MS. BANOVA: -- don't know if that really
5 answers your question, but that's the caution there.

6 MEMBER KIRCHNER: I specific said
7 canisters, because my intuition would be just what you
8 said about concrete and local environmental conditions
9 and such being a lot more variability there. But
10 going back to the canisters themselves, it would seem
11 to me that there would be an order of magnitude less
12 variability. I think Rod's trying to make a comment.

13 MR. MCCULLUM: Yeah, just want to confirm,
14 there are 16 specific certificates of compliance out
15 there that cover 90 percent or over 2,700 canisters.
16 For example, standardized NUHOMS, there's 725 of
17 those, HI-STORM, there's 1,000 of those. Actually,
18 2,800 are covered under the CoCs.

19 So, yeah, there are opportunities where
20 you have hundreds, if not a thousand or more, of very
21 similar canisters. Some of the site-specific licenses
22 have some of the same canisters that are under the
23 CoCs too, they were just licensed site-specifically.

24 And I agree, concrete is extremely local,
25 but in terms of the stainless steel canisters that

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1 make up the bulk of the fleet, we do think there's a
2 significant potential for the use of surrogates. It's
3 really only a handful of designs out there right now.

4 CHAIR BALLINGER: This is Ron Ballinger.
5 I think that caution with respect to surrogates is
6 probably quite prudent, because while the
7 susceptibility criteria, environmental susceptibility
8 criteria are pretty easy to get a handle on, the
9 residual stresses in welds are not.

10 And so, you may have comparable
11 environment in one site or another, where you can use
12 surrogates in that respect, but the welding processes,
13 residual stresses, repair welds, and even the amount
14 of a canister that's inspectable might mask areas of
15 very high residual stress.

16 And so, that introduces a lot of
17 variability and I think caution is important here,
18 with respect to that variable.

19 MR. MCCULLUM: I agree 100 percent, it
20 would be a very complicated analysis that would have
21 to consider all of the factors that lead to CISCC. I
22 think we do have a lot of design information on these
23 systems and a lot of information on the manufacturing
24 processes that were used, they come out of the same
25 factories. But, absolutely, we would have to consider

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1 all of that.

2 CHAIR BALLINGER: Yeah, a lot of these
3 older canisters, where weld repairs were made, where
4 actually nobody knows.

5 MR. MCCULLUM: Right, those wouldn't be
6 good surrogates. But that's why we are not moving
7 forward with the surrogate thing at this time, there's
8 a lot more to learn on that. We have to figure out
9 how to do this.

10 CHAIR BALLINGER: Okay. We've got a five-
11 second rule, you can continue.

12 MS. BANOVA: All right. And, yeah, so,
13 that's sort of, I think, the big one in Reg Guide
14 3.76. And then, there are some other minor
15 clarifications. Several of them actually fall under
16 the umbrella of renewal application format and
17 content.

18 So, essentially, just since we've issued
19 NUREG-1927 and since NEI 14-03 Rev 2 came out, we have
20 gone through reviews of several storage renewal
21 applications. So, we've just learned a few things in
22 the last handful of years.

23 And so, most of our clarifications in that
24 area just reflect the passage of time and what we've
25 learned since the issuance of NEI 14-03 Rev 2. So, I

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1 would put them in the camp of fairly mild
2 clarifications, but it was a nice opportunity, I'll
3 say, in the Reg Guide, to be able to provide some of
4 those updates that we learned as we continued our
5 reviews.

6 So, I'll pause here again to see if
7 there's any questions on this slide before I advance.
8 Okay. So, I'm now on Slide Number 9.

9 So, in terms of public comments on the
10 draft Regulatory Guides, which was published as DG-
11 3055, we only received one public comment on the draft
12 Reg Guide, it was from NEI. And in the comment, NEI
13 mentioned that they agreed to the approach to
14 surrogates, as you heard from Rod today, they know
15 that they'll re-engage in the future as we gain more
16 information, as we become more comfortable with the
17 use of that idea.

18 And they also encouraged the industry use
19 of the AMID database, which we absolutely agree. And
20 then, there was a specific comment that NEI made on
21 the supplement in the license renewal application.
22 So, in the license renewal application, there's a
23 FSAR, Final Safety Analysis Report, supplement that's
24 included as part of the renewal application.

25 In the draft guide, the NRC made a

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1 clarification that we wanted to see the actual
2 proposed FSAR changes, and the comment from NEI said
3 that that wasn't really needed, as long as it was very
4 clear what aging management information is ultimately
5 going to go into the FSAR after the renewal and that
6 will be recorded as part of the design basis.

7 And so, we ultimately agreed with that, we
8 recognize that having FSAR page changes is actually
9 very nice, because it's very clear what the applicant
10 will be putting in the FSAR after we issue the
11 renewal.

12 However, as long as the NRC has sufficient
13 information to understand what aging management
14 details are going to get recorded in the FSAR, are
15 going to get recorded in the design basis, to make
16 sure that that information that we based our renewal
17 on, that formed the basis of our approval, that that
18 gets recorded in the design basis.

19 As long as that is clear to us, then we
20 were okay with not having the actual FSAR proposed
21 changes. So, we did make a revision to the proposed
22 final Reg Guide to address that comment.

23 And one final thing I'll mention on this
24 slide before I see if anybody has questions, I will
25 note that even though we only received the one public

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1 comment on the Reg Guide, we're continuing to monitor
2 the public interest.

3 I think it came up already, our
4 involvement in community engagement panels. So, we're
5 going to continue to do that. So, even though we
6 received the one comment, we're going to keep our ears
7 open to public input in aging management as we go
8 forward.

9 So, let me pause there and see if there
10 are any questions. Okay. Hearing none, let me
11 advance here, I'm now going to Slide 10.

12 So, this is almost a conclusion slide, I
13 think. We've heard a lot so far about what we've
14 already done to the framework, what we're planning to
15 do going forward, and this slide kind of touches on
16 how our framework, in a way, is risk-informed and how
17 it's flexible going forward, so that we can continue
18 to risk-inform it.

