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

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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619TH MEETING

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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THURSDAY

NOVEMBER, 2014

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ROCKVILLE, MARYLAND

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The Advisory Committee met at the Nuclear
Regulatory Commission, Two White Flint North, Room
T2B1, 11545 Rockville Pike, at 8:30 a.m., John W.
Stetkar, Chairman, presiding.

COMMITTEE MEMBERS:

JOHN W. STETKAR, Chairman

HAROLD B. RAY, Vice Chairman

DENNIS C. BLEY, Member-at-Large

RONALD G. BALLINGER, Member

SANJOY BANERJEE, Member

CHARLES H. BROWN, JR. Member

MICHAEL L. CORRADINI, Member

DANA A. POWERS, Member

1 JOY REMPE, Member
2 PETER RICCARDELLA, Member
3 MICHAEL T. RYAN, Member
4 STEPHEN P. SCHULTZ, Member
5 GORDON R. SKILLMAN, Member

6

7 DESIGNATED FEDERAL OFFICIAL:

8 CHRISTOPHER L. BROWN

9

10 ALSO PRESENT:

11 JOE COLACCINO, NRC

12 DEBORAH JACKSON, NRC

13 MARK KIRK, NRC

14 MARVIN LEWIS

15 STEWART MAGRUDER, NRC

16 MICHAEL MAYFIELD, NRC

17 TONY PIETRANGELO, NEI

18 GARY STEVENS, NRC

19 GEORGE TARTAL, NRC

20 BRIAN THOMAS, NRC

21 JOE WILLIAMS, NRC

22

23

24

25

P R O C E E D I N G S

8:32 a.m.

CHAIRMAN STETKAR: The meeting will now come to order.

This is the first day of the 619th meeting of the Advisory Committee on Reactor Safeguards. During today's meeting, the committee will consider the following:

Draft Regulatory Guide DG-1299, Regulatory Guidance on the Alternate Pressurized Thermal Shock Rule, SECY-14-XXXX, Proposed Updates of Licensing Policies, Rules and Guidance for Future Reactor Applications, meeting with representatives of the Nuclear Energy Institute and preparation of ACRS reports.

This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Mr. Christopher Brown is the designated Federal official for the initial portion of the meeting.

We have received no written comments or requests to make oral statements from members of the public regarding today's sessions.

There will be phone bridgeline. To preclude interruption of the meeting, the phone will

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1 be placed in a listen in mode during the presentations
2 and committee discussion.

3 A transcript of the portions of the
4 meeting is being kept and it is requested that
5 speakers use one of the microphones, identify
6 themselves and speak with sufficient clarity and
7 volume so that they can be readily heard.

8 I'll ask everyone to check your little
9 beepie devices and please turn them off and not make
10 them beep.

11 As an item of interest, the ACRS is
12 pleased to announce the rotation of Linda Allen as
13 Management Analyst where she serves as the liaison for
14 the Program Management Policy Development and Analysis
15 branch.

16 Linda's permanent assignment is in the
17 NRC's Office of Administration's Business Advisory
18 Center as an Acquisition Business Specialist.

19 Her other NRC positions included
20 Management Analyst, Licensing Program Assistant,
21 Travel Coordinator and Division Administrative
22 Assistant.

23 Linda's experience includes IT, property
24 management, payroll coordination and correspondence
25 management. She also earned a yellow belt -- and I

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1 have no idea what that is, so, if you're interested,
2 go ask her -- for time spent on a license renewal Lean
3 Six Sigma panel and as a member of the agency's
4 Emergency Response Team.

5 And we'd like to welcome --

6 (APPLAUSE)

7 CHAIR STETKAR: And with that, unless
8 there are other issues that merit discussion, we'll
9 continue with our first session which is on the
10 Alternate PTS Guidance and Dr. Ron Ballinger will lead
11 us through that.

12 MEMBER BALLINGER: Thank you, Mr.
13 Chairman.

14 On October 16th, 2014, the staff briefed
15 the Committee on draft Reg Guide 1299 which describes
16 a method for the staff considers acceptable to permit
17 use of the alternate fracture toughness requirements
18 for protection against PTS events for Pressurized
19 Water Reactor vessels.

20 We also discussed NUREG-2163 which is the
21 technical basis for that draft Reg Guide.

22 Today the staff will discuss the
23 following, the proposed guidance for 10 CFR 50.61a,
24 Background and Overview of the alternate PTS rules,
25 stakeholder feedback, guidance for criteria relating

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1 to the date of construction design requirements,
2 guidance for criteria relating to the evaluation of
3 plant specific surveillance data and other guidances
4 where they see fit.

5 We have no management introduction, so
6 I'll turn it over to Gary and Mark. You have the
7 floor, they have until 9:50, I probably shouldn't have
8 said that.

9 MR. STEVENS: Thank you. Good morning, I'm
10 Gary Stevens from the Office of Research.

11 I'd just like to recognize our division
12 director, Brian Thomas. Actually, yesterday I was
13 planning to say acting, but as of yesterday, he's now
14 official; and then our branch chief, Dave Rudland,
15 we're in the Component Integrity Branch.

16 Today we're going to talk to you on the
17 guidance we're preparing for the Alternate PTS Rule
18 for 10 CFR 50.61a.

19 That rule, or that alternate rule, was
20 published in the Federal Register in January of 2010.
21 We're developing guidance now for licensee application
22 and we have a draft reg guide, as was mentioned, DG-
23 1299 and a supporting technical basis NUREG which has
24 been assigned the number 2163.

25 We're requesting ACRS review for release

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1 of both documents for public comment.

2 So, this is just -- we'll give you a
3 little bit of background and overview of the alternate
4 PTS rule. We have engaged, as always, but in
5 particular on this one, stakeholders will summarize
6 the feedback we've received and then we'll go into the
7 guidance and we'll tell you what our current estimated
8 schedule is for the publication of these documents.

9 So, background, in terms of why was this
10 rule developed and the limits. Not a lot of detail
11 here, but at top level, this rule was developed
12 because of unnecessary burden on some of the licensees
13 and meeting these limits for continued long term
14 operation.

15 The 50.61 rule, which is what this rule is
16 an alternate to, the technical improvements that have
17 been developed since the time that rule was published
18 suggests that those limits are more conservative than
19 needed to maintain safety.

20 They do not necessarily increase overall
21 plant safety, plant specific analysis is not a
22 practical option and so, it creates an artificial
23 impediment for license renewal and extended
24 operations.

25 So, there's a lot of work generated from

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1 the previous rules, in some cases, that produces no
2 real benefit and this rule was undertaken because of
3 that.

4 The alternate rule is probabilistically-
5 based fracture mechanics and this slide gives you kind
6 of a graphical representation of the new limits. It's
7 a function of product form and material property and
8 thickness.

9 So, what you see here are two graphs where
10 the material property, based on RT PTS for a plate of
11 axial weld and you see two graphs based on thickness
12 of the base material.

13 And the dotted line represents the
14 simplified representation of the risk limit of one
15 times ten to the minus six through-wall cracking
16 frequency and those graphically show the limits that
17 were developed for this alternate rule as expressed by
18 this table.

19 MEMBER BALLINGER: As a matter of
20 clarification for the members that haven't immersed
21 themselves in this, can you be sure to give
22 definitions of some of these terms?

23 MR. SEVENS: Sure.

24 MEMBER BALLINGER: Like AW?

25 MR. STEVENS: So, AW would be axial weld,

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1 PL would be plate, so that's the product form, RT
2 would be the reference temperature which is a function
3 of material chemistry content and irradiation amount
4 for the material.

5 Any other questions on any definitions or
6 terms here?

7 MR. KIRK: And so here, just to clarify
8 and maybe contrast with the current rule. Of course,
9 in the current 50.61 framework, there is a single
10 screening limit -- a single screening value, RT PTS,
11 so that is a function of simply the most embrittled or
12 highest RT-MDT value in the entire beltline.

13 Whereas, here, we're setting separate and
14 distinct limits, for example, you can see the axial
15 weld limit reading off the horizontal axis. For the
16 thinner vessels is about 270 and the plate limit
17 conversely is about 350.

18 And so the reason for the differences in
19 these limits is the underlying flaw population that
20 was sampled. There's a much greater likelihood of
21 having bigger flaws in the welds and in the plates.

22 So, what we're trying to do here is do a
23 more accurate assessment of the vessel by not
24 essentially assuming that the whole beltline is
25 comprised of the material having the highest

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1 transition temperature.

2 MEMBER RICCARDELLA: Just a point of
3 clarification for my colleagues. The old limit was
4 270 degrees and the new limit --

5 MR. KIRK: And the new limit is --

6 MEMBER RICCARDELLA: -- 269 degrees. So
7 you might ask well, where does the relief come from?
8 And the relief comes from the definition of the RT
9 value. The old limit had a margin term which is,
10 what, 50 degrees?

11 MR. KIRK: It depends, it's plant
12 specific, but, yes, it can be up to 50, 60 degrees.

13 MEMBER RICCARDELLA: Yes, the old limit
14 had a margin term that was added to all of these
15 points that would move them to the right.

16 MR. KIRK: Right.

17 MEMBER RICCARDELLA: And the new limit
18 doesn't. That's why it's --

19 MR. KIRK: And the reason why it's
20 appropriate and that's a good point to bring out, the
21 reason why it's appropriate to not have the margin
22 term explicitly stated in the new limits is because
23 since the new limits were based on the probabilistic
24 calculations that simulated within them the
25 uncertainties on the unirradiated RT-MDT and the

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1 embrittlement and the material and the uncertainties,
2 they're all accounted for within these limits
3 themselves so there's no need to add the margin on
4 later.

5 So, as Dr. Riccardella points out, it's a
6 little deceiving that the old limit on axial welds was
7 270 and the new limit is 269, you know, the headline
8 there is what was the point. But really, instead of
9 being different by one degree Fahrenheit, they're
10 different by more like 60 degrees Fahrenheit.

11 MR. STEVENS: And I guess the other
12 subtlety to point out is the older limits are based on
13 use of the embrittlement train correlation in Reg
14 Guide 1.99 Rev 2. This rule has its own embrittlement
15 train correlation and the preceding comments assume
16 that effectively you would get the same estimate from
17 both which is maybe true on the average for PWRs.

18 MR. KIRK: On average, it's true, yes.

19 MEMBER CORRADINI: But other than that,
20 this is perfectly clear.

21 MR. KIRK: Yes, hopefully.

22 MR. STEVENS: Is that a question or
23 statement?

24 MEMBER CORRADINI: That wasn't a question.

25 MR. STEVENS: So, here you have the limits

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1 as kind of the tabular representation of those drafts,
2 product form, thickness, RT-MAX limits.

3 We've been asked quite often which plants
4 might use 50.61a and so here's what we can tell you in
5 that regard.

6 Four plants currently are projected to
7 reach the 50.61 limits during their 60 year operating
8 terms. And I'll just clarify for my friends in
9 license renewal that I'm not making any statement here
10 about whether all these plants have been or will be
11 approved for 60 years of operation.

12 MEMBER BALLINGER: That's a disclaimer.

13 MR. STEVENS: That's a disclaimer.

14 Beaver Valley 1 was projected to reach the
15 limits in 2033. They had submitted a year ago July,
16 a year and a half ago July ADAMS accession number
17 shown there. That's under staff review.

18 Palisades submitted the end of July this
19 past summer. That's under staff review.

20 Diablo Canyon's projected for 2033, Indian
21 Point 3 projected for 2025.

22 Several plants, and we didn't have a
23 number here and we were asked a couple of weeks ago at
24 the subcommittee meeting how many and our guess is
25 perhaps on the order of about ten would likely require

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1 implementation of the alternate rule if they were to
2 pursue 80 years of operation. That's based on simply
3 reaching the 50.61 limits during the 80 year interval.

4 Additional plants may elect to use 50.61a
5 for economic reasons. My understanding is that's in
6 part why Beaver Valley 1 submitted earlier than the
7 2033 date. And those, we don't really have an
8 indication of how many plants that might be.

9 Any questions on that before we go on?

10 MEMBER CORRADINI: Maybe you're going to
11 cover it later, but I assume that you have to know the
12 flaw distribution or staff has got to be convinced
13 that the applicant has surveyed it to know what the
14 flaw distribution is within? Because that's got to be
15 the key input to all of this, I assume?

16 MR. STEVENS: Yes, as you'll see, there's
17 really two gating criteria for use of the rule, one of
18 which is results of their ongoing NDE for the vessel.

19 MEMBER CORRADINI: Okay, fine.

20 MR. STEVENS: And we're going to go into
21 that.

22 MEMBER CORRADINI: Okay, fine. Thank you.

23 MR. STEVENS: This is a very simplistic
24 overview diagram of 50.61a. And basically, there's
25 three requirements to use it. We'll discount the top

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1 one which was your construction permit issued prior to
2 2010 which is when the rule took effect. For the
3 operating fleet, that's really not a question. For
4 future reactors, they'll have to deal with that and
5 we'll talk about very briefly.

6 But really, there's two gating criteria
7 that plants must pass in order to apply the rule and
8 this is very simplistic and we'll get into the
9 guidance on each of these.

10 The first is they need to assess their
11 plant specific material and verify that their
12 embrittlement trends are following those that were
13 assumed in the technical basis for the rule. If they
14 meet that gating criteria, that's one check.

15 And then the second one, as I just
16 mentioned, is NDE related. They need to take the
17 results of their ongoing Section 11 examinations and
18 verify that what they're seeing in terms of flaws is
19 bounded by the flaw population that was assumed in the
20 technical basis for this rule.

21 If the answer is yes to both of those,
22 then they get a green pass to be able to use the rule
23 and the screening criteria as we showed you before.
24 That requires a submittal to the NRC. Basically
25 anything that happens under this rule requires

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1 submittal to the NRC.

2 MEMBER SKILLMAN: What has the experience
3 been relative to construction records? I mean some of
4 these plants have a very torturous history,
5 particularly the construction of the reactor vessels.
6 Some ended up taking ocean voyages for their final
7 machining or their final placement of forgings or
8 weldings or welds.

9 So, this must, at some point, create a
10 significant records management effort to be able to
11 identify the materials to get physicals and chemicals
12 from the CMTs for the plates, for the forgings.

13 So, what are you finding relative to those
14 who own reactor vessels and their ability to produce
15 information?

16 MR. STEVENS: Fundamentally, the material
17 information we require is for the beltline of the
18 vessel and that's already been collected as part of
19 the 10 CFR 50 Appendix H surveillance program or
20 things like Generic Letter 92-01 that came afterward
21 for maybe some of the earlier vintage plants.

22 So, with respect to the information
23 required for this rule, it's already been compiled by
24 the licensees.

25 MEMBER SKILLMAN: Okay, thank you.

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1 MR. STEVENS: So, here's a comparison of
2 50.61 to the alternate rule 50.61a and basically, the
3 limits -- the referenced temperature limits in 50.61
4 as shown by the top line, they're more restrictive.
5 They're less restrictive in 50.61a which is a
6 voluntary or alternative to 50.61, but it comes with
7 additional -- there's an additional price to pay for
8 that.

9 First is on the plant specific
10 surveillance data checks. Whereas, one of those is
11 required for 50.61, there's three required for 61a and
12 we're going to show you what those are and get into
13 that guidance.

14 And then the second one is on the NDE.
15 There is no requirement for checking NDE against any
16 criteria, in 50.61 there is and in 61a.

17 And those are the two gating criteria
18 we're going to talk about which is really the most o
19 four guidance is focused on surveillance data checks
20 and the NDE checks that are required by the alternate
21 rule.

22 All right, stakeholder feedback,
23 obviously, when the Reg Guide and the NUREG go out as
24 drafts for public comment, and we are sending both out
25 as drafts and it's our intent to send them at the same

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1 time, we will be getting stakeholder feedback as is
2 common to the NRC process.

3 But we have also engaged the interested
4 stakeholders and throughout the last five years or so
5 development of just guidance. Specifically, we had
6 three public meetings that were focused on PV
7 integrity issues and we've had others but those
8 meetings in 2011 in particular focused on the
9 development of this guidance and quite a bit of
10 emphasis on both of these gating criteria, but
11 especially the NDE.

12 EPRI's Material Reliability Program, or
13 the MRP, actually, in the fallout of those meetings,
14 recommended several technical approaches for us to
15 consider in the development of this guidance.

16 They published an MRP report 334 in
17 January of 2012 and we've provided a copy of that to
18 the committee previously. It's publically available.

19 In that report, they had seven areas with
20 15 specific recommendations and if you've seen NUREG-
21 2163, our draft technical basis and Table 3 and
22 Chapter 3, I think it is, we specifically addressed
23 those recommendations.

24 And I'll say that we basically -- we
25 adopted or we tailored guidance in response to the

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1 majority of those comments, not quite all, but all of
2 the comments were considered and addressed and those
3 are specifically shown in the report.

4 So, we had very specific additional
5 stakeholder feedback beyond what we're going to get
6 through the public comment process direct with the
7 industry on this as we went through.

8 And in the backup slides to this
9 presentation are the seven areas listed.

10 All right, so, we're going to go into the
11 guidance now and as I said, there's two main gating
12 criteria. The third one was the construction permit
13 and I'm going to turn it over to Mark for this part.

14 MR. KIRK: So, with regards to the
15 construction date, this is really just an
16 acknowledgment that as part of the basis work that
17 underlies this rule is documented in NUREG-1806 and --
18 I'm sorry, yes, 1806 and 1874 and various related
19 documents.

20 All of the analyses were of what are now
21 current construction plants. We had on B&W, one CE
22 and Westinghouse design plant and went through
23 considerable effort to make sure that the reference
24 temperature limits were equally applicable to all
25 current designs given their plant design, materials,

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1 thermal hydraulic challenges and so on.

2 We haven't done a similarly comprehensive
3 study with regards to the new plants that are
4 currently being built and so, that's what this
5 criteria is meant to reveal that if an owner of one of
6 the plants that's currently under construction will be
7 started sometime in the future wanted to use 50.61a,
8 they would have to go through the effort of
9 demonstrating that the underlying analysis are
10 applicable to their plant.

11 Having said that, if any of the plants
12 that are currently under construction that will
13 hopefully be started soon were to ever need this rule
14 would be rather surprising from an embrittlement
15 perspective.

16 So, then the next part concerns the plant
17 specific surveillance data check. Okay, so the idea
18 here is fairly simple is that, you know, one of the
19 main relationships that's in the overall model of the
20 RPV we used is the equation that predicts how
21 embrittlement evolves with fluence and how it depends
22 on a number of variables such as temperature, copper,
23 nickel, phosphorus and so on.

24 And so, simply stated, we want any
25 applicants to go through a check or a confirmation

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1 that the manner in which they're material is
2 embrittling is sufficiently similar to the model that
3 we used in the calculations as to permit its realistic
4 use.