19 So, the first thing to mention here is
20 that the focus of our renewals, it's really on the
21 continuation of the approved design basis and the
22 continued performs of those SSCs important to safety.
23 So, at its nature, we're focusing on the important to
24 safety aspects of the system in the renewal.

25 The AMPs are summarized in the Final

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1 Safety Analysis Report, so that is under a licensee's
2 change control process. Licensees can change those
3 AMPs and aspects of the AMPs without NRC approval, as
4 long as they meet the criteria in 10 CFR 72.48, which
5 is the change control regulation of Part 72.

6 The guidance does not specify corrective
7 actions for aging management programs. We do, as we
8 discussed, we rely on the quality assurance programs
9 and the corrective action programs at the licensee's
10 site.

11 And, really, when we review the aging
12 management programs, we focus on the acceptance
13 criteria to make sure that we have acceptance criteria
14 that are essentially based on the aging effects and
15 when those can occur and what they would do, and
16 setting those acceptance criteria as a very low
17 threshold, so if you trigger those, as soon as you
18 trigger those, you're immediately into the corrective
19 actions program.

20 And we also feel that it's more sound to
21 rely on the corrective actions program, because there
22 is a wide range of, we expect a wide range of
23 inspection findings. You have some variability in the
24 storage system designs.

25 And then, also, we expect there to be

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1 continued development of inspection and repair
2 technologies. And so, that allows us the flexibility
3 to take advantage of those in the future.

4 One other thing to mention here, of
5 course, as we've been talking about, the framework
6 does allow licensees to change those aging management
7 programs to respond to operating experience, and that
8 really ensures that those aging management programs
9 remain effective throughout the period of extended
10 operation.

11 As you've heard, these periods can go up
12 to 40 years, so we want to make sure that those AMPs
13 are dynamic, that they're not static and they're not
14 frozen at the time of the issuance of the renewal, but
15 that they continue to change and learn as we learn.

16 And I'll mention also that, although we
17 believe we have the sustainable framework here and a
18 risk-informed framework, our work continues. I know
19 you've heard this message, I think, a few times, so
20 our work continues, which I'll get into on the next
21 slide on path forward.

22 But let me just pause there to see if
23 there's any questions. Okay. So, I'll now go to my
24 final slide here. I'm now on Slide 11 for those folks
25 on the phone.

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1 So, this is our path forward. So, for Reg
2 Guide 3.76 itself, after ACRS consideration and any
3 comments and input that we get from ACRS, we will
4 publish the Reg Guide after that. So, we look forward
5 to doing that in the future.

6 And in terms of the larger storage renewal
7 framework, we're going to complete those ongoing
8 framework updates that I talked about earlier in my
9 presentation. We're going to continue to risk-inform
10 our framework and revise our guidance as needed, as we
11 gain that information, as we gain the operating
12 experience from AMP inspections.

13 And as additional work is completed,
14 which, as we discussed a few times now, that work
15 continues in understanding the probability and the
16 consequences of stress corrosion cracking, and so, as
17 we learn more, we're going to continue to risk-inform
18 our framework and update our guidance as needed.

19 Of course, licensees, as they enter the
20 period of extended operation, they will be
21 implementing their aging management programs, they're
22 going to be entering their operating experience into
23 AMID, and, ultimately, making adjustments to the AMPs
24 going forward, to make sure that they're responding to
25 the operating experience and everything that we're

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1 learning in terms of aging management.

2 NRC will inspect the licensees'
3 implementations of AMPs, as we've discussed. We're
4 going to look at how they're using AMID, how they're
5 reporting to AMID, how they're learning from AMID,
6 and, ultimately, how they're using their change
7 control processes to change the AMPs to respond to the
8 operating experience and the knowledge that's being
9 gained.

10 We feel that this framework is
11 sustainable, flexible, and that it will ensure
12 continued safe storage for the period of extended
13 operation. And we appreciate the opportunity to
14 present today. And so, with that, I'm going to see if
15 there's any questions on my presentation from the
16 subcommittee members.

17 CHAIR BALLINGER: This is Ron. I guess
18 this is the time for me to chime in. This is now my
19 personal opinion. What you've done is excellent, a
20 very excellent program that will result in
21 satisfactory performance with one exception, possibly.
22 And that is the element of surprise.

23 The problem with some of these inspection
24 is that there's a significant fraction of these
25 canisters that can't be inspected, either because of

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1 the way they're installed or just not being able to
2 get at areas.

3 And I've mentioned residual stresses in
4 welds. Those residual stresses in welds are quite
5 unpredictable. And so, even for the best welding
6 techniques, you're going to get residual stresses that
7 are going to be highly variable.

8 And so, that means, at least to me, that
9 the possibility of you getting a surprise -- what I
10 mean by surprise is, you've identified a canister that
11 you think needs to be inspected because of it meeting
12 certain criteria and then, only to discover that
13 another canister actually has a leak, a canister that
14 you deemed not as susceptible as the ones that you've
15 chosen.

16 And so, that is what I mean by surprise.
17 And that leads me back to what I've been harping on
18 from the beginning. And that is, I think we've gotten
19 the cart before the horse a bit.

20 Because if we had done and we do a proper
21 consequence analysis, we will discover, as I think
22 most people expect, that the consequences of a stress
23 corrosion cracking leak or through-wall stress
24 corrosion crack are essentially zero. No consequences
25 to the health of public or safety.

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1 And if we had done that to start with, it
2 might have made the whole process that you've gone
3 through -- very well, by the way -- much simpler,
4 because if we get up front the consequences being
5 very, very, very low or zero, then some of the
6 inspections and other kinds of things that we're doing
7 now as a result of this program may not have been
8 necessary, or at least not as frequent.

9 So, that's the reason I've been harping on
10 the consequence analysis. And it's ongoing, but it's
11 been ongoing for a very, very long time. I mean, a
12 very long time. So, I would encourage somebody to, I
13 don't know, somehow accelerate this consequence
14 analysis so that you can factor it into your ongoing
15 updates for this. So, that's my story and I'm
16 sticking to it.

17 MS. BANOVA: Thank you, Dr. Ballinger.
18 And I think all I'll say is, we agree, we look forward
19 to the consequence analysis work. Of course, as I
20 have mentioned previous, we continue work and, also,
21 understanding better the probability, where chloride
22 induced stress corrosion cracking can actually occur.
23 And so, the work continues, our work is not doing.

24 CHAIR BALLINGER: But you don't have to
25 have a probability. You can assume that there's a

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1 stress corrosion cracking through-wall crack and then,
2 analyze the consequences.

3 Because I think stress corrosion cracking
4 in this respect, well, in this case, with the residual
5 stress uncertainty and the like, is almost
6 unpredictable. I'm sure --

7 MR. MCCULLUM: I'm just onscreen to say,
8 I'm going to take your encouragement back into all the
9 meetings I have with industry, with EPRI, with the
10 scientific team at DOE.

11 We continue to have these discussions that
12 a consequence analysis built on overly conservative
13 assumptions would not be very useful. So, in order to
14 overcome that, we need more science, we need more
15 information.

16 And I can only say, I agree with you and
17 I will take your words and continue to push harder to
18 bring that information to bear for exactly the reason
19 you mentioned.

20 MEMBER RICCARDELLA: Yeah. This is Pete
21 Riccardella. I would say that there are different
22 types of consequences. There are safety consequences,
23 but then, there's also public relations consequences
24 that have to be addressed.

25 I mean, if someone reports, oh, spent fuel

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1 casks are leaking at such-and-such a site, that could
2 have some serious consequences, even though there are
3 no real safety consequences.

4 CHAIR BALLINGER: Well, we can turn that
5 around and say that if we say that there isn't going
6 to be a leak in these canisters and all of a sudden we
7 have one --

8 MEMBER RICCARDELLA: Yeah.

9 CHAIR BALLINGER: -- that's a public issue
10 as well.

11 MEMBER RICCARDELLA: Yeah.

12 MS. BANOVA: And this is Kris Banovac,
13 let me add one thing, because I don't want to miss the
14 chance to say this. Of course, consequences for
15 storage are one thing.

16 I do want to recognize that storage is not
17 the final step, there will be transportation after
18 storage. There's the possibility of a second storage
19 period at a different site. Ultimately, geologic
20 disposal at some point in the future. But they are
21 next steps.

22 So, absolutely, transportation, possibly
23 a second storage stage, and, ultimately, disposal.
24 And so, I think, I would just say that, of course,
25 consider the storage consequences is important, but we

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1 also can't forget the next steps.

2 So, even if the consequence is small for
3 storage, we'd want to make sure that it would be small
4 going forward. If the canister is relied on for
5 confinement in the transportation package, then the
6 robustness of the canister is, obviously, important.

7 So, I just wanted to throw out that idea
8 and just make sure that we didn't forget about those
9 next steps.

10 CHAIR BALLINGER: Yeah, that's true, but
11 when you start to do transportation, that is, in
12 effect, another tollgate. That's a place where you
13 can fully inspect the canister to make sure that it's
14 sound, prior to transportation. So, those are cases
15 where you can verify the canister integrity before
16 transportation, for example, or storage.

17 MR. BOYCE: Can I add something here? Can
18 you hear me? Assuming you can, I'm Tom Boyce, I'm the
19 branch chief --

20 CHAIR BALLINGER: Yeah.

21 MR. BOYCE: -- in NMSS for the Materials
22 and Structural Branch. We don't disagree that the
23 consequences are potentially low. We are following,
24 with great interest, the efforts that industry is
25 pursuing on these. And I think Rod mentioned several

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1 of them, and I think Kristina has them in her slides.

2 But just to prove we're not just following
3 them, we actually reached out and put in, to our
4 colleagues in research, and put in place a user need
5 request with a specific task to assess and risk-inform
6 chloride induced stress corrosion cracking, including
7 the consequence analysis.

8 So, we're expecting a scoping report in
9 about November of next year, with a final report that
10 would include the efforts that industry has made to
11 date in about September of 2023. So, we are taking
12 what you're saying seriously, is my point.

13 CHAIR BALLINGER: Thank you. Are there
14 other comments from members?

15 MEMBER BIER: Yeah. This is Vicki Bier,
16 I just had a quick question of clarification for
17 Kristina. When you talk about reviewing the
18 implementation of the AMPs, the use of AMID, and the
19 adjustments to the AMPs, is that against a fixed set
20 of criteria that need to be met or is it just kind of
21 common sense, does the inspector agree that this was
22 done in a reasonable manner?

23 MS. BANOVA: Yeah. So, the inspectors,
24 so they will actually be using the AMPs that were
25 approved as part of the renewal for that site or for

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1 the CoC that that site might be using.

2 They'll actually use the aging management
3 programs that were approved as part of the renewal and
4 make sure that the licensee is implementing those
5 programs as appropriate. So, they're ultimately going
6 back to what was approved as part of the renewal and
7 making sure that the licensee is implementing that
8 correctly and appropriately.

9 MEMBER BIER: Okay. So, it is a
10 compliance check, not just kind of a reasonableness
11 check?

12 MS. BANOVA: Yes.

13 MEMBER BIER: Thanks.

14 MEMBER KIRCHNER: Ron, this is Walt. This
15 is --

16 CHAIR BALLINGER: Yes, sir.

17 MEMBER KIRCHNER: -- more a personal
18 comment than a technical one. But I don't see any
19 value in going further in risk-informing this, in
20 terms of consequence analysis. I agree with your
21 assessment, that the result of that would be a very,
22 potentially very low risk to the public.

23 I would think that, going forward, since
24 Kristina mentioned they were thinking about potential
25 next steps if there's interim storage, again, this is

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1 a personal opinion, interim storage is like when your
2 mother tells you to clean up your room, you don't put
3 things on a chair, that's what interim storage is, you
4 put them away where they belong.

5 So, until there's a geologic repository,
6 my own opinion is that the consequence of risk to the
7 public is minimized by having a bulletproof program on
8 this dry cask storage. And that leads the political
9 pressure distributed to solve the problem correctly,
10 which is a geologic repository.

11 There's certainly much more risk in moving
12 the casks or opening them, et cetera, et cetera, at an
13 interim site and then, picking them up and moving them
14 again. So, that's just one member's opinion.