5 And so, the vehicle for doing that is
6 doing a statistical comparison of a particular
7 reactor's plant specific surveillance data with the
8 general trends.

9 And if we go to the next slide, I'm not
10 going to go through the math. The math is in the, of
11 course, in the Reg Guide and the NUREG. But
12 basically, we're testing for three things shown
13 schematically in the pink curves how embrittlement
14 evolves with increasing fluence which is the
15 horizontal axis of the vertical axis on the top plot
16 is the amount of transition temperature shift as
17 measured with a Charpy test. So that's how much more
18 embrittled the material is becoming with time.

19 And the curves schematically show the
20 characteristic trend that there's a rather more
21 considerable increase in embrittlement with fluence
22 during the first two years of operation and then
23 embrittlement saturates out as all of the copper and
24 the nickel precipitates out of solution, eventually,
25 it's a self-limiting process because there is just no

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1 more hardening possible in the material.

2 So, that's the generic trend and what we
3 want to see is that the green dots, and I should back
4 up and say that the generic trend is based on both
5 physical understanding and statistical analysis of all
6 of their surveillance data in the U.S. reactor fleet.

7 So, we have I'd say a good degree of
8 confidence that the generic trends are in pretty good
9 shape. What we want to make sure is that for a
10 particular reactor that's trying to use this rule that
11 it doesn't show some sort of anomalous behavior.

12 So we check for anomalous behavior in
13 three ways. One is just to see if the trend is
14 predicting the mean of the data correctly. If it's
15 not, it would be exhibited by the surveillance data
16 appearing to be consistently high above the generic
17 trend. That's the test on the left.

18 The test in the middle would reflect a
19 different evolution of radiation damage with fluence
20 than is shown in the generic trend.

21 And in the third case, we're looking for
22 a single flyer data point.

23 These are all, you know, fairly simple
24 statistical tests. You do them in a spreadsheet.
25 It's not a particular burden on the licensee and I

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1 think is a, you know, a good prudent step just to make
2 sure that there's nothing peculiar in the plant
3 specific data.

4 MEMBER POWERS: At the subcommittee, we
5 asked you specifically what outlier tests you were
6 doing and you --

7 MR. KIRK: And I forgot to look that up.
8 I apologize, I --

9 MEMBER POWERS: Why are you keeping this
10 from me?

11 MR. KIRK: I feel badly, I really do.

12 MEMBER POWERS: You think I forgot.

13 MR. KIRK: When Gary started -- when we
14 started grilling Gary about flaws, I will get on my
15 computer and see if I can figure --

16 All I can tell you, we worked with Lee
17 Abramson on this and it was the one he recommended.
18 I know that's not a good answer, but I'll see if I can
19 -- if I can't get you an answer here, we'll get it
20 back to you.

21 But, yes, I now remember you pointing out
22 and me agreeing that there's way more than one kind of
23 outlier test.

24 MEMBER POWERS: Yes.

25 MR. KIRK: So, carrying on, embarrassment.

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1 So, then the question obviously occurs is
2 to what's a plant to do if they fail the test? Well,
3 we can't anticipate all cases where all different ways
4 that a particular small set of data might deviate from
5 a general trend. But we have included in the draft
6 guide specific guidance for two types of failures.

7 One is the mean test failure. Basically,
8 you're asked to add on a factor called ADJ for
9 adjustment, not adjective, that is the amount by which
10 you failed the test. So, essentially, you get a plant
11 specific penalty of that many degrees Fahrenheit.

12 In the case of the still to be determined
13 what the right statistical name is outlier test, if
14 the outlier happens to be at a low fluence where a low
15 is defined as being less than ten percent of the
16 fluence of concern, the evaluation fluence, we permit
17 the plant to discount that on the basis that all of
18 these assessments are focused on long term operation.

19 And also, you know, just the pragmatic
20 recognition that the low fluence data points are often
21 prone to error just because of the signal-to-noise
22 problem of trying to measure a very small amount of
23 embrittlement using the Charpy test.

24 So, those are the two, I'll say recipes
25 that we've put into the draft guidance.

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1 More generally, the draft guidance advises
2 licensees and, from my personal point of view, this is
3 the most important part, is that if these statistical
4 tests are showing that you're data's in some way
5 anomalous, it really, to me, is a sign that one should
6 dig into the data more to understand what it's trying
7 to tell you and I think that, to me, is the main
8 point, not just figure out that you're 5.5 degrees
9 Fahrenheit above the limit and add it on because these
10 should be rare events.

11 MEMBER RICCARDELLA: What is the size of
12 that pink band that -- I presume if you're within that
13 pink band, that --

14 MR. KIRK: Yes, schematically, that's a
15 two sigma.

16 MEMBER RICCARDELLA: Two sigma?

17 MR. KIRK: Two sigma.

18 MEMBER RICCARDELLA: So, if you're within
19 the two sigma, then you don't need to make
20 adjustments?

21 MR. KIRK: Right.

22 MEMBER RICCARDELLA: But, if you're
23 outside of it, you do. Do you make the adjustment all
24 the way back to the mean or just back to the two
25 sigma?

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1 MR. KIRK: Just to the -- I'm sorry, just
2 to the two sigma.

3 MEMBER RICCARDELLA: Thank you. I
4 apologize for the details, but I was not present at
5 the --

6 MR. KIRK: No, no, that's fine. I mean
7 that's a fair question.

8 Okay, so next? And now I'm looking up
9 outlier tests.

10 MR. STEVENS: I was going to say, so now
11 I have to grab your attention long enough for Mark to
12 go look up the answer to the question.

13 MR. KIRK: Hopefully, I have it. I think
14 I have to call the agents.

15 MR. STEVENS: All right, NDE requirements,
16 the alternate rule has two what we call flaw tables in
17 them, they're shown here.

18 One is for plates and forgings and one is
19 for welds and they specify the maximum number of
20 allowed flaws on either per-length or per-volume
21 basis.

22 And this very simplistically reflects the
23 flaw distribution that was assumed in the technical
24 basis for the rule.

25 One of the requirements of the alternate

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1 rule is for licensees to take the results of their
2 already ongoing Section XI examinations for beltline
3 welds and to take the results from those examinations
4 and compare them up against these tables as a check to
5 make sure that whatever flaws they may have and their
6 indications they may have in their vessel are bounded
7 by what was assumed in the technical basis.

8 Okay, on this slide, and I'm going to
9 pause a bit based on some questions we had at the last
10 meeting.

11 But what is required here is a qualified
12 examination in accordance with ASME Section XI
13 mandatory Appendix 8. It's not a requirement specific
14 to this rule, plants are doing that already.

15 However, there may be some adjustments a
16 licensee may wish to make within the confines of their
17 procedures for those examinations if they're going to
18 apply this rule.

19 One of those, for example, is this rule
20 does require that any axial flaws that are detected at
21 the clad-base metal interface do not open to the
22 inside surface so it requires that they verify that.

23 Section XI by itself wouldn't require
24 that. Section XI would require the licensee to pass
25 ASME acceptance standards or do a flaw evaluation to

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1 show acceptability. That may not require a separate
2 exam to look for connection with the inside surface.
3 So that is something that utilities would have to keep
4 in mind if they were going to apply the alternate
5 rule.

6 Optional is NDE uncertainty. Application
7 of NDE uncertainty such as probability of distribution
8 or flaw sizing uncertainty to the results. The rule
9 doesn't require that it does allow it as an option if
10 the utility should chose to do that.

11 And then when we get into the guidance,
12 I'll explain why they might want to do that.

13 Now, we did have some questions at the
14 subcommittee meeting as to why we were not requiring
15 POD to be included. And I'll just say there's -- I'll
16 give two answers to that.

17 The simple answer is the rule doesn't
18 require it, so the guidance isn't going to require it.
19 But why doesn't the rule require it? And the reason
20 for that is the flaw distribution that was built into
21 the technical basis for the alternate rule was based
22 on destructive examination of a small volume of vessel
23 material.

24 And anything that was discovered in that
25 volume, whether it was under a microscope or by NDE or

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1 whatever, then if it was a slag inclusion, if it was
2 a pour from the fabrication process, whatever, it was
3 considered or assumed to be a flaw and built into this
4 flaw distribution.

5 So, what you got was a very conservative
6 flaw distribution that literally contained several
7 thousand flaws in it that was built into the technical
8 basis for this probabilistic fracture mechanics
9 analysis that went into the rule.

10 So, it's very conservative. It was never
11 expected that any vessels in service would come anywhere
12 close to finding flaws that would approach that flaw
13 distribution.

14 However, when the rule was written, it was
15 felt to be prudent that at least some sort of a check
16 be made to make sure no plants were outliers with
17 respect to what we expected.

18 And, in fact, we and NRC have seen dozens
19 of examinations. I personally have seen lots of
20 examinations and every one we've seen that's what we
21 find is that the flaws that are detected in service
22 are 20, 30 factors lower than what is seen or what
23 assumed in this flaw distribution.

24 Typically, plants will find maybe a few
25 indications. Even in some cases, and we've referenced

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1 some of these in our report in terms of examinations
2 where the gain was turned way up, plants might find as
3 many as 120 on the order of that indications at most.
4 Most of them find less than ten. It's far below the
5 thousands that were assumed in the technical basis for
6 this.

7 There's a check made to make sure there's
8 no outliers but in that spirit, that's why NDE
9 uncertainty wasn't mandated as part of the rule.

10 Also, there is a tendency for the size of
11 flaws that are found in these vessels are smaller and
12 NDE tends to oversize those flaws which is
13 conservative when you apply or when you check them
14 against the flaw tables in the rule.

15 MEMBER RICCARDELLA: Can we go back to the
16 previous slide?

17 And I've been communicating with Dr. Shack
18 on this because, as you know, he's the one who has the
19 concern about the probability of detection.

20 You know, if you look at the bins in the
21 top one, you know, these are cumulative bins. So to
22 evaluate this, you have to break them down into
23 incremental bins. Okay?

24 So the first bin is .075 to .47, the first
25 non-zero bin, .075 to .475. But if I break that down

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1 into the portion that are between .075 and .125, it's
2 about 76 flaws.

3 MR. STEVENS: That's right.

4 MEMBER RICCARDELLA: And per thousand
5 inches. The NDE uncertainty, if I use the EPRI POD
6 curve, the NDE uncertainty in that bin is about 35
7 percent on the POD CURVE.

8 So, conceivably, you could triple, you
9 know, you do an inspection and if you're right up
10 against the limit, you could triple the number of
11 flaws in that bin.

12 The next bin down is 68 flaws, but the NDE
13 uncertainty in that bin from the POD curve is about 85
14 percent. So you're pretty good on that bin and after
15 that, the POD's essentially one.

16 My question is, what percentage of -- do
17 you have an estimate of what percentage of the
18 through-wall crack frequency comes from that -- mostly
19 that first bin? I mean is a significant portion of
20 the through-wall crack frequency?

21 MR. STEVENS: Do you know that number? I
22 don't.

23 MR. KIRK: No, something I was told about.

24 MEMBER RICCARDELLA: It would be something
25 worth looking up because if that's small, then you

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1 say, well, even if I'm off by a factor of three, it's
2 really a no, never mind in terms of the risk or the
3 through-wall crack frequency.

4 MR. KIRK: We might have a graph. I'm not
5 -- we should keep going, I've made a note of that.

6 MEMBER RICCARDELLA: Okay. I'm just
7 trying to keep Dr. Shack satisfied.

8 MR. KIRK: Always wise.

9 MEMBER RICCARDELLA: He's watching over us
10 now.

11 MR. STEVENS: All right, so this table
12 kind of shows how the requirements are invoked and
13 starting from the top of the table, these are the ones
14 that have the most significance to risk, and maybe
15 this gets to a little bit of your question although
16 it's not quantified. And then moving down, and it
17 describes how each of them are assessed.

18 So, surface connected ID flaws, with a
19 depth that are greater than .075 inch which gets you
20 beyond that first bin, beyond the cladding would
21 require flaw specific assessment for through-wall
22 cracking frequency.

23 Primarily, the --

24 MEMBER BALLINGER: Again, those are
25 surface-connected flaws?

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1 MR. STEVENS: Right.

2 MEMBER BALLINGER: And the bins that we've
3 been talking about, those aren't necessarily surface-
4 connected flaws?

5 MR. STEVENS: That's right, they're not.

6 Imbedded flaws within the one inch of the
7 inner diameter and actually it's the inner one inch or
8 ten percent, which ever is greater which typically
9 would be one inch, you need to assess compliance
10 against these flaw tables. If you exceed the flaw
11 tables, then you need to assess through-wall cracking
12 frequency.

13 MEMBER RICCARDELLA: So, a separate exam
14 is required to confirm that you don't have these
15 through-wall -- that you don't have surface breaks?

16 MR. STEVENS: That they're not surface
17 connected, that's correct.

18 Imbedded flaws that are beyond the one
19 inch or ten percent but are within the inner three-
20 eighths of the vessel wall thickness need to be
21 assessed to Section XI acceptance criteria, actually,
22 any flaws that have been detected would need to do
23 that, but for this rule, that would be a requirement.

24 And if the acceptance criteria is
25 exceeded, then you would have to assess through-wall

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1 cracking frequency again.

2 Also, obviously, and in accordance with
3 Section XI, if you exceeded that acceptance criteria,
4 you would have to do a Section XI flaw evaluation as
5 well.

6 And then embedded flaws beyond the inner
7 three-eighths thickness vessel, no assessment is
8 required. For the rule, obviously, you still have to
9 meet Section XI requirements.

10 Basically, thermally driven stresses for
11 these PTS-type cool down transients produce greater
12 risk significance for flaws near the ID and that's
13 what's going on here.

14 So, the assessment or requirements are
15 much more stringent for those types of flaws.

16 Okay, so, we're going to spend a little
17 bit of time on this. This is an attempt to flowchart
18 how the NDE results would be evaluated under the
19 alternate rule and it all starts at the top, it's Step
20 A which is a qualified ASME code, Section XI, Appendix
21 8 Examination.

22 That's not something -- plants are doing
23 that anyway, so that's a requirement. And my
24 understanding is all plants now, essentially all
25 plants, or I think all plants, have had at least one

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1 Appendix 8 exam.

2 MEMBER BALLINGER: Let me ask a question.
3 Is POD effectively imbedded in that analysis?

4 MR. STEVENS: No.

5 MEMBER BALLINGER: Okay.

6 MR. STEVENS: No, Section XI does not
7 require any flaws detected in an examination, ND
8 uncertainty isn't applied or POD in doing a Section XI
9 flaw evaluation.

10 MEMBER RICCARDELLA: The code argument is
11 that we've got other margins in there that adequately
12 cover them.

13 MR. STEVENS: So, the recordable flaws
14 that would come out of that examination, and I don't
15 have it here, it is in the backup slides, we have a
16 figure in the NUREG that kind of shows the Section XI
17 NDE process and what a recordable flaw would be.

18 It goes through the first check, Step B,
19 or any of these axial flaws that are greater than .075
20 inch depth at the clad based metal interface, do they
21 open to the ID of the vessels? So, this would require
22 some other supplemental examination to determine.

23 In the NUREG, we've talked specifically
24 about eddy current. Eddy current was used for all the
25 flaws detected at Palisades to verify and that is an

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1 acceptable method to the staff. There could be some
2 forms of visual, there could be others, but we
3 specifically talk about eddy current and potentially
4 visual in the -- it's our expectation that most of the
5 licensees are going to apply eddy current.

6 MEMBER BALLINGER: Now, have any of the
7 two -- either of the two submittals found any surface
8 connected flaws?

9 MR. STEVENS: No.

10 MEMBER BALLINGER: No.

11 MR. STEVENS: So, if they fail that
12 criteria, basically, you're out. Some other
13 assessment would be required. You've violated one of
14 the gating criteria and the rule, you wouldn't be able
15 to use the rule.

16 So, if you pass, you don't have any such
17 flaws, you'd move down to Step C and you need to
18 verify that all flaws pass the acceptance criteria of
19 Section XI.

20 If no, then obviously, you would have to
21 do a flaw evaluation in accordance with Section XI and
22 if you pass that, then you could come back into the
23 rule. There would be other checks involved.

24 If you didn't pass the Section XI exam,
25 you would, again, be out and then to some other

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1 assessment required.

2 MEMBER RICCARDELLA: And incidentally,
3 that assessment does include a deterministic
4 evaluation of pressurized thermal shock, right?

5 MR. STEVENS: Yes.

6 MEMBER RICCARDELLA: In your Section XI
7 flaw values, you have to have to consider that
8 expansion?

9 MR. STEVENS: That's right.

10 Okay, so if you pass the Section XI
11 acceptance standards, then you're into flaw assessment
12 and here we are into the inner one percent, or I'm
13 sorry, inner one inch or ten percent, which ever is
14 greater, to take you flaws and check them against the
15 flaw tables.

16 We do have a sample problem in NUREG-2163.
17 Now, basically, the Section XI examinations are
18 focused on the welds but they do go, what is it, I
19 always forget this, it's one or two --

20 MR. KIRK: Half, it's half a thickness.

21 MR. STEVENS: Half a thickness on either
22 side of the weld, there is -- so the inspection volume
23 includes both weld material and play material. And
24 basically, what we give in the guidance is based on
25 design drawings or there might be some ISI drawings,

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1 is to map the flaws into whether they fall into the
2 weld or the plate material.

3 And then, you would quantify those and
4 compare them up to either the flaw, or I'm sorry,
5 either the weld or the plate table in the rule.

6 We do have a note in there that some
7 provision, at least some consideration, should be
8 given to flaws that might be in the plate material
9 that are close to the weld, maybe in the heat-affected
10 zone.

11 We don't give specific guidance on that
12 but we just indicate that flaws that are close to the
13 weld, it may be appropriate to consider them as weld
14 flaws or maybe as both weld and plate flaws.

15 The limits for welds are lower than for
16 plates generally, so that's a more conservative check.
17 So we do note that some consideration should be given
18 for that.

19 But fundamentally, you'd separate any
20 indications into the weld or the plate there based on
21 the examination volume, compare them against the two
22 flaw tables and if you pass that check and you've
23 passed the light, you've passed the check for NDE and
24 you would be allowed to use the PTS screening criteria
25 provided you also pass the surveillance checks.

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1 So, at the bottom yellow box, proceed and
2 you have to submit your application to the director of
3 NRR for review and approval. And that review and
4 approval, by the way, the rule requires, I think, is
5 it three years, it's three prior to reaching the 50.61
6 limits.

7 MEMBER SCHULTZ: Gary, could you just go
8 through one more time this between Step H and Step I?
9 What is being done there?