15 But I don't think there's much value in
16 chasing consequence analysis for these dry cask
17 storage installations. I know that was our
18 recommendation, so I'm perhaps dissenting four years
19 later from a previous ACRS letter.

20 But I think what we've been presented is
21 a very good program and it addresses what Pete brought
22 up, which is not just public protection and safety,
23 but also, confidence. And so, I applaud and thank the
24 presenters.

25 CHAIR BALLINGER: Okay. I don't hear --

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1 we need to go around amongst the members one more
2 time, but can we get the public line open? Is it
3 open?

4 MR. DASHIELL: Public bridge line is open
5 for comment.

6 CHAIR BALLINGER: Thank you. Are there
7 any members of the public that would wish to make a
8 comment? If so, please identify yourself and then,
9 make your comment. With some fear and trepidation, I
10 guess we should close the public line.

11 MR. DASHIELL: Public line is closing.

12 CHAIR BALLINGER: Thank you. Okay. The
13 staff indicated in the beginning that a letter was not
14 required, but it's up to us whether we would like to
15 produce a letter. So, I'd like to go around to the
16 members and get your opinion on that topic.

17 My personal opinion is that we should have
18 a letter, and the reason is, not because we might have
19 some major suggestion, but this is the penultimate Reg
20 Guide, which is the sort of top of the heap, if you
21 will, in that it unifies everything.

22 So, I'm thinking that my personal opinion
23 is that a letter, however short it might be, to
24 provide an end point, is worth doing. But I'm just
25 one member, so I'm interested in everybody else's

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1 opinion.

2 MEMBER REMPE: Ron, if we were to do this,
3 are you going -- I mean, isn't it too late to put it
4 in the July meeting --

5 CHAIR BALLINGER: Yeah, I --

6 MEMBER REMPE: -- since it's already been
7 posted?

8 CHAIR BALLINGER: Yeah, I think it's
9 probably too late, but --

10 MEMBER REMPE: So, then, we're into
11 September --

12 CHAIR BALLINGER: Yeah, yeah.

13 MEMBER REMPE: -- and how does that impact
14 the staff's schedule, if they have to wait until
15 September? Is that a problem?

16 CHAIR BALLINGER: I do not know.

17 MEMBER REMPE: Before we go around the
18 table, I want to make sure I understand the impact of
19 such a decision. And perhaps the staff could comment
20 on, do they mind waiting until September.

21 MS. BANOVA: This is Kris Banovac, is it
22 okay if I --

23 CHAIR BALLINGER: Yeah, sure.

24 MS. BANOVA: -- answer that? And I'll --

25 CHAIR BALLINGER: Very good, yeah.

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1 MS. BANOVA: So, obviously, this Reg
2 Guide is a long time coming. NEI 14-03 has been out
3 for some time. We're excited to finally get to this
4 point, I mean, we obviously had some competing
5 priorities, which is why it did take us so long to
6 finally get to the formal endorsement of the Reg
7 Guide.

8 So, but that said, and I know we've
9 mentioned a few times during the meeting, we do have
10 the guidance. We referenced this guidance in NUREG-
11 1927, I think Rod mentioned this.

12 We've been very pleased to see, even
13 though we don't have the formal endorsement yet in the
14 Reg Guide, we've been very pleased to see that
15 applicants are referencing NEI 14-03 in their renewal
16 applications, they are using it, they're mentioning
17 AMID, the tollgates.

18 And so, even though there isn't a formal
19 endorsement yet, everybody's already using it, which
20 we're very thankful to industry for that. So, I think
21 there, and please, Chris Regan jump in, or anybody
22 else, I don't think there's a rush to get the Reg
23 Guide on the street, since we've already waited this
24 long.

25 Obviously, as the project manager on it,

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1 I'm anxious now that we're close to the end to get
2 done. But, really, I don't see any pressing need to
3 get it done. But I'll let Chris Regan add to that,
4 please, Chris?

5 CHAIR BALLINGER: But NUREG-1927 is on the
6 street also.

7 MS. BANOVA: Yes, NUREG-1927 --

8 CHAIR BALLINGER: And that --

9 MS. BANOVA: -- that's been out since
10 2016, yeah.

11 CHAIR BALLINGER: Yeah, that's really the
12 sort of heavy lifting.

13 MS. BANOVA: Correct.

14 (Simultaneous speaking.)

15 MS. BANOVA: Yeah, or it's kind of like
16 the sister, I think of them as kind of the sister to
17 NEI 14-03, the NRC side of the house and industry side
18 of the house. But I'll stop there, I've been talking
19 a lot.

20 MR. REGAN: Yeah. The SRP, we see as,
21 like, guidance for the staff. The Reg Guide is
22 essentially guidance for industry, and the industry
23 has their guidance already. So, the two are
24 complementary.

25 I think in the big picture, obviously,

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1 we're always interested in getting stuff finalized so
2 we can move on as quickly as we can.

3 I would caveat my response with, I don't
4 think September or a delay would be a significant
5 impact, barring if there was any suggestion or any
6 recommendation in the letter for the staff to initiate
7 or take any particular action or pursue any particular
8 issue.

9 So, I'll just caveat that response in
10 saying, yeah, it's fine if there was additional time
11 needed.

12 MS. BANOVA: And, Dr. Ballinger, may I
13 ask also that I would like to hear Rod's perspective
14 on it as well, as the industry representative? Is
15 that okay?

16 CHAIR BALLINGER: Sure.

17 MR. MCCULLUM: Yeah, I'm back on. I think
18 that would be, to put it frankly, a little bit
19 disheartening for industry. If there's a need for a
20 delay, if there's something that needs to be
21 addressed, but if we simply -- industry is looking
22 forward to this, we're already doing things that are
23 in it now.

24 And I just think, if I have to tell my
25 industry, well, we've got to wait another three months

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1 to get this endorsed -- we're looking to be more
2 efficient here, Kristina talked about how we've
3 shortened review times, we're looking for interactions
4 with the regulator that get us to reasonable outcomes
5 and more reasonable points in time.

6 So, I would have some work to do with my
7 industry to explain another delay at this point, since
8 we think we've closed all the substantive issues. I
9 could do that, I guess, but I'll really rather not to.
10 That's my perspective.