10 MR. STEVENS: Yes, I'm going to --

11 MEMBER SCHULTZ: You said you check the
12 flaw tables?

13 MR. STEVENS: Okay.

14 MEMBER SCHULTZ: And that puts you on, if
15 you've passed, then you're back on the halfway to the
16 --

17 MR. STEVENS: So, what I did is I just
18 went down this path here and now I'm going to go here.

19 MEMBER SCHULTZ: Okay.

20 MR. STEVENS: So, this path would be that
21 you basically do your NDE.

22 MEMBER SCHULTZ: All right.

23 MR. STEVENS: Everything checks out in
24 Section XI, you pass the flaw tables, you go to the
25 bottom for C, pass go.

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1 MEMBER SCHULTZ: That's fine, I understand
2 that.

3 MR. STEVENS: So, now we're back up to the
4 flaw assessment and let's say that when you do your
5 NDE, you take your NDE results and you check them up
6 against that Step D, the flaw tables, you don't pass.
7 In other words, when you take your number of flaws and
8 you divide them by the weld length or by the plate
9 volume and you check them against the tables, you have
10 a higher quantity than what's allowed in those tables.

11 So, now what can you do? The game's not
12 necessarily over here, so we provide some guidance on
13 what can happen next.

14 The first check there is at Step G, that
15 box, which is now you can account for NDE uncertainty.
16 Now why would you do that? Well, there's two aspects
17 here that you might build into the analysis.

18 First would be POD which would increase
19 your number of flaws, but the other one which is the
20 reason this step is here is the flaw size. And
21 generally the flaws that the licensee would find in
22 these exams are smaller and the NDE tends to oversize
23 them.

24 What that's going to tend to do is it's
25 going push the flaw, detected flaws, up into a higher

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1 bin where the allowable number of flaws is lower.

2 So, it is possible that if you took into
3 account sizing error and reduced the size per flaw,
4 you would drop those flaws into a lower bin with a
5 higher allowable and maybe even with POD
6 considerations, you might pass.

7 It wouldn't be our expectation that that
8 necessarily would be true, but I guess there is
9 theoretically a case out there where that might be
10 true, so that step is in there for that.

11 So, accounts for NDE uncertainty and
12 recheck the tables and see if you then pass, the rule
13 allows that. And if you do, you're at Step H, you
14 pass and you come back over and now you're able to
15 apply the screening criteria.

16 Realistically, I wouldn't expect that
17 somebody's going to exceed the tables that application
18 of that box would then allow them to pass. But it's
19 there as a check, it's possible.

20 MEMBER RICCARDELLA: But, I mean
21 realistically, you don't expect anybody to exceed the
22 tables, do you?

23 MR. STEVENS: That's right.

24 MEMBER RICCARDELLA: I mean, you're
25 talking --

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1 MR. STEVENS: Yes, I'm going to get into

2 --

3 MEMBER RICCARDELLA: -- 160 flaws per
4 thousand inches of weld.

5 MR. STEVENS: Keep in mind as we go
6 through Steps G, H and I, your mind might capture also
7 sorts of other possibilities that we could provide
8 guidance on but realistically, we put in relatively
9 simply guidance but we really don't expect plants to
10 go down this path.

11 We haven't seen in the dozens of exams
12 we've looked at, anybody that approaches the flaw
13 limits.

14 MEMBER SCHULTZ: Is this set so it takes
15 into account the inspection technique that's being
16 used? In other words, you said, well, so eddy
17 current, we find acceptable and that's what we've kind
18 of used over the past periods of time to set up what
19 we do know about vessels and flaws and so forth.

20 What if we come up with a much more
21 capable detection methodology and we go and look and
22 find ten times as many flaws?

23 MR. KIRK: And we would hope that would be
24 the case.

25 MEMBER SCHULTZ: What's that?

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1 MR. STEVENS: That's exactly what's been
2 said.

3 MEMBER SCHULTZ: And so, is the process
4 taking this into account?

5 MR. STEVENS: So, here's the way the
6 process would take that into account, I think two
7 ways.

8 First off, I guess we would expect
9 Appendix A to be modified over time to adopt improved
10 methods and it would come naturally into here with
11 whatever version of Appendix A we've approved.

12 MEMBER SCHULTZ: It would recognize that
13 this is a different technique of investigation?

14 MR. STEVENS: So, as improvements are made
15 there, they would automatically be adopted to here
16 given that the staff has approved that version of
17 Appendix A to new rule making.

18 The other place it's going to come in is
19 with the NDE uncertainty with any improvements in
20 techniques, I would think, would lead to better PODs,
21 tighter sizing uncertainties and those would be
22 factored in at this place here.

23 So, if you have the greatest NDE known to
24 mankind then I would image NDE uncertainty would be
25 very small and that's where you'd get the benefit of

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1 it.

2 MEMBER RICCARDELLA: But see, just to
3 clarify, the big number of flaws, the 166 flaws, that
4 was based on constructive examination of a slab of a
5 vessel that was -- what did they call it -- the PV
6 rough?

7 MR. STEVENS: PV rough.

8 MEMBER RICCARDELLA: Yes, so --

9 MR. STEVENS: An unnamed --

10 MEMBER RICCARDELLA: But there's no NDE
11 uncertainty in that and, as Gary said, a lot of those
12 flaws weren't really flaws, they were slight
13 inclusions.

14 MR. STEVENS: Well, it was --

15 MEMBER RICCARDELLA: One really cracks.

16 MR. KIRK: PV rough and Shoreham, and yes,
17 there was intentional error towards over-calling
18 everything. So, the expectation was that while, as
19 has been pointed out, you know, given the vessel
20 volume, if your scale beats flaw tables to the vessel
21 volume, you come up with thousands and thousands of
22 flaws. In fact, we're finding, you know, if there are
23 several dozen that's a lot.

24 MEMBER SCHULTZ: Right, right. So, that
25 setup should preclude issues in this area?

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1 MR. STEVENS: Right, and keep in mind, I'm
2 going to back up here, and the other thing, there's,
3 you know, whereas, you might say the level of
4 improvement might be infinite, get as good as you can,
5 the tables would say, can you get to less than .075?
6 There is no limit on flaws less than that because
7 they're not important to risk contribution.

8 So, if you were, in the theoretical world,
9 able to find everything at .075, trying to find
10 something smaller than that would not be a useful
11 pursuit.

12 MR. KIRK: I can take a cut at Pete's
13 question whenever you want to work it in.

14 MR. STEVENS: What was his question?

15 MR. KIRK: About the risk significance of
16 the flaws in the smallest bin.

17 So, I will show you a graph and NUREG-1874
18 is at least a partial answer which may then initiate
19 more questions.

20 Okay, so what the plot is showing is --
21 it's been while since I've looked at this plot -- so
22 we've got each curve -- let's just focus on one curve
23 at a time --

24 So, the blue dots are for large diameter
25 piping at 60 effective full power years and vessel A

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1 otherwise known as Palisades, and the curve divides
2 the space into flaws that down where they're far
3 enough, where they're deep enough and have enough
4 through-wall extent to produce through-wall cracking
5 frequency versus up here all of these don't produce
6 through-wall cracking frequencies.

7 So, the answer to the question about how
8 much do the small flaws contribute, of course, depends
9 on the situation. If we just look at the large
10 diameter pipe break at 60 effective full power years,
11 the small flaws are contributing more than at --

12 MEMBER RICCARDELLA: Less.

13 MR. KIRK: Less.

14 MEMBER RICCARDELLA: More at ten to the
15 minus six.

16 MR. KIRK: More at ten to the minus six
17 and it also depends upon the transient. The
18 repressurization transient tends to have more risk
19 significance from the small flaws.

20 MEMBER RICCARDELLA: So, but if you're
21 above those curves, there's no contribution at all.
22 It's not quantitative, if your above there's no
23 contribution --

24 MR. KIRK: And if you're below them,
25 there's --

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1 MEMBER RICCARDELLA: There's some, but
2 you're not quantifying them.

3 MR. KIRK: Yes, but there's some. So this
4 isn't -- this certainly isn't a full answer to your
5 question. It is true that, I mean there is a small
6 flaw contribution here because it's a thermally driven
7 event.

8 The specifics of that contribution would,
9 you know, depend upon us running, you know, I guess
10 the thing would be to run the full suite of transients
11 at a particular embrittlement level and look at the
12 result.

13 MR. STEVENS: So, one thing that might
14 help, and correct me if I'm wrong here, but in August
15 when we gave the Appendix G brief and we talked about
16 these small surface breaking flaws, so we reassessed
17 those for impact here and those were flaws, two, three
18 percent of the wall thickness that just broke to the
19 clad into the base metal with the aspect ratio 6:1
20 say.

21 And those flaws contribute less than five
22 percent of the through-wall cracking frequency here
23 for these transients.

24 MEMBER RICCARDELLA: So, looking at the
25 red curve at ten to the minus six, I mean that comes

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1 right through about .015.

2 MR. KIRK: At ten to the minus six.

3 MEMBER RICCARDELLA: Yes.

4 MR. KIRK: But the thing to keep in mind
5 is that --

6 MEMBER RICCARDELLA: The first bing
7 doesn't contribute at all in it?

8 MR. KIRK: Most of the plants that we're
9 assessing, I mean I think it's maybe more relevant to
10 look at the 60 EFPY curves because, remember, we have
11 to really crank up the level of embrittlement in the
12 model to even get up to a ten to the minus six level.

13 So, if you look at the 60 EFPY curves --

14 MEMBER RICCARDELLA: Yes, there's nothing
15 but a little three-tenths --

16 MR. KIRK: -- you need to be above three-
17 tenths of an inch to get any CPI constitution
18 whatsoever.

19 Obviously --

20 MEMBER RICCARDELLA: For both blue and
21 red?

22 MR. KIRK: Right. Obviously, the more
23 embrittled you get, the more risk significant small
24 flaws become.

25 MEMBER RICCARDELLA: Okay, thank you.

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1 MR. KIRK: So, sorry, I had to stumble
2 through that. And the answer --

3 I need to do more research because it's
4 not specifically stated in our document. I believe
5 it's the Grubbs test but I'll have to get you an
6 answer on that. Sorry for the --

7 MEMBER BALLINGER: So, yes, we need to
8 know it.

9 MR. KIRK: I know some of his statistical
10 colleagues at Sandia, so I'm going to get their help
11 in answering his question.

12 MR. STEVENS: All right, so we got
13 ourselves over to here. Step G, application of NDE
14 uncertainty, recheck the flaw tables, Step H is
15 possible.

16 Under the assumption that you fail, now
17 here's where the possibilities might open up. You can
18 then -- the rule requires you to evaluate for
19 acceptability and we have a couple of criteria we're
20 going to walk you through here.

21 One is to just do a simple check on the
22 RT-NDT values for all flaws under the assumption that
23 you maintain at least a 60 degree margin from the
24 minimum transient temperature. So we check that
25 against the RT-NDT for all flaws less than 15 degrees.

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1 Now, why would you do that for all flaws?
2 Each flaw would have its unique position, it's unique
3 fluence accumulation based on where it is on the
4 vessel. So the RT-NDT for each flaw would be unique.

5 If you pass that check, then -- and what
6 this really counts for is flaws that are in the more
7 remote parts of the beltline aren't going to
8 contribute significantly to risks compared to those
9 that are in the peak fluence area.

10 So, this kind of takes account for that
11 positioning and if you pass this check, you know, if
12 all your flaws are in the remote parts of the
13 beltline, this would be a simple -- relatively simple
14 check to allow you to still apply the rule.

15 Or, if that wasn't the case, you're into
16 calculating through-wall crack frequency and that
17 really gets into more probabilistic fracture
18 mechanics.

19 We provide some -- there's a lot of
20 possibilities there on how a plant might do that. We
21 give some general guidance on the contents of those
22 kind of analyses and we also have one check that
23 Mark's going to go over regarding that.

24 So, if you pass that check, you'd again be
25 back over into the -- you'd be allowed to use the

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1 alternate rule screening criteria and if not, you
2 would have to do some form of a plant specific PTS
3 assessment. That would obviously be much more
4 complicated, but in either case, it would have to be
5 submitted to the NRC staff for review and approval.

6 So, that's kind of the process on the NDE
7 side. Any questions on that?

8 MR. KIRK: Okay, so one section of the
9 rule allows essentially an alternative way to comply
10 with the rule rather than complying with the RT max
11 limits. But they're both related and, in fact,
12 they're both identical.

13 The way we came up with the limits was
14 simply to take from our probabilistic analyses the sum
15 of the through-wall cracking frequency due to these
16 different flaw populations, flaws in the axial welds,
17 flaws in the plate, flaws in the circ weld and flaws
18 in the forging and sum them up and set that sum equal
19 to ten to the minus six.

20 And based on the results of the PFM
21 analysis, that gave us this, well this is now just
22 shown in three dimensions because it's for a circ weld
23 axial weld plate plant.

24 So you've got three contributions and it
25 gives you this surface, if you will, that any

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1 combination of reference temperatures on that surface
2 would correspond to ten to the minus six. And so then
3 in principle, those become your reference temperature
4 screening limits.

5 I worked very hard to put a three
6 dimensional graph in the Code of Federal Regulations
7 and I nearly lost my job as a result. So, we went
8 back to two dimensions. And so, in creating a two
9 dimensional approximation of this, if you will, which
10 is what's in the table, there are some areas that
11 would be acceptable from the perspective of setting
12 the limit at ten to the minus six that would not meet
13 the simple tabular limits.

14 So, all we're saying here is if you happen
15 to get into that situation which we really don't
16 expect because it would be for a very highly
17 embrittled circ weld, you could, instead of doing the
18 simple comparison with the tabulated reference
19 temperatures, just calculate the through-wall cracking
20 frequency and demonstrate that you were below ten to
21 the minus six.

22 So, they're completely consistent, it's
23 just one's simpler to put in a table on a wall and the
24 other is equally rigorous but something we just don't
25 expect to happen.

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1 MEMBER RICCARDELLA: But looking at your
2 earlier plot, pretty much everything's governed by the
3 axial weld anyway, right?

4 MR. KIRK: Precisely. And that's why we,
5 you know, in this case, we assume to get the two
6 dimensional representation, if you will, we assumed
7 that the reference temperature for the circ weld
8 wouldn't go over a particular value which escapes me
9 at the moment.

10 But we set that value to be above what we
11 expect at any plant that reaches its 60 EFPY.

12 So, yes, the table is effectively a two
13 dimensional slice through this surface at a fixed RT
14 circ weld.

15 MR. STEVENS: Any other questions on --
16 that's it for our -- in terms of summarizing our
17 guidance. Any questions before we go on to what our
18 plans are going forward?

19 All right, so where we are with these
20 documents, the program offices have reviewed --
21 technically reviewed -- both documents and we've
22 addressed comments incorporated and the versions
23 you've seen address that.

24 We're here, at ACRS, and afterward, we
25 need to go to Office of General Counsel for review.

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1 I've got schedules up here, these are kind of best
2 estimates. Obviously, if there were any significant
3 comments, given the holidays, whatever, there could be
4 delays beyond what I showed here. So, it depends on
5 what we get out of it.

6 So, best estimate, four weeks for OGC
7 review and then it's going probably take about two
8 weeks for us to get through the publication process to
9 get these published in the Federal Register for
10 review, maybe about two weeks.

11 So, we're looking at a public comment
12 period, it would be 60 days, maybe in the February
13 time frame, and 60 days review followed by our
14 addressing comments, revising the documents
15 accordingly and recirculating back through the system.
16 We expect right now to publish these sometime next
17 summer.

18 I guess I'll say that this schedule would
19 be consistent -- the February publication for public
20 comment would also be consistent with these documents
21 being out in the public as coincident with the Beaver
22 Valley and Palisades reviews that are ongoing.

23 That's all we have.

24 MEMBER BALLINGER: Comments from the
25 Committee? Questions? From the audience?

1 MEMBER RICCARDELLA: You have the Beaver
2 Valley/Palisades submittals, are they in accordance
3 with 61a, some draft version of it or something?

4 MR. STEVENS: Well, 61s was published in
5 2010, January 2010.

6 MEMBER RICCARDELLA: Oh, I see.

7 MR. STEVENS: So their submittals are for
8 use in 61a. The question might be --

9 MEMBER RICCARDELLA: If they follow your
10 guidance --

11 MR. STEVENS: -- are they in line with
12 our guidance and, you know, off the cuff, the answer
13 would be, they should and we say that because of the
14 involvement of the stakeholder throughout the process.

15 MEMBER RICCARDELLA: Okay, I understand.

16 MR. STEVENS: And we also, there was as
17 public pre-submittal meeting on Beaver Valley with the
18 staff prior to their submittal coming in. They kind
19 of -- I guess it was the licensee's final check on
20 making sure everything was in alignment with our
21 thinking.

22 MEMBER BALLINGER: Any others? From the
23 audience? Yes, it's not crackling and popping, so I
24 don't think it's open, but can we open the bridge
25 line?

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1 CHAIR STETKAR: While we're doing that,
2 just so we have it on the record, for the committee's
3 perspective, we often times don't get involved in
4 regulatory guidance at this stage of the process
5 before it's sent out for public comments.

6 We typically do get involved after it
7 comes back from public comments and before the Reg
8 Guide is issued as final.

9 This gives us an opportunity if we, as a
10 committee, felt that there were any significant issues
11 that should be addressed going forward before the --
12 during the public comment period, if you will, that
13 we'd have an opportunity to weigh in on that.

14 So, we may very well have another
15 opportunity to revisit the Reg Guide after the public
16 comments come in and, depending on how substantial
17 they might be and how they're resolved.

18 So, I just wanted to make sure the
19 committee was aware that we could see this again.

20 MEMBER BALLINGER: Their first slide said
21 the NRC staff requests ACRS review for release of the
22 documents. What kind of -- does that mean we have to
23 give some kind of approval?

24 CHAIR STETKAR: The NRC staff can request
25 anything. This is --

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1 MEMBER BALLINGER: But I mean do we have
2 to say yes, go ahead and release it?

3 CHAIR STETKAR: We don't have to say -- we
4 typically -- we don't have to say anything, that's a
5 committee decision. So, if we're silent --

6 MEMBER BALLINGER: They don't have to wait
7 for us?

8 CHAIR STETKAR: They don't have to wait
9 for us.

10 MR. STEVENS: Yes, so from our
11 perspective, my understanding in talking to the
12 research regulatory guide branch is, typically, we
13 wouldn't see a letter, request a letter for this.

14 CHAIR STETKAR: At this stage, typically,
15 the way it works is that if on the vast majority of
16 regulatory guides, we are given the opportunity to
17 look at them before they're released for public
18 comments.

19 The vast majority of them, we basically
20 pass on. They send it out for public comments, we'd
21 like to see it have an opportunity to review it after
22 public comments come back.

23 On more substantive Reg Guides, often
24 times we do say, well, we'd like a briefing before you
25 go out for public comments only to see if there are

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1 any significant technical issues that we feel need to
2 be addressed, perhaps, up front, which makes the
3 process overall much more efficient because there's no
4 surprises necessarily from the committee's perspective
5 when it finally comes back from public comments.

6 And that's basically what precipitated
7 this subcommittee exchange and this briefing to see
8 whether or not we, as a committee, from anything that
9 we've heard at this stage feel there's something that
10 we'd like to weigh in on.

11 We always have the opportunity and, in
12 fact, in some sense, have an obligation to weigh in on
13 final regulatory guidance.

14 So, that's the message is that we may very
15 well see this again as a committee and write a formal
16 letter on it when, you know, before it's issued final.

17 MEMBER SCHULTZ: In the backup slides,
18 number 36, you've got information from stakeholder
19 feedback EPRI seven recommendations. Could you just
20 walk through how those were addressed?

21 MR. STEVENS: Basically, yes, and these
22 are just seven -- these are kind of the seven areas
23 and what they -- and specifically, they had 15
24 recommendations that covered these seven areas.

25 So, what you see in the NUREG in table

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1 three is we actually have a table with 15 lines it.
2 It repeats their specific comment and it gives our
3 specific response.

4 And I'll say that we did take disagreement
5 to, okay, out of the 15, maybe three of the comments.
6 But we also made changes still and we disagreed with
7 the specific recommendation in the comment but it
8 might have led us to do some other change to the
9 guidance in response to it. So, we considered all of
10 them.

11 And so in that table, you can see exactly
12 how we responded to it. But predominately, we adopted
13 all of their recommendations where we could and in the
14 three or four cases where we couldn't, we still made
15 some changes and in the spirit of the comment.

16 MEMBER RICCARDELLA: And that's documented
17 there?

18 MEMBER SCHULTZ: That's in the --

19 MR. STEVENS: That's in the NUREG.

20 MEMBER SCHULTZ: Good, thank you.

21 MR. THOMAS: If I could, just a
22 clarification, Brian Thomas, Division of Engineering
23 and Research.

24 Just a clarification on what data point
25 would you use to decide whether or not you would see

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1 it again?

2 CHAIR STETKAR: We generally look at once
3 it comes back from public comments and you have the
4 public comments resolved, we'd like to take a look at
5 the Reg Guide at that point. But at that point, we'll
6 decide whether or not we want to have a meeting.

7 MR. THOMAS: Right, okay.

8 CHAIR STETKAR: But, I'm just trying to
9 give you fair warning that, even if we were to write
10 a letter at this stage, we'd still have the
11 opportunity to revisit later. But once you have the
12 public comments resolved, we'd like to get a copy of
13 the revised version of the Reg Guide and then we'll
14 decide whether or not we need to weigh in on it.

15 MEMBER BALLINGER: We must have an
16 electromagnetic block, it's not crackling and popping
17 or anything like that. Is there anybody out there?

18 I'm assuming it's open, usually we hear
19 crackling and popping. Hearing none, thank you very
20 much. Turning it back over to you, Mr. Chairman.

21 CHAIR STETKAR: Well, thank you very much.
22 I appreciate it and thanks again to research for a
23 good presentation.

24 With that, we will recess until 10:15
25 because we do have to hit our marks.

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1 (Whereupon, the above-entitled matter went
2 off the record at 9:50 a.m. and resumed at 10:16 a.m.)

3 CHAIR STETKAR: We are back in session and
4 the next topic on our agenda is proposed updates of
5 licensing policies rules and guidance for future
6 reactor applications and Dr. Dennis Bley will lead us
7 through that session.

8 MEMBER BLEY: Thank you very much, Mr.
9 Chairman.

10 I'm Dennis Bley, Chairman of the Future
11 Plant Designs Subcommittee. We've got members of the
12 NRO staff with us today to brief the committee on
13 their developing Commission paper entitled Proposed
14 Updates of Licensing Policies, Rules and Guidance for
15 Future Reactor Applications.

16 And it's reported this paper is about
17 improving the alignment between the new reactor
18 licensing process and 10 CFR 50 and 10 CFR 52, and
19 it's in case new plants come in under 50.

20 I understand the staff will be requesting
21 the Commission decisions on this paper and we'll hear
22 about that today.

23 This will be an information briefing and
24 the Committee has not yet seen any information on this
25 topic, so it's all new to us today.

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1 I'd like to invite at this time Debbie
2 Jackson and I'll let you introduce our session.

3 MS. JACKSON: Thank you. Thank you for
4 the opportunity to brief this morning.

5 Staff from the Division of Advanced
6 Reactors and Rule Making in the Office of NRO is here
7 this morning to brief the committee on a paper that we
8 hope to send to the Commission very soon.

9 We've held informal briefings with members
10 of the Committee on this topic over the last couple of
11 years. This morning, we'll provide an overview of the
12 content of the paper and, of course, we welcome your
13 feedback.

14 I'd like to turn the presentation over now
15 to Joe Williams, Senior Project Manager in the
16 division and Joe is the lead author for this paper.

17 MR. WILLIAMS: Thank you, Debbie.

18 I have with me here today George Tartal,
19 one of the other senior project managers in our
20 division.

21 We'll go on to the next slide.

22 Briefly, as we've already said, we're
23 looking to brief the ACRS on an upcoming Commission
24 paper. We'd definitely welcome your feedback.

25 Next slide?

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1 To describe the scope of the paper, we're
2 looking for some Commission decisions basically that
3 to confirm that certain existing policies apply to new
4 10 CFR Part 50 applications.

5 I want to make it clear right up front
6 that this does not deal with existing Part 50
7 applications, that is, Watts Bar Unit 2, Bellefonte 1
8 and 2.

9 Assuming that the Commission confirms that
10 those policies apply to the future Part 50
11 applications, we're asking them to direct the staff to
12 conduct a rule making effort with two purposes, one is
13 to align the new reactor requirements in 10 CFR 50
14 with those in 10 CFR 52. I'm going to be describing
15 where some of those discrepancies presently exist and
16 outline some of our proposals to address them.

17 MEMBER BLEY: So, this would be a
18 modification of Part 50?

19 MR. WILLIAMS: It would be Part 50 and
20 possibly some conforming regulations as well.

21 MEMBER BLEY: Okay.

22 MR. WILLIAMS: You know, so we have not
23 actually done the rule making effort at this point,
24 you know, but we have an idea of the work that we need
25 to do.

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1 Associated with that, George will be
2 talking for a couple of minutes about the Part 52
3 lessons learned activities and the rule making effort
4 that we'd like to conduct in that regard as well.

5 And then, we want to just outline to the
6 Committee guidance updates that would implement the
7 feedback that we get from the Commission. We also
8 need to do these guidance updates in anticipation of
9 a future Part 50 application regardless of the
10 feedback we get from the Commission, but we want to be
11 sure that the guidance aligns with the policies and
12 rules as they're in place at the time of those
13 applications are received.

14 The reasoning for this paper is fairly
15 simple insofar as the focus really for the last 20
16 plus years has been on new reactor licensing reviews
17 using Part 52.

18 As a result, we haven't really maintained
19 Part 50 and the associated guidance to the same level.
20 It's in, some cases, things are pretty well up to
21 date, in other cases, it's rather far behind.

22 So, in general, I can say that Part 50 and
23 the associated guidance do not reflect all current
24 expectations.

25 MEMBER BLEY: Joe, another question. In

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1 our reviews of some of the design certs, we've raised
2 questions about how things will be handled after the
3 plants start up, the new plants.

4 And my recollection is, people have kind
5 of assumed it will be a mix of things from Part 52 and
6 adopting some existing requirements from Part 50 for
7 operating plants.

8 Is the goal of this to try to look at
9 those issues as well and align the two?

10 MR. WILLIAMS: I would think that that
11 sort of topic might fall more within the scope of
12 George's presentation about, you know, the lessons
13 learned.

14 MEMBER BLEY: But that's today?

15 MR. WILLIAMS: Yes. I don't know that
16 we've addressed, you know -- we don't intend to
17 address each and all of the line items that might be
18 affected because that -- to identify those would
19 actually require the rule making effort. But we want
20 --

21 MEMBER BLEY: What I was asking is, if the
22 rule making effort goes ahead, it will be trying to
23 align those sorts of issues?

24 MR. WILLIAMS: I would think so, yes.

25 MEMBER BLEY: Yes, okay.

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1 MR. WILLIAMS: So, you know, a question
2 arises like why do we need to do this?

3 And basically, we know that there are
4 entities that are considering the use of Part 50,
5 Tennessee Valley Authority had considered that for the
6 Clinch River site. We had actually had discussions
7 with them over a couple of years about proposed
8 regulatory framework for a planned construction permit
9 application there.

10 Circumstances have changed and now TVA
11 plans to seek an early site permit under Part 52 for
12 that site. But, nonetheless, it illustrates the fact
13 that people do still look at Part 50 and consider
14 whether or not that process fits their business needs
15 or not.

16 We also know that some of the advanced
17 reactor applicants, the non-LWR applicants, are at
18 least considering Part 50. Some folks have said in
19 the past that they've considered it. I believe, for
20 example, the NGNP Alliance has said that Part 50 might
21 be an approach.

22 You know, I'm not trying to render a value
23 judgment about the viability of any of those future
24 projects or anything, but I think that if we have
25 these entities that are considering pursuing a license

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1 at some point in the future, it's incumbent on us to
2 be sure that we're clear about our expectations.

3 So, we need to document the Commission
4 expectations to inform the decision making that these
5 potential applicants have so they know clearly what,
6 you know, they need to fulfill when they make that
7 application.

8 MEMBER REMPE: Out of curiosity, how many
9 interactions are you having with these non-LWR
10 applicants like in the last year?

11 MR. WILLIAMS: I don't deal with those
12 particularly. I know some members of our staff have
13 some conversations with them occasionally at a pretty
14 high level. I don't know if, you know, Stu or if any
15 of you folks would want to speak to that?

16 MR. MAYFIELD: This is Mike Mayfield from
17 the staff.

18 We've had an unfortunate number of
19 interactions with them in the past --

20 (SIMULTANEOUS TALKING)

21 MR. MAYFIELD: -- where they are
22 aspirational in nature as opposed to specific
23 applications and pre-application kind of discussion.

24 We spend a fair bit of time dealing with
25 folks that have some very interesting new ideas that

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1 aren't quite yet ready to come in but they continue to
2 want to know what is expected or would be expected of
3 us and if we went down the Part 50 route.

4 So, it becomes -- one of the comments that
5 we have gotten from a number of sources is that NRC
6 becomes an obstacle to the new technologies moving
7 forward. And one of those obstacles is they really
8 don't understand what will be expected of them in an
9 application.

10 So, as they are considering Part 50, we
11 think it's incumbent upon us to make clear what's
12 going to be expected and that it's really going to
13 look very much like the Part 52 requirements. Does
14 that help?

15 MEMBER REMPE: Yes, thank you.

16 MEMBER CORRADINI: Well, don't lose him
17 yet. So, they're going to go over what -- the last
18 part of what you said is actually quite interesting.

19 So, you're saying that the downstream
20 expectation is Part 50's going to look a lot like Part
21 52 except for what I'll call some of the public
22 hearing parts of this?

23 That's what I heard you -- that's what I
24 interpreted what you just said.

25 MR. MAYFIELD: Joe is going to spend a

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1 fair bit of time explaining to you what that really
2 means. So, rather than me trying to go off his
3 presentation again, let him get through it because I
4 think he'll answer your questions.

5 MR. WILLIAMS: Yes, I also want to make it
6 clear that there are other public stakeholders, folks
7 who's interest might be affected by a proposed power
8 plant. It's important that they understand our
9 expectations as well, so we want to be sure that we're
10 clear about that up front.

11 The last bullet I think is important,
12 while, you know, Mike makes the point that some of
13 this stuff is aspirational and, thus, several years
14 down the line, it's going to take some period of time
15 for us to make this a reality, that is to conduct the
16 rule making effort, you know, if we do that in a nice,
17 deliberative fashion, that can take several years.

18 Similarly, the guidance updates, we've
19 started some of those presently, but, you know, when
20 we changed the rules and then have to change the
21 guidance to conform to those rules, that takes some
22 time as well.

23 So, we're trying to do this, get out ahead
24 of this and address these topics in a timely fashion
25 for these future projects.

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1 This slide describes how we have
2 identified the topics --

3 MEMBER BROWN: Can I ask one question --

4 MR. WILLIAMS: Certainly.

5 MEMBER BROWN: -- relative to your and
6 Mike's comments?

7 If Part 50 is going to start looking like
8 Part 52, why even have it?

9 MR. WILLIAMS: It's, you know, it's --

10 MEMBER BROWN: Why not do Part 52 for
11 everybody and --

12 MR. WILLIAMS: I guess, you know, in this
13 case, you know, Part 50 will look like Part 52 in
14 terms of the technical requirements associated with
15 it. It nonetheless provides a separate process that,
16 you know, in certain regards, you know, conceptually,
17 Part 50 could be desirable to an applicant who is in
18 a developmental stage and thus, they want to initiate
19 construction but develop the design and their testing
20 programs and so forth and proceed to an operating
21 license at some future date.

22 They may want to do their test programs in
23 parallel with some of their early construction, for
24 example.

25 If you have a more complete design, then

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1 Part 52 is a more appropriate scheme to follow.

2 MEMBER CORRADINI: But that spirit is
3 still going to be kept?

4 MR. WILLIAMS: The spirit in what regard?

5 MEMBER CORRADINI: The spirit you just
6 went through.

7 MR. WILLIAMS: Okay.

8 MEMBER CORRADINI: Because we're missing
9 a member who seems to lecture us about this so I'm
10 trying to figure out where he went.

11 The Part 50 does have its advantages for
12 a first of a kind design, whether it be light water or
13 non-light water. And I think everything you just said
14 in terms of expectations is part of the reason.

15 So, I want to make sure those things are
16 --

17 MR. WILLIAMS: Yes, and I think, you know,
18 an illustration of that point is perhaps to some
19 degree, I don't want to characterize TVA's approach
20 for them too much, but my understanding is that they
21 saw first of a kind deployment of an SMR as
22 potentially advantageous under Part 50, for example.
23 And that's not -- and it's certainly not as exotic as
24 a non-LWR application.

25 So, you know, different people in their

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1 particular business needs and their perception of the
2 risks within the two processes, you know, they need to
3 make informed decisions in that regard.

4 MEMBER BROWN: You commented on
5 completeness.

6 MR. WILLIAMS: Yes, sir.

7 MEMBER BROWN: Part 52 is reviewed, I
8 guess, my perception from your comment that it's a
9 more complete design. Based on the designs we
10 reviewed under Part 52, and particularly my area, the
11 design was almost incomplete or nonexistent and it was
12 like sucking blood out of rocks to get the applicants
13 to give you even an architecture of their I&C systems.

14 It was all this amorphous cloud diagram of
15 we'll follow the rules and regulations and don't
16 bother asking us for the details.

17 Whereas, my perception, and I've only been
18 on the Committee for six and a half years, so I didn't
19 do any of the old stuff in spite of my age. My
20 understanding was in the old days, there was a far
21 greater description of the plant systems, at least in
22 my area from the I&C and others, the protection
23 systems, safety systems that were reviewed in somewhat
24 detail by the NRC --

25 MR. WILLIAMS: Yes, sir.

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1 MEMBER BROWN: -- and before they were
2 ever, you know, before you put the Betty Crocker/Good
3 Housekeeping Seal of Approval on it.

4 MR. WILLIAMS: Where that was done,
5 though, is that I would say that, you know, the
6 construction permits were issued based upon the
7 preliminary design and the description of the
8 criteria, for example, say an IEEE standard that the
9 instrumentation control design might be completed too.

10 The final design was reviewed and approved
11 as constructed in the operating license review. So,
12 the final as-built design was the final NRC licensing
13 decision for --

14 MEMBER BROWN: But you had the ability to
15 interact on that design. I mean you knew what it
16 looked like.

17 MR. WILLIAMS: During the operating
18 license review?

19 MEMBER BROWN: During that review, yes.

20 MR. WILLIAMS: Okay, we would not -- it
21 would be during the OL review, not during the --

22 MEMBER BROWN: In the Part 52, the way the
23 I&C stuff was going, you never ever saw it again after
24 you got through that operating license. It was just
25 the cloud diagram of rules and regulations and nobody

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1 got to see anything after that other than auditing
2 type requirements, but you never saw the detailed
3 design. That's why I was asking the question.

4 MR. WILLIAMS: Okay.

5 MEMBER BROWN: Still a little fuzzy, but
6 you all can go on.

7 MR. WILLIAMS: Yes.

8 MEMBER BROWN: Thank you.

9 MR. WILLIAMS: So, this slide briefly
10 outlines the process that we followed to identify the
11 topics that I'll be describing in a little more detail
12 in a couple of minutes.

13 Part of it was just a comparison of the
14 application requirements within the two regulations,
15 10 CFR 50.34 describes the bulk of the application
16 requirements, certainly from a technical point of view
17 for both a preliminary safety analysis report
18 supporting a construction permit and then for the
19 final safety analysis report which supports the
20 operating license application.

21 The content in 10 CFR 52, I guess it's 79
22 for the VC, is that correct or do I have that
23 backwards? And 47 for the COL.

24 So, looking in those two sets of
25 regulations to see where there were differences.

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1 We also looked at policy statements and
2 decisions. In this case, I'm using the term policy
3 statement kind of broadly. I include like policy
4 statements but also, you know, Commission papers that
5 where we saw policy decisions.

6 We've also had some experience gained in
7 recent new reactor licensing activities that's given
8 us some insight and that includes some of the guidance
9 development activities that we have ongoing.

10 We have also sought some stakeholder
11 feedback. We got some insights, for example, the
12 interactions that I mentioned a couple of minutes ago
13 with the Tennessee Valley Authority during the what
14 was termed the regulatory framework review for the
15 planned, at that time, construction permit
16 application.

17 One thing, you know, I probably should
18 mention, too, that you had mentioned, sir, that you
19 were unfamiliar with, you know, the CP reviews and
20 that sort of thing.

21 One of the things that I think illustrates
22 some of the need here is the realization that the last
23 construction permit for a reactor under Part 50 was
24 issued in late 1978, so it actually predates Three
25 Mile Island. You know, I was senior in college at

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1 that time, so it's, you know, quite some time ago.

2 Moving on to describe some of the
3 categories where the issues fall, advanced reactor
4 policies that have been applied only to Part 52.
5 There are a couple of reasons for that.

6 Sometimes the staff would pose a question
7 to the Commission, what do you want us to do for this
8 design certification process, for example?

9 And so we posed a question in a Part 52
10 context, the Commission responded in a Part 52
11 context.

12 There are some new reactor licensing rules
13 that have not been applied to new Part 50
14 applications. An example of that is 10 CFR 50.53f
15 which describes the TMI Action Plan requirements. I'm
16 going to talk about those here a little bit more in a
17 couple of minutes.

18 But those application requirements, you
19 know, the applicability statement of the regulation
20 says this regulation applies only to this set of
21 reactors which was a bunch of reactors that were under
22 construction at that time and I don't believe any of
23 which were actually completed.