11 CHAIR BALLINGER: Okay, thank you. I
12 think what we need to do is to get members' opinions
13 and see what people think. So, we have almost all of
14 the members here. So, let me just, at this point, go
15 down the list that I have. Vicki, what do you think?

16 MEMBER REMPE: Wait a second, Ron. Didn't
17 you want to get public comments before you went around
18 with the members?

19 CHAIR BALLINGER: I did.

20 MEMBER REMPE: Oh, I'm sorry, I guess I
21 forgot, I apologize, I --

22 CHAIR BALLINGER: Yeah, there were --

23 MEMBER REMPE: -- was distracted for a
24 minute

25 CHAIR BALLINGER: We got silence. So,

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1 Vicki?

2 MEMBER BIER: I'm reasonable satisfied
3 with what I've heard here. I feel like I'm new enough
4 to the committee that I don't have a deep sense of the
5 political pluses and minuses of having a letter versus
6 just informally saying, yeah, we don't need to do
7 anything more on this. So, I will abstain on that
8 side.

9 CHAIR BALLINGER: Oh, abstain.

10 (Laughter.)

11 CHAIR BALLINGER: Charlie?

12 MEMBER BROWN: I guess I would, in spite
13 of industry's concern about the delay, I think there's
14 at least three points that I took out of the Reg
15 Guide, the use of surrogates and the clarifications
16 relative to them, the endorsement of the tollgate
17 approach to doing business, and the database that's
18 being built with the AMID approach, that I personally
19 think it's a good idea to get the committee's Betty
20 Crocker, Good Housekeeping stamp of agreement. That's
21 my personal opinion. So, I would write a letter.

22 CHAIR BALLINGER: Okay. Dave?

23 MEMBER PETTI: I'm agnostic, I could go
24 either way. So, I'll just go with what the most of
25 the committee think. I mean, it's a grey area, I

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1 think, at this point.

2 CHAIR BALLINGER: Okay, you're amongst the
3 nones. Okay. Greg?

4 MEMBER HALNON: Hold on just a second.
5 Whoops, I'm sorry. I'm good with no letter, unless
6 you want to put a placeholder for the surrogate
7 conversation going forward. But from what I heard, I
8 didn't hear a need for it.

9 CHAIR BALLINGER: Okay. Jose?

10 MEMBER MARCH-LEUBA: Yes, I'm here.
11 Again, I'm either way. As a rule of thumb, I think
12 positive letters have almost as much value as negative
13 letters. So, if I have to lean one way, I would issue
14 a letter, with a positive outcome.

15 CHAIR BALLINGER: Walt?

16 MEMBER KIRCHNER: Concurring with Jose, I
17 don't like to confine our letters to finding problems
18 or identifying new ones. If something makes sense, we
19 should recognize that good work done and the letter
20 can be very brief, but I would lean in favor of a
21 letter.

22 And procedurally, I would point out, we
23 could always have a short special meeting of the ACRS
24 just to write this letter, if we want to consider the
25 schedule aspect. Thank you.

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1 CHAIR BALLINGER: Joy?

2 MEMBER REMPE: So, I was going to say, I
3 don't see a need for a letter, but in thinking about
4 our last letter, where that risk approach was
5 emphasized, it might be valuable to say something
6 about that our current perspective has changed and we
7 support this program. And so, I guess that might be
8 a reason. The surrogate inspections might be a reason
9 also to go ahead and do a letter.

10 I like what Walt said about maybe just go
11 ahead and do something virtually in August to get the
12 letter on out the door, so we don't hold up things
13 unnecessarily. But we can discuss that later if
14 everyone agrees to do a letter.

15 CHAIR BALLINGER: Okay. Pete?

16 MEMBER RICCARDELLA: Yeah, well, I agree
17 with the comments about a letter would be valuable,
18 but if it has the effect of delaying publication of
19 the Reg Guide, then I'd be opposed to it.

20 CHAIR BALLINGER: Well, you got to come
21 down on something.

22 MEMBER RICCARDELLA: If we can do as Joy
23 just said and get the letter out in time that it
24 doesn't impact the Reg Guide, then I would say go
25 ahead and do it.

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1 CHAIR BALLINGER: Yeah. I mean,
2 personally, I think if the letter is worth doing, the
3 schedule should not be an issue. I mean, if we don't
4 need a letter, we don't need a letter, regardless.

5 MEMBER RICCARDELLA: Yeah.

6 CHAIR BALLINGER: Matt?

7 MEMBER SUNSERI: So, I'm in the position
8 of thinking that we don't need a letter on this, and
9 I do appreciate the fact that writing positive letters
10 is of value, but when the value is consumed by the
11 cost, I don't agree with that.

12 It sounds like the industry has got
13 everything they need, sounds like staff doesn't need
14 anything, I don't see the need to wrap up from our
15 previous position, because, I mean, we're really not
16 changing anything.

17 But I am, behind the scene here, been
18 trying to figure out, if we choose to write a letter,
19 when we could do it, and I haven't reached a
20 conclusion on that yet. But working on trying to make
21 it available earlier than September, if that's what we
22 decide to do.

23 CHAIR BALLINGER: Okay.

24 MEMBER SUNSERI: But just to be clear, I'm
25 voting no, for no letter.

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1 CHAIR BALLINGER: So, you're voting no, is
2 that it?

3 MEMBER SUNSERI: Yes, regardless of if we
4 could write it or not, I don't think we need to.

5 CHAIR BALLINGER: Vesna?

6 MEMBER DIMITRIJEVIC: Yeah, well, my
7 position from the beginning was, I mean, after
8 discussion started, if we can do it fast to recognize
9 good work.

10 And I just want to say this was an
11 excellent presentation, which I really enjoyed, and
12 obviously reflects really good work. I mean, if we
13 are going to delay things to recognize this good work,
14 that doesn't make sense.

15 So, what I was going to say, if we can do
16 it faster, then yes, if we cannot, then no. But now,
17 I just, because not to complicate it, I would vote no,
18 if it comes to that. That's it.

19 CHAIR BALLINGER: Okay. Well, I thought
20 it would be a lot easier than this, but it actually is
21 coming out, with all the abstentions, no. So, absent
22 further discussion, which we, of course, can have, I
23 think the noes have it. So, I --

24 MEMBER SUNSERI: Ron, this is Matt. Just
25 let me throw out one more alternative here, and

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1 probably folks don't like this, but we could say,
2 based on this discussion, we don't see any need to
3 hold up the issuance of the Reg Guide and then, just
4 write a letter after the fact praising it or providing
5 whatever positive comments we feel, and if we feel the
6 need to wrap up to our previous letter, then that
7 would take care of this, but not have anything to do
8 with the issuance of the Reg Guide.

9 CHAIR BALLINGER: Do we --

10 MEMBER SUNSERI: So, that's --

11 CHAIR BALLINGER: Do we have a precedent
12 for that anywhere? Have we done that before?

13 MEMBER KIRCHNER: I don't think that, from
14 a parliamentarian standpoint, I don't think, Matt, we
15 can do that. We only speak through our letters.

16 CHAIR BALLINGER: Wait, wait, what --
17 okay. So, explain why that wouldn't be, because I
18 completely would not understand that from a
19 parliamentary standpoint.

20 MEMBER KIRCHNER: Well, we only speak
21 through our letters. You're saying, go ahead and
22 issue the Reg Guide and we'll follow up later, we
23 can't say that from a subcommittee.

24 MR. MOORE: This is --

25 MEMBER KIRCHNER: The subcommittee makes

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1 recommendations to the full committee.

2 MR. MOORE: May I --

3 MEMBER KIRCHNER: But if --

4 MR. MOORE: May I comment --

5 MEMBER KIRCHNER: -- it helps -- one more
6 thing, Scott, if I might. If it helps give you the
7 kind of majority you need, Ron, I'll change my vote to
8 no letter.

9 CHAIR BALLINGER: Okay. I mean, I think,
10 it's really up to the full committee whether we have
11 a letter. And so, that would -- what the subcommittee
12 would be doing at a full committee meeting is
13 recommending not doing a letter, I think that's the
14 correct path. And so, I guess, if you change your
15 vote, then we're saying, in effect, we don't need a
16 letter.

17 Now, the question is, do we want a full
18 committee presentation? I think we have to, where we
19 recommend not doing a letter, am I correct, Mr.
20 Parliamentarian?

21 MEMBER KIRCHNER: No, you're --

22 CHAIR BALLINGER: Oh.

23 MEMBER KIRCHNER: -- not correct.

24 CHAIR BALLINGER: Okay.

25 MEMBER KIRCHNER: In P&P, we can discuss

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1 in this full P&P and the recommendation can be
2 advanced from the subcommittee that no letter is
3 needed. And the committee as a whole then can vote in
4 P&P yes or no.

5 CHAIR BALLINGER: Oh, okay.

6 (Simultaneous speaking.)

7 MEMBER BROWN: Ron?

8 CHAIR BALLINGER: Yeah?

9 MEMBER BROWN: This is Charlie. Walt's on
10 the money, I've done that at a couple of subcommittee
11 --

12 CHAIR BALLINGER: Okay.

13 MEMBER BROWN: -- meetings in the I&C
14 world --

15 CHAIR BALLINGER: Okay.

16 MEMBER BROWN: -- several years ago. We
17 can make a decision that a letter is not made, we've
18 done that several times in the past --

19 CHAIR BALLINGER: Okay, I stand --

20 MEMBER BROWN: -- in my personal
21 experience.

22 CHAIR BALLINGER: Okay, I stand corrected.
23 That makes life a little bit easier. So --

24 MEMBER MARCH-LEUBA: This is Jose.
25 Couldn't P&P also issue a recommendation or, I mean,

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1 a vote asking the executive director, Scott, to send
2 them a memo to the staff saying that everything looks
3 good, therefore, we're not writing a letter? And we
4 --

5 CHAIR BALLINGER: I mean, that's the
6 general --

7 MEMBER MARCH-LEUBA: -- can do that?

8 CHAIR BALLINGER: That's what usually
9 happens, right?

10 MEMBER MARCH-LEUBA: No, usually, we vote
11 and then, we just drop it --

12 CHAIR BALLINGER: Okay.

13 MEMBER MARCH-LEUBA: -- if there is no
14 documentation.

15 CHAIR BALLINGER: Okay. That's an
16 administrative thing, I think. I think --

17 MEMBER MARCH-LEUBA: Yeah, but that would
18 take the place of a positive letter, saying --

19 CHAIR BALLINGER: Well, but again, Walt
20 would say that we only speak through our letters.

21 MEMBER MARCH-LEUBA: But we have, I mean,
22 that would be a P&P outcome where we have voted and we
23 ask the executive director to inform NRR that we like
24 the approach and we don't see the need for a letter.

25 CHAIR BALLINGER: Scott, are you on?

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1 MR. MOORE: Yes, I am.

2 CHAIR BALLINGER: Is that a reasonable
3 path?

4 MR. MOORE: I mean, the committee can
5 direct me to write the staff and let the staff know
6 that the committee doesn't see the need for a letter,
7 yes.

8 CHAIR BALLINGER: Okay.

9 MR. MOORE: The other thing I will say is,
10 there have been instances, even in the two years that
11 I've been with the committee, where the staff has gone
12 ahead and issued a document based on the briefing to
13 the committee ahead of getting the committee's
14 response.

15 So, I don't know that the committee was
16 aware of that, but we saw the document go out before
17 the staff had the committee's response. So, I think
18 it depends on what the committee's going to say in its
19 recommendations.

20 CHAIR BALLINGER: Okay. I mean, I think
21 we've pretty much settled on not doing a letter,
22 unless I hear something, strong arguments the
23 contrary. That being the case, we can have the
24 discussion at P&P and that's it, right?

25 MR. MOORE: That's correct.

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1 CHAIR BALLINGER: Okay. Are there other
2 folks that would like to chime in and add to the
3 discussion?