24 And we've looked at the application review
25 guidance updates that we need to address the Part 50

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1 processes.

2 Some of the source documents that are in
3 play here, the severe accident policy statement, there
4 are some Commission papers and the associate Staff
5 Requirements Memoranda that are listed here.

6 And what we want to do in the paper is say
7 that -- to have the Commission confirmed that the
8 discrepancies that we've identified from these
9 documents and their implementation in the regulations
10 confirm that this set of topics also applies to new
11 Part 50 applications.

12 Some of the things that were addressed
13 here, the severe accident policy statement, for
14 example, said that an applicant submitting a new
15 design for NRC approval could address severe accident
16 acceptably if they addressed the TMI requirements.

17 They demonstrated the adequate resolution
18 of all the unreviewed safety issues and medium-high
19 priority generic safety issues that, you know, on the
20 list that the NRC maintains.

21 The applicants complete a PRA and consider
22 severe accident vulnerabilities in their design. And
23 the staff completes a design review based upon
24 deterministic techniques but using risk insights as a
25 complementary aspect.

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1 The Commission papers here, SECY-89-013,
2 that informed the Commission of the staff's intent to
3 go beyond the existing, at that time, standard review
4 plan criteria to demonstrate enhanced safety.

5 Some of the issues that were addressed
6 were reliability assurance, fire protection, hydrogen
7 generation, so it caught some, you know, external
8 event stuff and caught some severe accident aspects.

9 SECY-90-016 recommended the number of
10 positions pertinent to evolutionary design issues,
11 hydrogen generation control, containment performance
12 core and concrete interactions, for example.

13 SECY-93-087 addressed 21 different topics
14 and extended previous positions to passive designs
15 which were first discussed in that paper.

16 MEMBER CORRADINI: So, just so I
17 understand, I remember all of these, but in terms of
18 they're connected to 10 CFR 52 and they're not
19 connected, at least not clearly connected, to any sort
20 of -- that's what I'm not --

21 MR. WILLIAMS: It varies to some extent.
22 I mean, for example, you know, an example would be how
23 are TMI, you know, requirements captured? There was
24 a regulation in Part 52 that says if you're a Part 52
25 applicant, you need to address the technically

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1 relevant portions of the TMI Action Plan.

2 MEMBER CORRADINI: And there's nothing
3 like that in the 50?

4 MR. WILLIAMS: And 50 excludes, presently,
5 a new applicant from doing that. Part 52 --

6 MEMBER CORRADINI: But, if I might just
7 make sure, excludes it or simply is silent?

8 MR. WILLIAMS: The applicability statement
9 in 50.34f says this rule applies to these power plants
10 and those power plants alone.

11 MEMBER BLEY: Which were the operating
12 plants?

13 MR. WILLIAMS: No, sir. It was actually
14 a set of plants that were under construction at that
15 time.

16 MEMBER BLEY: Oh, the near term.

17 MR. WILLIAMS: Yes.

18 MEMBER BLEY: Yes. Okay.

19 MR. WILLIAMS: And so, it actually does
20 not apply. So, I can't say, sir, that it's silent, it
21 actually mentions certain applicability. It actually
22 excludes -- in infer that they did not contemplate new
23 Part 50 applications at that time and how those topics
24 would be addressed.

25 You know, also within SECY-930-087, I'll

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1 talk about briefly that there was some information on
2 leak before break and steam generator tube rupture
3 that was addressed in that paper.

4 At the back of the presentation slides
5 here, just for your convenience, I have these items
6 listed and their associated session numbers so that
7 you can locate them if you have an interest and
8 certainly, we can provide copies if that's convenient
9 to you.

10 This slide describes some of the rules
11 that are not applied to new Part 50 applications. I
12 already mentioned TMI Action Plan requirements.

13 The requirements in Part 52 to provide a
14 PRA and its description, or rather to describe the PRA
15 I should say. Those do not exist.

16 Requirements associated with severe
17 accident prevention mitigation features and had also
18 requirement to submit a description of the fire
19 protection program application requirements.

20 MEMBER BLEY: Now, in your draft paper, I
21 assume all these things are giving us bullets or --

22 MR. WILLIAMS: Yes, sir.

23 MEMBER BLEY: -- actually expanded --

24 MR. WILLIAMS: There's --

25 MEMBER BLEY: -- and explained in some

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1 detail?

2 MR. WILLIAMS: Yes, to give you an idea of
3 the structure of the paper, there's a cover memo that
4 just broadly addresses these topics, then there's an
5 enclosure that addresses the 50/52 alignment topics
6 and talks about these topics, you know, in what we
7 consider to be appropriate length. It's about 15
8 pages all told, you know, to address the various
9 topics.

10 So, there's a page or two about some of
11 the topics and just a paragraph or two, dependent upon
12 the subject.

13 MEMBER BLEY: Okay.

14 MR. WILLIAMS: So, to talk about the TMI
15 Action Plan requirements, I mentioned already that
16 that's an expectation of the severe accident policy
17 statement and I already described how design
18 certification and combining license applicants are
19 required to address those items.

20 So, you know, as I've already mentioned,
21 the new Part 50 applications are already excluded
22 here. So, in this case, it seems to me that it's
23 simply confirmed for us that you expect that new Part
24 50 applications need to meet the same standard. So,
25 we want to make sure that those requirements are

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1 applied consistently to all applications going
2 forward.

3 PRA, again, another expectation of the
4 severe accident policy statement. In SECY-93-0087,
5 that document set an expectation that the applications
6 would provide a description of the PRA and it's
7 results.

8 There are also requirements for a COL
9 holder to maintain and upgrade their PRAs and that's
10 captured in 50.71h.

11 Again, these applications do not presently
12 apply. So, we want that all new reactors, including
13 Part 50, have the same requirements for developing and
14 maintaining the PRA, provide the descriptions to the
15 staff so we can incorporate the insights in our
16 reviews and then also address Reliability Assurance
17 Program in SECY-95-132.

18 And then, you know, as the plant begins to
19 operate, I would hope that we'd have similar
20 expectations that that information would be maintained
21 and updated in a manner consistent with Part 52
22 applicants.

23 Once again, the severe accident policy
24 statement set expectations for the severe accident
25 design features. In SECY 90-016 the staff talked

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1 about evolutionary advanced light water reactor
2 designs limiting core concrete interactions. Basically
3 provides sufficient floor space to enhance debris
4 spreading and provide for quenching debris in the
5 cavity. The Commission approved that proposal.

6 In the subsequent SECY-93-087, the
7 position was extended to both evolutionary and passive
8 designs to include flooding of the containment cavity
9 and protection of structures and concrete ensuring
10 that the pressuring and temperature do not exceed
11 appropriate limits.

12 Also in SECY-93.087 staff indicated we
13 talk about the, or we would evaluate the impact of the
14 interaction between fuel and coolant as well as steam
15 and hydrogen generation, dynamic forces on the
16 integrity of the containment and, you know, ensuring
17 that the containment performance would not be
18 adversely affected.

19 Yes, sir?

20 So, you know, again here, only Part 52
21 applicants are required to provide this information.
22 We recommend that the policy statement expectations be
23 extended to all new reactor applications.

24 Regarding the fire protection program
25 description, this is actually more an administrative

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1 clarification than it is an actual discrepancy.

2 Presently, there's an explicit requirement
3 in Part 52 for combined license applicants to address
4 fire protection program features. Those requirements
5 are implicit within Part 50 because there's still an
6 obligation for a licensed applicant to address the
7 requirements in 50.48, but there aren't the same
8 explicit application requirements that there are in
9 Part 52.

10 So, for clarity and consistency between
11 the two regulatory schemes, we would propose that
12 consistent application content requirements be
13 implemented.

14 Within SECY-93.-087 there were a couple of
15 issues that were addressed only in a Part 52 context.
16 For example, the paper made a recommendation regarding
17 leak before break and it described how the staff would
18 address leak before break in design certification
19 reviews and it had to do with, as I'm reading here,
20 stipulation and bounding limits that were established
21 using the preliminary analysis results during the
22 design certification phase and then verified during
23 combined license through ITAAC.

24 However, ITAAC, of course, only applied to
25 a Part 52 application so there needs to be some sort

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1 of mechanism to extend that same expectation to the
2 Part 50 process. As I was describing before, we would
3 have some preliminary information associated with that
4 topic in the construction permit application and then
5 we would confirm the adequacy of the applicant's
6 mechanisms to address this topic in the operating
7 license review.

8 Similarly, the --

9 Yes, sir?

10 MEMBER BLEY: Excuse me, Joe. In the Part
11 50 licenses, the ones that were issued and the plants
12 that are operating, we always had pre-op testing
13 programs that did something like ITAAC but I don't
14 know if that was defined under regulation or not. Was
15 it? Or how was that controlled?

16 MR. WILLIAMS: I know there's a regulatory
17 guide associated with pre-operational testing, I can't
18 recall the number off hand.

19 MEMBER BLEY: Okay.

20 MR. WILLIAMS: So, you know, and
21 certainly, you know, in a broader sense, you know, in
22 an operating license review, I presume we would have
23 reviewed the plant and said that, yes, this design is
24 adequate to meet our regulations. But then we would
25 inspect the as-built facility including looking at the

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1 pre-operational testing, you know, because we said,
2 you know, we expect these pumps to deliver this kind
3 of flow, this kind of pressure, for example, so they
4 would need a program to confirm that to our
5 satisfaction.

6 MEMBER BLEY: And what we'd be looking at
7 here would be making however that's done the same in
8 both Part 52 and 50?

9 MR. WILLIAMS: I don't know that the
10 process would be the same but the end point would be
11 the same because the regulatory process, we don't have
12 ITAAC under Part 50 but we do have --

13 MEMBER BLEY: Well, I mean that's one
14 possibility, you might have ITAAC under Part 50.

15 MR. WILLIAMS: It would not be as such, it
16 would be functionally equivalent. I can't
17 characterize the solution to the issue necessarily.

18 MEMBER CORRADINI: I didn't understand the
19 issue, Dennis, because under 50, they would have to
20 have a requirement of a public hearing and all the
21 design would have to be complete and inspected. So,
22 there would be no such thing as an ITAAC. There'd be
23 inspections and testing.

24 MEMBER BLEY: You had to have a hearing
25 after everything was built and in place?

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1 MR. WILLIAMS: That's not correct.

2 MEMBER BLEY: I don't think that's right.

3 MR. WILLIAMS: No, between. There's --
4 for under the Part 50 process, there is a hearing
5 associated with the construction permit, issuing the
6 construction permit.

7 There is a hearing opportunity associated
8 with the operating license review. That would be that
9 there'd be a contention that was made that a claim
10 that the plant actually, for some reason or another,
11 did not fulfill its licensing basis.

12 And it would be only if that was found to
13 be a prima facie, you know, hopefully I'm using that
14 term correctly in this case because I am not a lawyer.
15 But, you know, there'd have to be, you know, some
16 reasonable case made that the facility did not fulfill
17 the regulations and the hearing would then be held.

18 CIVE CHAIR RAY: Let me -- and I'm looking
19 for a spot to -- this seems like a good one.

20 I happen to chair the AP-1000 Subcommittee
21 right now, so I'm very in to the problems and dilemmas
22 that Part 52 represents.

23 Before that, I worked with Jim Curtis when
24 I was at NEI to get the whole idea of a design
25 certification up on the table. So, I have some idea

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1 of what the motivations were, at least at that time.

2 And then when you were a senior in
3 college, I was licensing a plant.

4 MR. WILLIAMS: It's been a while since
5 anybody made me feel youthful, so thank you.

6 VICE CHAIR RAY: Well, I can certainly do
7 it.

8 But the point that I want to get to with
9 that background is, the problem of making the
10 investment necessary in a Part 52 design to avoid the
11 kind of problems that we're experiencing now is
12 insurmountable, I think.

13 In other words, getting enough information
14 of the kind that Charlie's talking about on the table
15 at the time the certification is done so that you
16 don't have to work through the COL applicants to get
17 exemptions from the design certification and,
18 ultimately, amend the certified design.

19 It's just a very, very challenging process
20 that has to take place.

21 So, the idea being that at the OL stage in
22 a Part 50 application, you aren't trying to do what
23 people are trying to do today with Vogtle 3 and 4 and
24 Summer and Levy and so on, but just to make exceptions
25 from the certified design to reflect the reality that

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1 emerges from executing a detailed design.

2 Therefore, the issue that Dennis was
3 talking about, which I think you've characterized fine
4 to me, which is that these ITAAC aren't going to be
5 the same as the Part 52 ITAAC are in terms of their
6 purpose. But the end point would be the same.

7 MR. WILLIAMS: Yes, sir.

8 VICE CHAIR RAY: I guess I then have the
9 question why do you even characterize them as ITAAC?
10 I mean we never found it necessary in the Part 50 days
11 to do that. The whole point of ITAAC was to narrow
12 things down early on.

13 MR. WILLIAMS: And I don't wish to
14 characterize them as ITAAC in the Part 50 context if
15 I wasn't clear on that point, I should have been.

16 VICE CHAIR RAY: Okay. That's all. I
17 think you were clear enough, I just wanted to be clear
18 that I'm understanding what you're saying because the
19 whole point of ITAAC and the other things that were
20 developed in connection with Part 52 was to avoid the,
21 at least perceived uncertainty, I think TMI
22 contributed to it a lot as a unique event.

23 But, nevertheless, the uncertainty
24 associated at the OL time that I didn't have
25 confidence in what I was going to be able to -- what

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1 I was going to have to do in order to get an operating
2 license. I want to get that behind me.

3 But it has its drawbacks as I know people
4 are sharing with you and people are experiencing
5 insofar as how do I reflect the reality of a detailed
6 design that's executed way after the design
7 certification occurs. And of course, we established
8 ITAAC to try and permit that to happen and other parts
9 of the Part 52 process, but they're awkward in some
10 cases and difficult.

11 MR. WILLIAMS: Yes, I guess there are
12 other people that are better prepared to address that
13 than I, but at least in the -- I've spent a lot more
14 time thinking about Part 50 over the last couple of
15 years than Part 52, you know, which makes me an
16 outlier around here.

17 VICE CHAIR RAY: You can share that.

18 MR. WILLIAMS: But, it certainly occurs to
19 me that a lot of the issues that we're seeing
20 presently, we try to find a process with Part 52 to
21 avoid some of those issues. It's very difficult to
22 avoid them for first of a kind.

23 Second, third of a kind, though, I would
24 hope with the referenced combined license reviews that
25 we would be past that and that when those plants

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1 actually begin construction, we'd be largely past
2 that.

3 VICE CHAIR RAY: Well, my argument down at
4 Forrestal has always been do Part 50 on the first of
5 a kind, do Part 52 after that.

6 MR. WILLIAMS: And I think that's, in a
7 manner of speaking, that's where TVA was coming from
8 when they were talking about Clinch River.

9 VICE CHAIR RAY: Right, exactly. That's
10 why I talked to TVAs down there and not up here.

11 But, that is the way to benefit from Part
12 52 without drawbacks of discovering a lot of problems
13 when you do a detailed design after the certification
14 has occurred.

15 MR. WILLIAMS: I can appreciate that,
16 certainly.

17 So, if there are any other questions on
18 this subject?

19 I think I'll just move on to the next
20 slide then.

21 Similar to the policy and regulations, our
22 guidance updates, we've only focused on Part 52
23 recently. You know, for example, we issue Interim
24 Staff Guidance documents, they only address Part 52
25 applications, so they'll have to be updated as needed

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1 to address a possible Part 50 application for a
2 construction permit and then for its subsequent review
3 of an operating license.

4 There's some other topics that we've
5 addressed on in a Part 52 context like RTNSS,
6 Regulatory Treatment of Non-Safety Systems. We
7 haven't constructed a passive plant under Part 50, so
8 the regulatory guidance on how the staff conducts that
9 review, you know, that's described in SRP Chapter 19
10 and other places, that's only addressing a Part 52
11 application, not a Part 50 application.

12 There's also information in Part 52 about
13 combined licenses. Applicants, they need to provide
14 information on programs like the environmental
15 qualification, their ASME code, containment leak
16 testing, reactor vessel surveillance, maintenance rule
17 operating training, radiation protection, fire
18 protection, fitness for duty.

19 A lot of those things have changed since
20 1978. Many of them, you know, ASME coded existed in
21 1978 but things have changed since 1978.

22 EQ existed in some form in 1978, but it
23 changed a lot as a result of TMI.

24 Other items like maintenance rule, that's
25 well after TMI and well after the last construction

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1 permit was issued. So, the guidance that we have that
2 has not addressed these topics in the Part 50 context
3 needs to be touched and updated.

4 And I'll note one aspect of this is a lot
5 of this activity needs to happen regardless of whether
6 or not the Commission endorses our path forward on
7 this paper because a lot of these issues exist
8 regardless and we're trying to address them presently
9 as part of our updated guidance documents.

10 MEMBER CORRADINI: So can -- go ahead.

11 MEMBER BLEY: Okay, I'll go.

12 Are you recommending any kind of
13 administrative process for the future such that when
14 changes are contemplated to Part 52 or separately,
15 Part 50, that they're integrated at that time so that
16 we don't get in this spot again in the future?

17 MR. WILLIAMS: I'm not personally familiar
18 with the processes involved in the guidance updates
19 and that sort of thing, but I'd certainly expect that,
20 you know, ordinarily we change rules and then we
21 change our implementing procedures and guidance. And
22 so I expect Joe Colaccino, the head of the Policy or
23 the -- excuse me, not the policy branch --

24 (SIMULTANEOUS TALKING)

25 MR. COLACCINO: Joe Colaccino this week,

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1 I am the head of the Rule Making and Guidance Branch
2 in NRO. And so we do do the guidance some.

3 We update -- we maintain the SRP for the
4 agency, NUREG-0800, and we were talking -- when there
5 was thought of doing -- we might get a construction
6 permit, we were going to look at whether we would --
7 and how we would fashion -- pull that guidance in to
8 our existing guidance documents they have. The SRP
9 which could accommodate it as it is, but we need to,
10 I think, educate the staff on how to do that because
11 we've doing Part 52 applications now for, you know,
12 for a couple of decades.

13 The application guide, you might have
14 heard of that Reg Guide 1.206, we're also looking to
15 add -- and we still have that kind of like it's a
16 longer term plan to put that construction permit OL
17 guidance somehow factored into the guidance that we
18 give to applicants for new reactor licensing
19 applications.

20 So, yes, that is something we're thinking
21 about when those needs arise. Is that helpful?

22 MEMBER CORRADINI: Can I ask it a little
23 bit differently?

24 MR. COLACCINO: Sure.

25 MEMBER CORRADINI: So, if TVA had come in

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1 with a Part 50, would you be able to apply all of
2 these things which logically you should have to that
3 application or from a legal standpoint you couldn't or
4 you'd have to -- I'm struggling as to a lot of this is
5 very logical so it just seems natural that you would
6 have done it even if TVA came under Part 50.