4 MR. RAHIMI: I have a question.

5 CHAIR BALLINGER: Who are you?

6 MR. RAHIMI: This is Meraj --

7 CHAIR BALLINGER: Oh, okay.

8 MR. RAHIMI: This is Meraj Rahimi, branch
9 chief of Regulatory Guides in the Office of Research.
10 And I guess my question is, do we need, because within
11 our branch, we're trying to hit a metric in terms of
12 issuing the final Reg Guide, do we need to wait until,
13 I guess, the subcommittee or the full committee, they
14 have their meeting before we can issue the Reg Guide,
15 now that it's been decided no letter is needed?

16 MR. MOORE: Meraj, this is Scott. The
17 full committee's in two weeks, when we have P&P.

18 MR. RAHIMI: Okay, good. Okay, yeah, two
19 weeks.

20 MEMBER REMPE: And the answer to his
21 question is, yeah, you need to wait until that P&P
22 discussion is over, right, Scott?

23 MR. MOORE: You should, yes.

24 CHAIR BALLINGER: Okay.

25 MR. RAHIMI: Okay.

1 CHAIR BALLINGER: So, now, we're homing in
2 on it. We've got no letter and we'll have the
3 discussion at P&P and go from there. Last, but not
4 least, for sure, Steve Schultz, do you have anything?

5 DR. SCHULTZ: I have no further comments,
6 Ron, except what's been said by the members reflecting
7 the good work that has been done. And I do appreciate
8 the collaboration between industry and the staff in
9 working toward this resolution.

10 The industry's response really is one that
11 pulls together a lot of experience associated with
12 aging management and brings it together for the
13 application of this purpose. And so, I'm very glad to
14 see that.

15 CHAIR BALLINGER: Great. Okay. So, I
16 think, barring other comments, I think we're done for
17 the day. And, again, I'll speak again for the
18 committee as a whole and myself that this was a great
19 job that's been done up to this point and we're
20 looking forward to updates, as needed, as you go
21 forward. And with that being said, I think the
22 meeting is adjourned.

23 (Whereupon, the above-entitled matter went
24 off the record at 4:23 p.m.)

25

RG 3.76 / NEI 14-03

Completing the Regulatory Framework for Long-term Spent Nuclear Fuel Storage

NRC ACRS

June 23, 2021

Rod McCullum
Nuclear Energy Institute



Dry Cask Storage of US Spent Nuclear Fuel



Used fuel inventory*

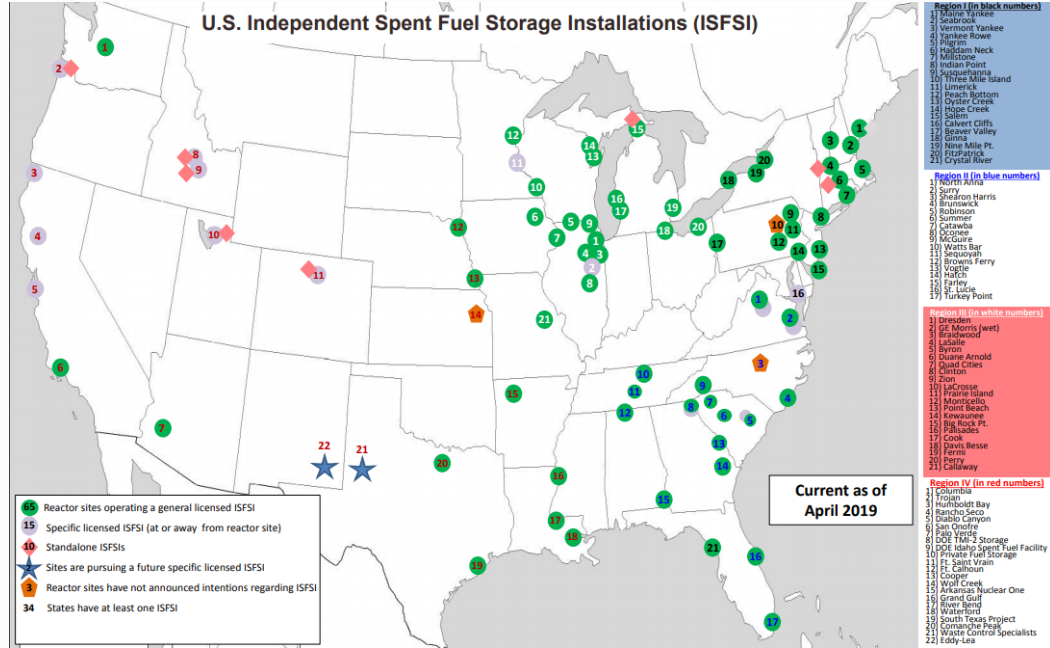
Approximately 86,000 MTU
Increases 2 - 2.4k MTU annually

ISFSI** storage

148,646 assemblies
41,000 MTU (48%)
3,370 casks/modules loaded
73 Operating dry storage ISFSIs
Eventual deployment at 76 sites (119 reactors)
19 sites where reactor operations have ceased

Long-term commitment

First Casks Loaded in 1986
Licenses being extended to 60 years
Licenses extensions approved at 32 sites
Licenses renewable for additional 40 yr. periods
NRC determined casks safe for “at least” 100 yrs



*As of December 2021

** ISFSI = Independent Spent Fuel Storage Installation

Long Term Dry Storage Framework



NEI 14-03 Cornerstones

- Consistent format and content of license renewal applications (LRAs)
- Operations-based aging management through learning aging management programs
- Sharing of operating experience related to aging management - AMID
- Periodic “tollgate” safety assessments

LRA Format and Content

- Section 1: General Information
- Section 2: Scoping Evaluation
- Section 3: Aging Management Review
- Section 4: Time Limited Aging Analysis (TLAAs)
- App. A: Aging Management Programs
- App. B: Granted Exemptions
- App. C: License/CoC Changes
- App. D: UFSAR Supplement
- Additional appendices as needed (environmental report supplement, financial qualification, etc.)

Operations Based Aging-Management

Effective licensee implementation of an operations-based DCS aging management program will require the ability to efficiently change AMAs based on feedback from operating experience, research, monitoring, and inspections

Opportunity going forward

As industry gains additional experience applying operations-based aging management, we envision reaching a future point at which it would be appropriate to re-engage in the dialogue relative to the use of surrogate inspection results.