7 MR. WILLIAMS: Right, I want to -- I'm
8 sorry, you had more?

9 MEMBER CORRADINI: No.

10 MR. COLACCINO: So, and Joe has done a lot
11 of thinking about that, so I think Joe's the right
12 person to answer.

13 MR. WILLIAMS: Yes, we had certainly spent
14 a lot of time contemplating what we would have done
15 with that application. That was part of what informed
16 our conversations with TVA.

17 First of all, you know, regarding these
18 specific alignment topics, we still would have needed
19 the Commission's decisions on these policy issues to
20 confirm their expectations up front.

21 More broadly, you know, we already knew of
22 some areas that we needed to adjust our thinking or to
23 update the guidance to support the application.

24 If they had come in on the schedule that
25 they had proposed at one time, we'd be scrambling

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1 right now.

2 MEMBER CORRADINI: But let me say it a
3 different way.

4 What you're saying is there's this process
5 gap, legal process gap, but to fill it, you could have
6 gone to the Commission and said, yes, all this laundry
7 list was stuff which seems totally logical to apply
8 applies. Go forth and do it.

9 MR. WILLIAMS: Yes, sir.

10 MEMBER CORRADINI: Okay.

11 MR. MAGRUDER: Yes, this is Stu Magruder
12 from the staff also.

13 We have, as Joe mentioned, we've had a lot
14 of conversations with TVA about this and they actually
15 volunteered to meet all of the current requirements
16 already. So, it wouldn't have been an issue of asking
17 them or requiring them to do that, they were going to
18 do it anyway.

19 However, I agree that it would have been
20 cleaner and we probably would have gone to the
21 Commission with a paper saying this is how we're going
22 to license the Clinch River construction permit
23 application, this is how we're going to do that just
24 to get their confirmation that that's the correct
25 thing to do.

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1 MR. CORRADINI: Okay, thank you.

2 MR. WILLIAMS: All right, we'll move on.

3 We're going to talk about a couple of the
4 particular topics that are addressed in the paper
5 regarding guidance that are issues of interest.

6 First is the severe accident mitigation
7 alternatives for SAMA for the construction permit
8 Environmental Impact Statement.

9 We don't have a precedent for doing this
10 in a construction permit. We started doing this kind
11 of review in I believe is 1987 or '88. And, as I
12 said, that would have been, you know, nine or ten
13 years after the last construction permit was issued.

14 So, we don't have any guidance on how to
15 do that in a construction permit review. We've done
16 a lot with license renewal, for example. We've done
17 it in the Part 52 licenses that we've issued.

18 But there's some new challenges associated
19 with addressing this for a construction permit
20 because, as I note in the first bullet here, the
21 findings associated with the construction permit are
22 generally preliminary but we're supposed to be making
23 some sort of final judgment with our final
24 Environmental Impact Statement regarding the impacts
25 of construction and operation of the facility.

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1 So, how to walk that line and to
2 characterize the findings in the EIS is a bit of a
3 challenge and we need to develop guidance to address
4 that subject.

5 MEMBER CORRADINI: But, if I might just
6 ask, maybe I don't remember the sentence, but is the
7 detailed design necessary to come up with some
8 estimates?

9 MR. WILLIAMS: That's part of the issue.

10 MEMBER CORRADINI: I guess I didn't expect
11 that to be the case. I mean from a siting standpoint
12 and general attributes of the design would probably go
13 most of the way.

14 MR. WILLIAMS: You may well be correct but
15 the fact of the matter is we haven't tested that. We
16 haven't really fully formed our own views on the
17 approach.

18 When we were talking about the paper some
19 time ago, we were talking with OGC about this
20 particular topic. And at that time, we identified
21 that there was kind of a spectrum of potential
22 applications we might consider.

23 And at that time, it was actually when we
24 were talking with TVA and we expected them to submit
25 a CP based upon the mPower design.

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1 And so, we considered that to be the first
2 scenario, that is we would have a CP with a relatively
3 complete design because we would have had in hand at
4 that time, we would have had contemporaneously the
5 mPower design certification application, at least that
6 was the expectation at that time.

7 So, in that case the increment from our
8 existing recent precedent would have been relatively
9 small and relatively manageable.

10 Go from that, you can go all the way to,
11 you know, you're talking about somebody submits a non-
12 LWR design and it's much more conceptual and that kind
13 of thing. That would have been more of a challenge
14 because then, you know, what assumptions are you
15 making about severe accidents, do you even have enough
16 information to complete a meaningful PRA at the CP
17 stage?

18 MEMBER CORRADINI: So, let me ask a
19 question in an adverse way. If you're going to change
20 all of this for 10 CFR 50, why not just simply admit
21 the fact that you needed design certification going
22 either of them?

23 MR. WILLIAMS: I think that --

24 MEMBER CORRADINI: It strikes me that that
25 would be the minimal set of information you need to

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1 make an informed judgment whether it be 50 or 52.

2 MR. WILLIAMS: It's not obvious to me that
3 that level of information would be necessary for the
4 construction permit. You know, the regulations and I
5 believe the Atomic Energy Act recognizes that the
6 preliminary information is acceptable to initiate
7 construction but we acknowledge that we have the need
8 for that detailed information when we actually
9 authorized the operation of the facility.

10 So, you know, we're essentially, you know,
11 the applicants or construction permit holders
12 proceeding at risk.

13 VICE CHAIR RAY: That's right, yes.

14 MEMBER CORRADINI: But it just strikes me
15 that in today's environment, who would proceed at that
16 risk without knowing more what the design is?

17 VICE CHAIR RAY: Well, I think that that's
18 -- there's no answer to that question because there's
19 no bright line there. The difficulty is how much are
20 you going to demand at the CP stage?

21 The applicant may have a lot more
22 information and certainty than he wants to incorporate
23 in the CP because they need to have flexibility that
24 verify it through detailed design that's only going to
25 take place later, for example.

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1 So, he may have a good idea what he's
2 doing and know what risks he's taking, but to have
3 that morph into a Part 52 certification, now becomes
4 a whole different set of risks.

5 MEMBER CORRADINI: Knowing what people
6 want in terms of up front information, I can't believe
7 that you wouldn't have that. You're just worried
8 about the fact that if you certified it, then you have
9 to go through the amendment of the certification.
10 That's your biggest issue.

11 VICE CHAIR RAY: You're certifying
12 something that you didn't have a detailed design for,
13 correct. And therefore, what you said is the case.
14 But I guess we have different perceptions in what
15 people would be willing to do.

16 MEMBER CORRADINI: I can't -- everybody
17 really seems to want more information these days, I
18 can't imagine that you'd get away with the conceptual
19 design. But your point is from a process standpoint,
20 you might know it in detail but you would prefer not
21 to have it certified so I have to uncertify this and
22 recertify that.

23 VICE CHAIR RAY: That's right.

24 MEMBER CORRADINI: Okay.

25 MEMBER BROWN: Relative to Harold, in our

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1 Part 52 reviews, I mean as I was asking for more
2 extensive information on architectures for the
3 instrumentation control systems, it struck me the push
4 back was, hey, we don't need to do that.

5 Yet, when I looked at the piping systems
6 and other parts of the design, I think they had pipe
7 links, pipe flows, pressure drops, more information,
8 stress analyses and more stuff than you possibly shake
9 a stick at.

10 Yet, in an area of the electrical world,
11 I was given a box with some wires going up, you know,
12 a sensor coming in and a protection signal going out
13 and saying don't trust us, it's going to be good.

14 So, there's a conflict relative to -- and
15 I'm trying to put that in the context of a
16 construction permit under Part 50, what information
17 from a big picture or architectural stand, did they
18 get a construction permit without having any idea what
19 the piping systems were going to look like?

20 VICE CHAIR RAY: No, but I want to put
21 something out to bid because it's a vendor-supplied
22 system and, you know, five years down the road be able
23 to get what's then available at the best price, not
24 tell you initially what it's going to be way before I
25 ever even buy the darn thing.

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1 MEMBER BROWN: From my stuff or from a
2 piping standpoint?

3 VICE CHAIR RAY: No, I'm not talking about
4 piping.

5 MEMBER BROWN: See, everybody loves piping
6 because they can go hand rot and be not and --

7 (SIMULTANEOUS TALKING)

8 VICE CHAIR RAY: My thing is it's not as
9 simple as you think it is.

10 MEMBER CORRADINI: I mean, look at it this
11 way, yesterday the Commission had this thing on small
12 modular reactors and I thought it was Commissioner
13 Svinicki asked the question straight up, are we going
14 to be able to get rid of DAC? Because what you're
15 talking about is DAC, you're not talking about --

16 So, it's a very particular type of the
17 ITAAC that was causing, you at least --

18 MEMBER BROWN: No, it was the actions of
19 any information about what the design looked like from
20 a fundamental architectural standpoint. I don't care
21 about the little pieces that go inside the cabinets,
22 it was an architectural standpoint.

23 MEMBER BLEY: They did it sometimes using
24 ITAAC that they didn't call DAC to look at it.

25 MEMBER BROWN: Yes, it was very mushy.

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1 And my worry in listening to this presentation is do
2 we go down a path where we now backslide and not be
3 able to have a -- with a computer-based technologies
4 where we don't have an understanding of the basis
5 architecture.

6 VICE CHAIR RAY: No, the risk that the
7 applicant takes is that when you come in for the OL
8 and show them in detail and you can go open up the
9 damn boxes and look at them yourself, you say no, this
10 is no good. That's the risk they take.

11 MEMBER BLEY: From what you're asking,
12 Charlie, the construction permit did not lock in the
13 design of the plant.

14 MEMBER BROWN: Right.

15 MEMBER BLEY: It set some parameters that
16 the plant would have to meet.

17 MR. WILLIAMS: It set the criteria that
18 represents to some degree an agreement between the
19 agency and the permit holder in that case about how
20 the design would be completed.

21 MEMBER BROWN: How I can complete
22 something that I haven't seen is beyond me from a
23 conceptual architectural standpoint.

24 Because can they go two loops to four
25 loops for a pressurized water reactor? Could they

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1 change the design of the -- on a BWR? What is the
2 little thing down at the bottom that all the water
3 comes out through?

4 MEMBER CORRADINI: It's called a wetwell.

5 MEMBER BROWN: The wetwell, thank you very
6 much.

7 MEMBER CORRADINI: You can tell how much
8 I've learned about BWL.

9 MEMBER BROWN: I mean, it seems to me
10 there's got to be some connection to reality if we're
11 going to issue a construction permit of some general
12 boundary conditions of what the plant's going to look
13 like before the guy goes down and starts building
14 pieces and all of a sudden, you get a surprise.

15 VICE CHAIR RAY: There's a hundred plants
16 out there that have been built under Part 50.

17 MEMBER BROWN: I understand that.

18 VICE CHAIR RAY: Okay.

19 MEMBER BROWN: I was building reactor
20 plants for the Navy for the -- at the time he was
21 getting out of college, I was already on my third
22 reactor.

23 (SIMULTANEOUS TALKING)

24 VICE CHAIR RAY: It sounds like you're
25 asking do we know how to build plants under Part 50

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1 and the answer is, we've built lots of them.

2 MEMBER BROWN: Yes, I had no idea that
3 nobody knew what they were building, that's all.

4 (SIMULTANEOUS TALKING)

5 MR. WILLIAMS: That is what led to a lot
6 of the issues that we were dealing with, I think, back
7 then.

8 MEMBER BROWN: Well, that's what I heard
9 secondhand was that they were get to the operating
10 license point and then hands were going up in the air
11 that that's not good enough and this is not good
12 enough and, therefore, the license, or the applicant
13 licensee was being forced to change his design to
14 comply with the desires that the NRC expected but
15 didn't see when they finally got to the licensing
16 stage. That's all.

17 And I can understand the Part 52 part a
18 little bit better except I was kind of -- when I saw
19 the mechanical side, I said oh, gee, that's -- at
20 least there's some idea of what you're getting. The
21 electrical side, I&C side, excuse me, the digital I&C
22 or whatever protection and safety systems, it was
23 nonexistent.

24 MR. WILLIAMS: Perhaps at some risk, you
25 know, I'd use, you know, if it helps at all, an

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1 analogy that I find helpful with regards to Part 50.
2 I actually think of it to some degree as building a
3 house.

4 A house is obviously much more less
5 complex than a nuclear power plant, but the analogy is
6 to build a house, you have to get a building permit.
7 That building permit is absolutely analogous to a
8 construction permit.

9 When you get that building permit, you
10 don't describe every detail within the house, you
11 don't tell them where all the studs are going, you
12 don't tell where all the electrical outlets are going
13 to be, but you do say that I'm going to meet this
14 standard for, you know, the local building code for
15 the electrical design, meet the plumbing code, it's
16 not in a flood plain, you know, the site perks if I
17 need a septic system, that kind of thing.

18 You meet those -- you confirm that the
19 site meets appropriate siting criteria and you tell
20 whatever the regulatory authority, the county or
21 whatever, that, you know, you have identified and will
22 implement the design consistent with, you know, the
23 established codes and standards.

24 Then when you build the plant, you know,
25 you've identified the footprints of the plant and its

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1 basic characteristics. You're going to tell somebody
2 that's, you know, when you build a house, that it's,
3 you know, going to be such and such a footprint and
4 two or three stories and so many bedrooms and that
5 kind of thing.

6 You really can't go back and say, well, I
7 want to build, you know, I want to build an apartment
8 block here instead. You know, there are definite
9 limits on that and the same thing with the
10 construction permit, you have to characterize the
11 facility that you're going to be building to some
12 degree and the regulations describe this in the, you
13 know -- better than I can.

14 So, when you complete the house, that
15 house is inspected by local inspectors to confirm that
16 it meets all those standards just as we confirm that
17 for inspection, that it meets the appropriate design
18 for the power plant.

19 MEMBER BROWN: I just went through a few
20 years ago the construction of a house and I can tell
21 you right now that when I had -- when my wife wanted
22 designer switches with the little squares in them and
23 they had the flip switches, I had to pay for that
24 because it wasn't shown on the plans on which they got
25 the permit. That detail was not shown and I got

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1 nailed, okay, because I didn't ask enough questions,
2 and that wasn't the only item that got involved.

3 And what is the cable system run, for
4 this, that and the other thing? So, if you don't pay
5 attention to that at the construction permit time, you
6 don't end up with it and you pay extra for it
7 afterwards and I'm well aware of what it takes to pay
8 for it afterwards, it's not exactly cheap.

9 MR. WILLIAMS: Okay. I'm going to move
10 on.

11 MEMBER BROWN: That's fine, thank you.

12 MEMBER SKILLMAN: Joe, I'd like to ask you
13 a question here. With the items that you've pointed
14 out changes in regulation since 1979 maintenance rule,
15 reinforcement on EQ, high-energy line break, a whole
16 bunch of them, 50.65 and you can mark through that
17 tail end of 50.

18 It seems to me that you may have done a
19 gap analysis between present 10 CFR 50 requirements
20 and present Part 52 and identified the outliers.

21 So, my question is, is that what you have
22 done here?

23 MR. WILLIAM: Yes, I think we have. You
24 know, the items that I was describing earlier like the
25 PRA and severe accident requirements, the TMI

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1 requirements, those are really the gaps that we found,
2 you know --

3 MEMBER SKILLMAN: And is there a
4 spreadsheet or a ledger that perhaps might be useful
5 for the members to look at where you --

6 MR. WILLIAMS: I haven't developed as
7 such, no.

8 MEMBER SKILLMAN: Because it seems to me
9 that that is very valuable for those of us, I'm like
10 Harold, I'm an old Part 50 guy, and I thought I knew
11 it quite well but I also helped write a design cert.
12 So, I'm well aware what 52 requires.

13 MR. WILLIAMS: Yes, the, you know, we're,
14 you know , to take an example like maintenance rule,
15 you know, and we don't need to change the rules to
16 apply maintenance rule to a new Part 50 application.

17 MEMBER SKILLMAN: But you need to make
18 sure that the new Part 50 applicant is signed up for
19 it.

20 MR. WILLIAMS: Right. Yes, yes, and
21 that's, you know, where the gap, if you will, is to
22 the extent maintenance rule has been implemented, it's
23 been implemented for operating plants. It's been
24 implemented for existing Part 50 licensees.

25 What we haven't done is talk about how we

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1 would address that topic in construction permits. To
2 what degree do we need information on the maintenance
3 rule of the construction permit stage? Probably not
4 a whole lot, but we probably, you know, at least need
5 confirmation that that applicant is going to develop
6 a program and, you know, with the right
7 characteristics and that kind of thing.

8 And we'd certainly need to confirm that
9 it's ready to go at the time the operating license is
10 issued.

11 So, we haven't addressed it from the
12 license issuance point of view within Part 50
13 presently. You know, we've issued it just from the
14 existing licensees.

15 And remember, too, that Part 52 generally
16 points back to Part 50 for the technical requirements
17 for a particular license. It's only in a few of these
18 odd little areas, if you will, you know, like PRA
19 where it says, you know, that it's established a
20 technical requirement independent of a requirement
21 within Part 50.

22 So that's, you know, it's a relatively
23 small but albeit, you know, we believe significant set
24 of changes for, you know, or differences between the
25 two regulatory schemes.

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1 MEMBER SKILLMAN: So, let me communicate
2 what I was trying to say several minutes ago. It
3 seems to me that what would be valuable is just a crib
4 sheet that shows the gap analysis results. And I'd be
5 quick to say one of things in Part 50 that certainly
6 carried over in Part 52 is Appendix B to Part 50,
7 which is a critical piece of everything that we're
8 doing here.

9 MR. WILLIAMS: Sure.

10 MEMBER SKILLMAN: So, thank you,
11 appreciate that.

12 MR. WILLIAMS: Move on to another topic,
13 this is -- is there a question? Okay.

14 The next couple of items I want to talk
15 about are similar in that there's some recent rule
16 changes that really haven't clearly differentiated
17 between the information that's required for a
18 construction permit and the information that's
19 required associated with an operating license.

20 You know, as I've described that the
21 construction permit is based upon the preliminary
22 safety analysis report which is the preliminary design
23 and leaves a lot of the final information for the
24 operating license review and the FSAR and the FSAR is
25 based upon the as-built as-designed facility.

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1 The problem in this particular case is
2 that one of the rules, 10 CFR 50.54hh dealing with the
3 mitigative strategies that that rule doesn't
4 distinguish between the requirements for a
5 construction permit versus an operating license.

6 Clearly, that we're going to have
7 different expectations there. So, we need to come up
8 with guidance that would say this is what needs to
9 happen at this stage, the preliminary information for
10 the CP, this is the information that we need to
11 support the operating license review.

12 The regulation I cite here, 50.35
13 describes -- that's regarding issuance of construction
14 permits and what it does, the text of that rule, if
15 you look at it, it says that, you know, you can issue
16 a construction permit if you found that it meets --
17 that an application meets the regulations with some
18 information that can reasonably be left for a later
19 decision, that is the operating license decision.

20 One of the things that we're also aware
21 of, we're well aware that there's a lot of activity in
22 this realm that this rule could change going forward.
23 And so whatever guidance that we do develop would
24 conform to the rule as it exists down the line. We'd
25 be sure to maintain the guidance in that manner.

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1 Any questions? Move on?

2 In a similar vein, the aircraft impact
3 assessment rule, 10 CFR 50.150, that also does not
4 distinguish between the application content of a
5 combined license, or excuse me, a construction permit
6 or an operating license.

7 However, if you look at the statement's
8 considerations associated with that rule, it talks
9 about preliminary information for the CP and final
10 information for the OL and there are differences in
11 the regulations in that the application requirements
12 in 50.34, there's a line item for a CP and there's a
13 line item for an OL.

14 The terminology they use is very similar.
15 It says, you know, demonstrate that you meet this
16 rule. So, but it doesn't set a different threshold
17 there.

18 So, we need -- it's merely in this case a
19 matter of having the guidance to say this is the
20 expectation for the CP, this is the expectation for
21 the OL and that's something we plan to do with
22 guidance.

23 Another wrinkle in this last bullet, 51.50
24 is unique in that it actually sets expectations for
25 change control associated with the PSAR. Existing

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1 facilities, when they were built, once the PSAR was
2 issued, that was done, it wasn't amended.

3 This rule actually sets some expectations
4 that a PSAR would be revised under certain
5 circumstances and that's unique, you know, in our
6 regulations. So what threshold would actually
7 constitute a license amendment, for example? A change
8 to the construction permit?

9 That's something that we're unfamiliar
10 with so we need to determine what that appropriate
11 threshold would be an incorporate that in the
12 guidance.

13 Some of the other guidance updates I'd
14 already mentioned, ISGs that need to be updated, how
15 we address the way liability assurance program in Part
16 50 space needs to be addressed.

17 You know, in Part 52, we take the, you
18 know, risk information and we say go forth and design
19 the final design and make sure that, you know, it
20 fulfills all the expectations of the PRA going forward
21 and if there's adjustments to be made, you make those
22 adjustments. We don't have guidance on how to do that
23 moving from a construction permit to an OL.

24 Similarly, RTNSS, we haven't dealt with
25 that in a Part 50 context, as I mentioned before. And

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1 there's information on required programs, we talked
2 about that a few minutes ago as well. So, you know,
3 incorporating guidance updates to be sure that it
4 reflects the Part 50 licensing process.

5 Implementation of this aspect of the
6 presentation, the staff considered whether or not rule
7 making would work or whether or not there's another
8 process like an order or a license condition would be
9 appropriate. And it's certainly the staff's opinion
10 that rule making is obviously the best approach but we
11 did consider these other options that was found that
12 it's a little bit problematic.

13 The reason being, is that the regulations
14 say that a license will be issued when somebody
15 demonstrates that they meet the regulations. If we
16 want them to do something beyond those regulations,
17 we really can't do that, at least no easily.

18 If, you know, we have legal problem, if an
19 applicant says, you know, I've got to meet this set of
20 regulations and I met them all, I'm actually not
21 fulfilling my own regulation by saying, well, you've
22 got to do something else.

23 And absent some sort of exigent
24 circumstances, it's legally problematic for us to
25 impose that by some other mechanism.

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1 So, you know, we've explained that in the
2 paper. You know, we talk about how the agency's
3 actually been challenged in this regard. For example,
4 in the post-9/11 orders, the agency was challenged
5 that those orders actually constituted the de facto
6 rule making. That legal challenge was rendered moot
7 when we actually conducted that rule making to codify
8 those orders.

9 But it's certainly an issue that makes an
10 option other than rule making somewhat challenging to
11 implement.

12 And then the guidance updates, we talked
13 about those, you know, already to some degree. Again,
14 I just want to reiterate the point that there's some
15 set of license, or rather guidance updates that needs
16 to go forward regardless, you know, if expect a Part
17 52 -- or rather a Part 50 application, we need to
18 update our guidance in many areas other than the ones
19 I've described here to address that eventuality.

20 And that's the end of my portion of the
21 presentation. I'll turn it over to George Tartal.

22 MEMBER BLEY: This is a staff initiative,
23 right?

24 MR. WILLIAMS: Yes, sir.

25 MEMBER BLEY: You weren't directed to do

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1 that?

2 MR. WILLIAMS: That's correct. I should
3 pause, you know, and give people an opportunity rather
4 than rush through if there are any other questions.

5 MEMBER BLEY: I think we're good, go
6 ahead.

7 MR. TARTAL: Okay, thank you, Joe. I'm
8 George Tartal from the Office of New Reactors.

9 My slide addresses the lessons learned
10 rule making for Part 52. The last time we did a
11 significant update on Part 52 was in the year 2007.
12 We did this in anticipation of the wave of new reactor
13 license applications that we anticipated to get and we
14 did it to improve regulatory certainty and stability
15 and also to enhance the deficiency and effectiveness
16 of our licensing process.

17 Since then, since that 2007 update, we've
18 received a number of design certification, combined
19 license and early site permit applications. Right?
20 This committee has gotten to review -- had many
21 opportunities to review and interaction with the staff
22 on those applications and since 2007, we've issued
23 four early site permits, four combined licenses, two
24 design certification amendments and, more recently,
25 the fifth initial design certification for ESBWR.

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1 During those reviews, though, we've
2 accumulated a number of suggestions from the staff on
3 how the regulations guidance could be revised for
4 better clarity, consistency and effectiveness and
5 these are some of the lessons learned that we're
6 talking about here.

7 Additionally, after we issued the four
8 combined licenses, we initiated a lessons learned
9 review to identify potential enhancements to the Part
10 52 licensing process.

11 In that process, we solicited feedback
12 from both internal and external stakeholders. We held
13 a focus session on this topic in the 2012 regulatory
14 information conference and we even held a public
15 meeting to discuss with external stakeholders their
16 comments.

17 As a result of that, we generated a report
18 which is called New Reactor Licensing Process Lessons
19 Learned Review 10 CFR Part 52. In that report, there
20 are seven lessons learned that are described. One of
21 the lessons states that updates to the regulations
22 incorporating lessons learned will contribute to an
23 enhanced licensing process. So this effort would
24 address that recommendation.

25 In 2012, we actually started working on a

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1 regulatory basis to address the lessons learned.
2 However, due to budget constraints at the time, we put
3 that regulatory basis work on hold.

4 And we're proposing now to resume that
5 work on the lessons learned rule making in conjunction
6 with the changes that Joe went over here to align the
7 licensing requirements.

8 And by doing them as one rule making, we
9 believe that we can promulgate the proposed amendments
10 more efficiently and effectively than if we pursued
11 them as separate actions and that's something we also
12 talked about in the paper.

13 So, let me talk for a few minutes about
14 the kinds of changes that we're proposing. We're
15 talking about corrections, clarifications and new
16 requirements. Those are the three categories. Let me
17 give you a couple of examples.

18 One example is for corrections references
19 to Department of Homeland Security, those should
20 instead reference FEMA, all right, that's just a
21 really simple correction.

22 For clarifications, under the requirements
23 for applications for renewal of design certification,
24 and I'll note here that we do have two applications
25 that are currently docketed for renewing the ABWR

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1 design.

2 One of the things that the staff is
3 concerned about is there's language in the regulations
4 talking about the application must contain all of the
5 information necessary to bring the previous
6 application up to date. What exactly does that mean?
7 It's a little bit ambiguous and so this would be one
8 of our clarifications that efforts to try to clarify
9 what the staff's expectations are for renewal of
10 design certifications.

11 Another one on renewal and design
12 certifications is the regulations for length of
13 renewal gives a range of ten to 15 years, but how do
14 we determine what is the appropriate renewal duration
15 for a particular application?

16 So, these are some of the things that we
17 wanted to clarify.

18 Another clarification is whether standard
19 design approvals should remain effective after a
20 design certification for that same design is issued.
21 So, recognizing that at that point, or going back in
22 history before the 2007 update, there was a sequential
23 process for design certifications that you first had
24 to get the design approval and then you went through
25 the rule making and certified the design.

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1 Well, in doing that, you have two separate
2 regulatory approvals for the same design, all right,
3 so you have the final design -- final standard design
4 approval and the design certification. The question
5 is, should the design approvals stand if you've now
6 certified the design?

7 MEMBER SKILLMAN: Let me ask you a
8 question and I think this is the right place. And I
9 ask this question because I lived this life creating
10 a design cert.

11 MR. TARTAL: Okay.

12 MEMBER SKILLMAN: The interesting thing
13 about a design cert is that it isn't, if you will,
14 owned in a legal sense by the user. It is really the
15 new way an NSSS vendor puts his product on the street.
16 So, it's really owned by the NSSS vendor.

17 MR. TARTAL: So, the applicant, yes, the
18 applicant owns the design but the certification
19 really, it's the NRC's rule, it's really the NRC's.

20 MR. SKILLMAN: I'm not finished asking the
21 question.

22 MR. TARTAL: Okay.

23 MR. SKILLMAN: And you're three-quarters
24 of the way into this and you find, what I'm going to
25 call a white-knuckle special error. It is a

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1 significant error and I admit up front, the NSSS
2 vendor is not gifted with clairvoyance, these machines
3 as you point out, Joe, are very complicated.

4 So, in the course of time, as all of the
5 pieces being to come together, and by pieces I mean
6 the thermal hydraulic design, the ECCS design, all of
7 the features that make these plants what they are.

8 Through the discovery process, it is
9 realized here is an error and it's substantive. It
10 needs to be corrected.

11 How do the lessons learned address that
12 issue? Because here's the problem, once the certified
13 design is inculcated in 10 CFR Part 52 as an appendix,
14 it's now legislated. I won't say it's law, but it
15 exists for any user that chooses to use it.

16 And now the poor user who chooses to use
17 this certified design is stuck with a substantive
18 error. How does that user correct not only his design
19 but the underlying design certification?

20 MR. TARTAL: So, there is a change process
21 that's in each of the appendices in Part 52. Right?
22 Each appendix is the certification for an individual
23 design. So in that -- in each of the appendices,
24 there is a change process in there and that change
25 process would take you through, depending on whether

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1 the change is in Tier 1 or Tier 2 or Tier 2*, there's
2 a separate section in the rule text that talks about
3 what change process you go through to address issues
4 like that.

5 MEMBER. SKILLMAN: I understand that. So,
6 supposing I've got a Tier 1 or a Tier 2*, so I'm
7 really into the departure. Where does the emphasis
8 come for that change? Must the emphasis be on the
9 NSSS vendor or on the discoverer that might be the
10 future utility owner of that design? Who's got the
11 lead?

12 MR. TARTAL: I don't think I would assign
13 responsibility as one or the other to the lead. I mean
14 obviously the --

15 MEMBER SKILLMAN: Well, wait a minute.
16 Does the staff have the lead? You've bought the
17 design, you've actually inculcated it in the
18 regulation.

19 MR. TARTAL: Right.

20 MEMBER SKILLMAN: Does the staff have the
21 responsibility to amend?

22 MR. TARTAL: I think the staff has the
23 responsibility to recognize that there is an issue
24 with the design, right, and also that the way that
25 these issues normally come up is during construction,

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1 right? So you have an applicant that's trying to
2 construct a particular design that's certified in the
3 regulations.

4 As they're trying to construct it, they
5 identify problems like you're suggesting here, there's
6 some problem with the way the design is as certified.

7 And so, the combined license applicant or
8 may their NSSS vendor might working with them as
9 they're constructing the plant would normally identify
10 such an issue.

11 I don't think that the staff would take
12 initiative to try to look into the design further
13 after it's already certified unless there's some
14 ongoing construction associated with that particular
15 design because the design has finality. Right?

16 There are certain restrictions to the
17 staff to going back and rereviewing what we've already
18 reviewed and approved. That's what finality is really
19 all about.

20 MEMBER SKILLMAN: I understand that.
21 Supposing it isn't at the construction stage, it's
22 still in the analytical stage? It's one of the --
23 it's exactly what Charlie was talking about. There's
24 a box, there's something in the box and in the course
25 of analysis, you say by golly, this needs to be fixed.

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1 This is a white-knuckle special -- this is real. This
2 has to be fixed.

3 It's not constructed yet, it's still an
4 image, it's in our mind's eye we're going to build
5 that, but it's an analytical issue.

6 Who is the one that pushes the button that
7 says go fix it?

8 MR. COLACCINO: George, if I could? This
9 is Joe Colaccino again.

10 The question is a good one. It's
11 certainly one that we have thought about. We have not
12 on any of the certified designs and, as George was
13 talking about the change process, we could initiate --
14 the staff could initiate, the NRC could initiate a
15 looking at it, designer, it actually, it would be a
16 back fit. I think that's the way it's described.

17 And we would look at that on a case-by-
18 case basis. If we felt it was, depending on what the
19 activities were going on associated with by-design,
20 this is me talking now personally, I think that we
21 would have to make a decision on whether we would
22 initiate some sort of change or not.

23 But George was talking about construction,
24 obviously, those are things that we're looking at.
25 The amendment process on the Vogtle and Summer

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1 licenses, as they go through construction, those are,
2 you know, that's what the change process is there for.
3 And to me, although for the new builds and in those
4 first of a kind builds, it is somewhat painful but
5 that's -- to me, it's the change process working as it
6 is.

7 So, again, it's a good question that you
8 have. We haven't faced the issue, but we would take
9 it on a case-by-case basis and we would be prepared,
10 if we had to, to initiate that.

11 Is that helpful?

12 MEMBER SKILLMAN: Yes, it's helpful. And
13 to me the center of the -- it's kind of like a Chinese
14 finger puzzle, you get stuck in and you can't get out
15 of it because of finality.

16 So there needs to be something in that
17 finality finding that communicates if there is an
18 issue of substance, then I'm going to go one step
19 further. There could be a Part 21. There is some way
20 to undo it, at least that piece of finality so that
21 that portion of the design is thoroughly amended
22 including extent of condition and root cause so that
23 the design certification gets corrected and all of the
24 users, certainly in to the R-COL, get fixed so all the
25 S-COL users are also healed.

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1 It seems to me that that might be a lesson
2 learned that might not yet has emerged, but it ought
3 to. There needs to be a way to fix what could be an
4 underlying issue in a Part 52 certified design once it
5 has been inculcated in Part 52 as one of the appendix.

6 VICE CHAIR RAY: Well, the bigger problem,
7 I think, maybe it's implied in what Dick's saying, but
8 the bigger problem is, who's responsible to define the
9 extent of condition?

10 I mean you've got a problem, it's going to
11 get fixed and nobody's going to go forward and not do
12 that. But the real issue is what caused it and what
13 other things may be latent? And that's not an easy
14 thing to solve. And it's not even clear who the
15 heck's in charge of solving it.

16 MEMBER SKILLMAN: That's my point.

17 MR. COLACCINO: We thank you for the
18 comment. Certainly if the Commission directs us to do
19 rule making, this is one of the, you know, we've got
20 a very large list of those corrections,
21 clarifications, things that we'll look at.

22 So, and this is, like I said, this is
23 something that we do. We have thought about, but we
24 haven't exercised it in practice. But we believe the
25 current requirements as they stand in the design

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1 certification appendices would allow us to do that.

2 MEMBER SKILLMAN: Well I think it will
3 allow you to do it, the question is who pushed the
4 button and then says go do it?

5 MR. COLACCINO: Okay, understood.

6 MEMBER SKILLMAN: What is the initiating
7 target? Thank you and I thank Harold for his
8 clarification, that's good.

9 MR. COLACCINO: You're welcome.

10 MEMBER SKILLMAN: Thank you. Good
11 comment, thank you George.

12 MR. TARTAL: Okay, so I have a few more
13 examples on new requirements. One is for limited work
14 authorizations. Currently there is no change process
15 for limited work authorizations. Should we have a
16 change process and what would that look like? That
17 would be another potential new requirement that we
18 might address in this rule making.

19 Another one is on expiration of combined
20 licenses. So, what happens if, for example, a
21 combined licensee comes in with an application. They
22 get their license from us and they decide not to
23 construct. Should we have an expiration date for such
24 a combined license?

25 We have expiration dates, for example, for

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1 design certifications. Should we not have a -- should
2 we or should we not have an expiration date for
3 combined license applicants. And, oh by the way, we
4 do have some current combined license applicants that
5 are considering doing this right now.

6 MR. TARTAL: So, as Joe mentioned a minute
7 or two ago, we have about a hundred different of these
8 kinds of changes in these three categories that we've
9 logged into an Excel spreadsheet and these are the
10 different changes that we're considering as part of
11 this part of the rule making that's outside of the
12 part that Joe already went over.

13 And then, if the Commission approves of
14 our proposal, we plan to resume work on this rule
15 making as soon as we can.

16 And that's it for my slide. Other
17 questions?

18 MR. WILLIAMS: I'll just briefly talk
19 about our next steps. Presently the paper is -- we're
20 refreshing some of the concurrences that we've
21 obtained over the last several months. We plan to
22 forward the paper to the EDO's office within the next
23 couple of weeks.

24 Whenever the Commission renders the
25 decision, we will implement their direction and we

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1 would look to engage with this committee as we needed
2 regarding the specifics of any future rule making
3 activity and the guidance updates as those are
4 developed.

5 And that's the end of our presentation.,
6 so thank you.

7 MEMBER BLEY: Okay, thank you for the
8 presentation. We're glad to hear it.

9 I'm a little disappointed we didn't get to
10 see the paper before you're sending it up. We talked
11 to you about that before and had some -- a little
12 guidance from the Commission that it would be good for
13 us to comment on things such as this. Look forward to
14 seeing that paper when it's available for us to see
15 it.

16 I guess we should ask if there are any
17 public comments? Maitri? Can you get the bridgeline
18 open?

19 We're going to open the bridgeline in a
20 second so if you're on the bridgeline, we'll ask you
21 to speak up and then if anyone has comments, they've
22 got a chance to do that.

23 CHAIR STETKAR: While we're waiting for
24 that, I guess the last point that Dennis mentioned, in
25 the last couple of Commission briefings we've had,

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1 received some feedback from the Commission about
2 timeliness of our input to the Commission on, you
3 know, relatively weighty issues and we take that to
4 heart and hope that, you know, we have a little bit
5 more time for interaction on these things and going
6 forward into the future.

7 It's I don't think good for the staff,
8 it's not good for ACRS to be caught in this position
9 or things go up and the Commission asks us, you know,
10 what our opinions are and then complains that they
11 hear about it late.

12 MEMBER BLEY: The bridgeline is now open
13 and I understand one party's on the bridgeline. If
14 you have any comments, please let us know at this
15 time.