- Feb. 1 2019 NEI letter to NRC

Proposed Final RG 3.76

Implementation of Aging Management Requirements for Spent Fuel Storage Renewals

Kristina Banovac, Marlone Davis, Darrell Dunn, Ricardo Torres, John Wise
Office of Nuclear Material Safety and Safeguards
Division of Fuel Management

Meeting with Advisory Committee on Reactor Safeguards
Subcommittee on Metallurgy & Reactor Fuels and
Subcommittee on Radiation Protection & Nuclear Materials
June 23, 2021

Outline

- Background
- Updates to storage renewal framework – completed and ongoing
- NEI 14-03 and RG 3.76
- Public comment on draft RG 3.76 (DG-3055)
- Flexible and risk-informed framework
- Path forward

Background – Storage Renewal Requirements

- Renewal of Independent Spent Fuel Storage Installation specific licenses and Certificates of Compliance for dry storage system designs, for a period not to exceed 40 years
 - 10 CFR §72.42 and §72.240
- Maintain intended functions in the period of extended operation (PEO)
 - Time-limited aging analyses
 - Aging management programs (AMPs)

Background – Update Storage Renewal Framework

- NRC staff experience with the renewal of storage licenses and certificates of compliance revealed a need for expanded guidance
- 15 storage renewal applications were expected to be submitted over several years
- NRC team assessed current regulatory framework to determine what changes were needed

Updates to the storage renewal framework – Completed

- NUREG-1927, Rev. 1 (Standard Review Plan for storage renewals), issued 2016
 - Discussed with ACRS in 2015 and 2016. ACRS issued letter.
- NUREG-2214 (Managing Aging Processes in Storage (MAPS)), issued 2019
 - Discussed draft MAPS with ACRS subcommittee in 2016
- Temporary Instruction 2690/011, issued 2018

Updates to the storage renewal framework – Ongoing

- Inspection Procedure for inspection of licensees' AMP implementation
- Endorsement of ASME Code Case N-860 in RG 1.147
- Continue involvement with:
 - Extended Storage Collaboration Program
 - International counterparts (development of IAEA guidance on storage aging management)
 - DOE/industry advancements in techniques for inspection, repair, and mitigation
 - Research in fuel performance, degradation mechanisms; DOE/EPRI high-burnup fuel demonstration
 - Risk assessment of canister aging mechanisms and effects (deposition chemistry, CISCC probability, crack growth rates, and consequence analysis)

NEI 14-03 and RG 3.76

- NEI 14-03 complements NRC staff guidance in NUREG-1927, Rev. 1
- 2 key aspects of NEI 14-03 included in NUREG-1927, Rev. 1
 - Aggregation and dissemination of operating experience in Aging Management INPO Database (AMID)
 - Learning AMPs and use of “tollgates” (periodic assessments of operating experience)
- Formal endorsement of NEI 14-03, Rev. 2 in proposed final RG 3.76

RG 3.76

- Proposed final RG 3.76 endorses NEI 14-03, Rev. 2, with some clarifications, for example:
- Surrogate inspections
 - Surrogate inspections for stainless steel canisters can be used when there is sufficient operating experience from canister examinations for various CISCC susceptibility rankings
 - For other SSCs/materials, there is no guidance yet for determining what other SSCs may be appropriate for surrogate inspections
- Renewal application format and content
 - Reflects lessons learned from reviews of renewal applications since issuance of NUREG-1927, Rev. 1

Public Comment on DG-3055

- Received one public comment from NEI on DG-3055
- NEI agrees with approach to surrogates and notes that industry will reengage with NRC on surrogates as operating experience is gained, encourages industry use of AMID
- Comment that specific proposed changes to the final safety analysis report (FSAR) are not needed in the renewal application
- NRC agrees with the comment; made a revision in the proposed final RG 3.76 to address the comment

Flexible and risk-informed framework

- Focus of renewal is on the continuation of the approved design bases and continued performance of SSCs important to safety
- AMPs are summarized in FSAR and under licensee change control; licensees may change AMPs without NRC approval if they meet 10 CFR 72.48
- Guidance does not specify corrective actions; rely on licensee quality assurance and corrective action programs
- Framework allows licensees to change AMPs to respond to operating experience and to ensure AMPs remain effective at managing aging effects in the PEO

Path Forward

- **RG 3.76:** publish RG 3.76 after ACRS consideration
- **Storage renewals framework:**
- Complete ongoing framework updates
- NRC revises guidance to respond to future operating experience, research, and development
 - e.g., risk-inform canister inspections
- Licensees implement AMPs, enter operating experience into AMID, and make adjustments to AMPs to respond to operating experience
- NRC inspects licensees' implementation of AMPs
- Ensure continued safe storage of spent fuel in the PEO

References

- 10 CFR Part 72, <https://www.nrc.gov/reading-rm/doc-collections/cfr/part072/index.html>
- NUREG-1927, Rev. 1, <https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1927/index.html>
- ACRS letter on NUREG-1927 ([ML16102A167](#)) and staff response ([ML16132A170](#))
- NUREG-2214, MAPS, <https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr2214/index.html>
- Temporary Instruction 2690/011, [ML20023A016](#)
- NEI 14-03, Rev. 2, [ML16356A204](#)
- DG-3055, [ML20282A298](#)
- Response to comment on DG-3055, [ML21098A024](#)
- Proposed final RG 3.76, [ML21158A061](#)

Acronyms

- ACRS: Advisory Committee on Reactor Safeguards
- AMID: Independent Spent Fuel Storage Installation Aging Management Institute of Nuclear Power Operations Database
- AMP: aging management program
- ASME: American Society of Mechanical Engineers
- CFR: Code of Federal Regulations
- CISCC: chloride-induced stress corrosion cracking
- DOE: U.S. Department of Energy
- EPRI: Electric Power Research Institute
- FSAR: final safety analysis report
- IAEA: International Atomic Energy Agency
- NEI: Nuclear Energy Institute
- PEO: period of extended operation
- RG: Regulatory Guide
- SSC: structure, system and component