16 MR. LEWIS: My name is Marvin Lewis,
17 member of the public.

18 MEMBER BLEY: Thank you, Marvin, do you
19 have any comments?

20 MR. LEWIS: I have a question. I just am
21 not getting PFR to and PFR Part 52 and nothing comes
22 back. So if you want to back fit, there's no guidance
23 in 10 CFR Part 50 or 52. I hope that somewhere in the
24 institutional memory there is some guidance there to
25 repair things.

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1 But let's go on. My second issue is the
2 obverse of what your statements are. You statements
3 are usually how do you correct -- how do you make sure
4 nothing gets through Part 50 or Part 52 unless it's
5 right?

6 CHAIR STETKAR: Marvin, we may have lost
7 you. If you can hear us, we'll give you a second to
8 see if we can reconnect with you.

9 MEMBER BLEY: Mr. Chairman, back to you.
10 We'll have to hear his comments offline, I think.

11 CHAIR STETKAR: Yes, we need to follow up
12 on that because it sounds like he was either cut off
13 or find out whether he hung up.

14 MR. LEWIS: I was cut off by the operator.

15 CHAIR STETKAR: You're back, okay, good.
16 Continue your comments. I don't know if you made any
17 --

18 MR. LEWIS: Well, what I'm trying to say
19 is, if there is a problem between the whole -- that
20 you've been describing, I would think there would be
21 a heck of a way or a very good indication for a
22 licensee seeing a way to save few bucks and think it
23 through.

24 MEMBER BLEY: Thank you for the comment.
25 I think -- Mr. Chairman, that finishes this segment,

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1 it's back to you.

2 CHAIR STETKAR: Great, thank you very much
3 and thanks to the public for the comments.

4 With that, because we do adhere to our
5 schedule here, we are recessed until 1:15.

6 (Whereupon, the above entitled matter went
7 off the record at 11:41 a.m. and resumed at 1:165
8 p.m.)

9 CHAIR STETKAR: We are back in session.

10 This afternoon we have what,
11 unfortunately, is I think two rare an opportunity.
12 We've had some discussions in the past but it's been
13 I think a couple of years or more to be able to have
14 a presentation from Nuclear Energy Institute and
15 hopefully a little productive dialogue to see what's
16 on your agenda these days, what you feel are important
17 issues going forward and hopefully we can have a
18 little bit of a dialogue.

19 And with out further ado, I'll turn it
20 over to Tony Pietrangelo of NEI. Tony?

21 MR. PIETRANGELO: Thank you, Mr. Chairman.
22 Good afternoon everybody.

23 Before I start the conversation, and I
24 really do hope it's a conversation here this
25 afternoon, I don't have any prepared slides. I think

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1 I learned a long time ago not put slides up in front
2 of the ACR.

3 MEMBER BLEY: Graham's not here. This is
4 your approach at plausible deniability, is that what
5 it is?

6 MR. PIETRANGELO: No, but first, I just
7 want to thank you for what you all do every month here
8 and that's provide the Commission with sound technical
9 and regulatory advice on the issues before them.

10 I think it's more important now more than
11 ever given we have some new Commissioners starting as
12 well as a lot of new staff at the agency. And I just
13 know the issues we work with the staff. A lot of
14 times, and I've got a pretty experienced staff at NEI
15 and we heavily leverage the industry for expertise on
16 a given issue in a given area.

17 But if you haven't worked in our industry
18 for -- or at the NRC and you're kind of new to the
19 whole endeavor of nuclear energy, it takes a while to
20 get up to speed with our culture, our technology, what
21 we do at the plants. And I think, you know, those are
22 the folks who are going to be before you or coming
23 before you. It's going to turn -- continue to turn
24 over.

25 So, the reviews you give these issues from

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1 a technical and regulatory perspective, I think is
2 just essential to getting a good product out of the
3 door to the Commission.

4 So gain, thanks for what you do for the
5 NRC and I think to help the entire enterprise go
6 forward in a safe and reliable manner.

7 This is good timing for me in that we just
8 had a senior management retreat at NEI. And we tried
9 to kind of look forward to do some strategic planning.

10 In the past I think we kind of fell into
11 a little bit of a trap and looking at what we did the
12 previous year when we went in to plan the next year.

13 This year, we did it differently. We went
14 out to 20/30 and started working backwards in five
15 year increments to see what do we really have to have
16 in place if the goals we had in mind for 2030, were
17 going to be attainable.

18 So when we look 20/30, why 20/30, why
19 20/30? Well, first of all, the first license renewal
20 from 40 to 60 plant expires in 2029. So, if we don't
21 do something you'll start to see base load nuclear
22 generation come offline.

23 2030 also happens to be the compliance
24 date and the EPA's 111(d) proposed rule making for
25 clean air and clean power emissions. So that's a very

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1 significant date for the entire electric utility
2 industry, let alone the nuclear industry.

3 So, what do we have to have in place? We
4 currently have roughly 20 percent of the generation in
5 the U.S. with about ten percent of the name plate, so
6 that's always been a good portion for us.

7 And what do we have to do to maintain
8 that? And, you know, you all are well aware we lost
9 several plants last year, Vermont Yankee's going to go
10 offline this year. Many of the units are in
11 competitive environments, so there's a lot of economic
12 stress on the units and in every plant that are
13 operating very, very well from our standards in terms
14 of safety or liability because the glut of low cost
15 natural gas, trying hard compete in some areas.

16 So, you know, we may lost a few more, we
17 hope not but what is it going to take to replace that
18 generation? Obviously the new plant activity at Watts
19 Bar 2, Vogtle and Summer are extremely important. I
20 think from our perspective if those projects are not
21 done, essentially on time and on budget, it's going to
22 be very difficult to get financing for a build out of
23 a second generation.

24 And so, there's a lot of different issues
25 that play on our ability to get to our goals in 2030.

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1 All right? So, we kind of worked backwards and what
2 I want to over is just some of the -- it's not every
3 priority issue we have but I think it's set of things
4 that we work with the NRC quite a bit that are very
5 important to us and I'll underscore that at the end
6 where I think there is an you can really help us in.

7 Let me start with Fukushima. I sent Ed
8 the letter we sent to the Commission on Tuesday, I
9 assume you've seen it. That's an extremely
10 significant issue for us and I tried to explain in
11 that letter how we got to where we are today? What
12 the thinking was on the industry side, how
13 interactions went with senior management, the NRC and
14 then the Commission.

15 Out of the box, I think we were very well
16 aligned on the Tier 1 activities which really are the
17 most important, both of them are really perspective,
18 we think.

19 And in terms of an answering the bell
20 perspective for our own credibility as a safe,
21 reliable industry.

22 So, we're well down that path now for its
23 implementation. All affordable equipment's been
24 bought both at the sites. We've stood up our two
25 National Response Centers in Phoenix and Memphis.

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1 So, we're really in the implementation
2 mode. So every site's going through modifications to
3 hook up their flex equipment, their mitigating
4 strategies. And in parallel with that, we've been
5 reevaluating the external hazards per the 50.54f
6 requests from the staff in March of 2012. For, you
7 know, beyond design basis external hazards.

8 And so, the first group of those came in
9 in March of 2013 another third of the plan, flooding
10 came in in March of 2013, another third came in this
11 year and the final third will come in in March of
12 2015. That's just on flooding.

13 With respect to seismic, all the Central
14 and Eastern United States plants submitted their
15 reevaluated seismic hazard, their GMRS for their sites
16 in March of this year. And the Western plants will
17 submit in March of 2015.

18 But we got the mitigating strategies order
19 in March of 2012. And in a perfect world it would
20 have been nice to have all those reevaluated external
21 hazards with us already in crafting the mitigating
22 strategies. We couldn't wait for all that work to be
23 done.

24 So, we made some assumptions, as the
25 letter explains and moved forward with implementation

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1 of mitigating strategies.

2 We're having a lot of interaction with the
3 staff on the disposition both of the mitigating
4 strategies as well as the reevaluated hazards.

5 We felt, though, now is the time though to
6 really step back for a moment and really, a lot of
7 these activities in Tier 1 were kind of siloed to a
8 certain extent when they were launched. But now is
9 the time to really bring those together to try to
10 complete the principle response to Fukushima.

11 And giving that the mitigating strategies
12 are for beyond design basis external hazards and you
13 have new information on the principle, too, seismic
14 and flooding. Now is the time to integrate that
15 information with mitigating strategy.

16 So, what we described in the letter is
17 kind of an assessment process to that that
18 information, review it against the mitigating
19 strategies and determine, if any, further actions are
20 needed. Either it's a revised strategy, a new
21 strategy for a specific hazard or if you're bounded
22 your current design basis then your assessment's quite
23 simple and that your mitigating Strategies aren't
24 affected.

25 So, we sent that to the Commission, we

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1 know there's a paper going up from the staff to the
2 Commission, specifically on the flooding hazard but we
3 think that this could apply to all the external
4 hazards, the assess process we laid out in this
5 letter.

6 So, we've been talking to the staff about
7 this since June, both on -- in each of the individual
8 areas and mitigating strategies and external hazards,
9 but as well as with at the steering committee level
10 and we meet about every two months.

11 We've stood up a Fukushima Response
12 Steering Committee the first month after the event in
13 March of 2011 and we've meeting regularly since then.
14 And there's a lot of activity obviously underneath
15 that steering Committee but I've got about a CNOs to
16 help us along with INPO and EPRI kind of guide the
17 industry actions going forward.

18 So, that's where we're at with that. To
19 me, it's extremely important -- we want to try to meet
20 this, I think the goal all along from the time the
21 orders were issued, but you try to complete the main
22 activities by the end of 2016.

23 And we will have implemented substantially
24 be complete with all the mitigating strategies order
25 implementation by 2016.

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1 Now, depending on what some of the
2 revisions do to the revised external hazards are, some
3 licensees may need additional time to refine their
4 implementation on the mitigating strategies. But for the
5 most part, we want to be able to say we're done in
6 2016.

7 I was a very young participant in the
8 industry back in the 80s when we were working on post-
9 TMI things and I think most of you will remember that
10 as well. That went on for quite some time.

11 I mean not just for five years, but ten
12 years, 15 years we were still a lot about post-TMI
13 actions. We don't want that to happen here. We want
14 to take the actions, get it complete and get Fukushima
15 behind us.

16 I think we've done a good job aligning
17 with the staff learning what the principle lessons
18 learned are and earn a position I think to implement
19 now and get this behind us as an industry and as a
20 regulator and move forward.

21 So, just let me stop there for a second
22 before I move on to the next one and ask if you have
23 any questions on our program.

24 MEMBER POWERS: Tony the recovery on
25 Fukushima is going to take a decade then what you're

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1 suggesting is, that nothing that's found in that
2 recovery is going to be pertinent to the improved
3 safety of the U.S. nuclear fleet. That's remarkable
4 prognostication.

5 MR. PIETRANGELO: That's not what I said
6 though, Dr. Powers, okay. I think we've got some
7 lessons learned, the principle lessons learned. If
8 you lose power and if you lose access to the ultimate
9 heat sink, I don't care what your design is, you're
10 ultimately going to melt fuel line.

11 MEMBER POWERS: I think we probably knew
12 that before the Fukushima.

13 MR. PIETRANGELO: Yes, but not as well.

14 MEMBER POWERS: I guess now we believe it.

15 MR. PIETRANGELO: I think the interaction
16 with the external hazard, the multiple unit aspect of
17 this has also been a principle lesson learned.

18 So, obviously, we're going to continue to
19 learn from the Japanese experience as they go through
20 the decommissioning effort at Fukushima. But the
21 principle lessons and the principle response, I think
22 are tied up in what we're currently doing in
23 implementation and that's what I'm referring to in the
24 letter we sent to the Commission.

25 We're always more as we go, but I think

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1 the main nuggets we needed to address promptly.

2 VICE CHAIR RAY: Tony, I read your letter
3 more than once and I --

4 MR. PIETRANGELO: I had a lot of help.

5 VICE CHAIR RAY: Huh?

6 MR. PIETRANGELO: I had a lot of help with
7 the letter.

8 VICE CHAIR RAY: And I have to ask, at
9 what point would the update of the external hazards,
10 if ever, result in a change in the design basis?

11 MR. PIETRANGELO: Great question. The
12 plants are designed, you can't move them around.
13 There may be some equipment that you make some
14 modification to if it's pertinent in Phase I of the
15 mitigating strategy as one you are relying on,
16 permanent plant equipment to cope, for example, with
17 batteries or diesels or whatever.

18 But for the most part, there isn't changes
19 to the design basis after the plant's been
20 established. These are licensing basis type changes
21 we're talking about.

22 VICE CHAIR RAY: Now, you know, I --

23 MR. PIETRANGELO: So these new data -- so
24 that's where we're at with this.

25 VICE CHAIR RAY: When you change the

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1 design basis of plants in the past, San Onofre 1 was
2 substantially changed. I thinking of things like
3 watertight doors and stuff like that if you're talking
4 about flooding. Not tearing the plant down and
5 rebuilding it again.

6 It just doesn't seem like there's any
7 space either for the plant or for the design of the
8 equipment that we're using to respond to beyond design
9 basis events for reflecting the ability to withstand
10 whatever these external hazards turn out to be.

11 And again, I'm just basing it on reading
12 the letter carefully.

13 MR. PIETRANGELO: Right.

14 VICE CHAIR RAY: I may be misinterpreting
15 it.

16 MR. PIETRANGELO: No, we really do not
17 think there will be substantive changes to any pieces
18 of the design bases. Given this is new methodologies
19 used for reevaluation of the external hazards.

20 But it goes into the licensing basis of
21 the facility. That's a living kind of current
22 licensing basis that it's described in --

23 VICE CHAIR RAY: I understand.

24 MR. PIETRANGELO: -- the regulations and
25 there's no such thing as current design basis defined

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1 in the regulations.

2 VICE CHAIR RAY: Yes, but --

3 MEMBER RICCARDELLA: I guess the concern
4 is, you know, roughly a third of the CS plants are
5 going to have new ground motion response specter that
6 are higher than they're quote, design basis.

7 MR. PIETRANGELO: Yes, yes.

8 MEMBER RICCARDELLA: In your opinion does
9 that require a license amendment?

10 MR. PIETRANGELO: No.

11 MEMBER RICCARDELLA: So you just update --
12 you can update that licensing basis without a license
13 amendment?

14 VOICE CHAIR RAY: No, it's beyond design
15 basis event I think is what Tony's saying.

16 MR. PIETRANGELO: Yes, there's already a
17 request into each licensee to update their ground
18 motion response specter.

19 MEMBER RICCARDELLA: Right.

20 MR. PIETRANGELO: And you're correct,
21 about a third of those are higher. They're going to
22 do additional analysis and for the most part, the
23 group one is seismic PRAs and that information will be
24 used to disposition any changes they make to the
25 facility.

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1 Depending on the risk significance or the
2 margins they have established at the plants for that
3 ground motion response specter, there could be a suite
4 of changes, physical mods made to the plant.

5 I'll give you a great example. For PWRs,
6 a lot of the condensate storage tanks or just the
7 water source for your turbine-driven auxiliary
8 feedwater pump if you lost power, a bay is non-safety
9 related. So it may not be qualified for that level of
10 ground motion and you may have to add stiffeners to
11 the tank in order to weather the storm, if you will
12 from that seismic event.

13 So, there could be changes and you would
14 update that into the licensing basis of the facility.

15 MEMBER RICCARDELLA: But that's -- in your
16 opinion, it doesn't require a license notice?

17 MR. PIETRANGELO: I think there's a
18 response to the 50.54f letter, there's additional
19 studies that are done then there are either proposed
20 changes by the licensee to the NRC then go through
21 their 50.59 process to see whether a license amendment
22 is required.

23 If that either changes an existing tech
24 spec or creates something new under the criteria, then
25 a license amendment would be submitted. But if not,

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1 I think they just go ahead and do it and they provide
2 the report to the NRC.

3 MEMBER RICCARDELLA: Isn't this kind of
4 what's at issue at Diablo Canyon right now on the
5 seismic issue? You know, they've done the technical
6 mods that they feel and they feel they're updated
7 design -- currently licensing basis is the higher
8 ground motions and if they're got the new ones
9 covered.

10 But some groups are arguing that no, that
11 you're licensing basis point is .4g, it's not .75g and
12 you've never come through with license amendment.

13 I think the whole this at issue is whether
14 a license amendment is required or not.

15 MR. PIETRANGELO: My understanding is what
16 the new information was already bounded by their old
17 information. Therefore, why do you need licensing
18 amendment?

19 MEMBER RICCARDELLA: But the old
20 information, but they never updated the license for
21 the old information, for the Hosgri fault, okay. The
22 license is based on the .4g not on the .75g Hosgri
23 fault.

24 I'm not giving an opinion one way or the
25 other, I'm just saying I think that's what is at

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1 issue.

2 MR. PIETRANGELO: And I'm not familiar
3 specifically with what the licensing basis of Diablo
4 Canyon is to that level. But I do know that the new
5 information they have to be bounded by the rule.

6 MEMBER RICCARDELLA: It's bounded by old
7 information, but that old information was never
8 formerly incorporated into the license. And that same
9 situation would exist for this one-third of the CS
10 plants. The same question would exist.

11 MEMBER CORRADINI: What -- can take it a
12 little direction which is the observation, at least
13 from Fukushima knew is it's interesting the RCIC pumps
14 worked way beyond their design base.

15 Where does NEI stand characterize that or
16 better understand relative to as a margin here for
17 current plants? Because to me, I would take that and
18 I say very interesting, I'd like to know more about it
19 so I could use that in some sort of, we'll call it
20 defense in depth beyond the design base and also
21 curiosity about would the same would occur with the
22 aux feed?

23 MR. PIETRANGELO: Yes, the assumptions we
24 had to make of the initial conditions for the
25 mitigating strategies and I think the letter spells

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1 this out, you couldn't assume any normal or emergency
2 AC power nor any access to the ultimate heat sink
3 source. All right? Because we didn't have the
4 reevaluated external hazard information.

5 When you go back in now with specific
6 hazard information, you can see what the actual impact
7 is on specific plant equipment for a specific hazard.
8 All right?

9 So, I think you'll pick up where we have
10 margin. We don't have to assume at time zero we lost
11 everything that this diesel sits up higher than where
12 the new reevaluated hazard flood level is and we would
13 take credit for it in that circumstance.

14 With RCIC, I think that's one of the
15 things Dana referred to was trying to understand
16 better over time --

17 MEMBER CORRADINI: Well, I think that's
18 what I was kind of going to launch up of what Dana
19 started with in this area.

20 CHAIR STETKAR: Let me try another thing,
21 though, because this affects a little bit of the, I
22 think, time sensitivity to this desire to say we won
23 the war at the end of 2016. And I'll use your
24 condensate storage tank as an example because it's
25 better than the one I had.

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1 Perhaps now a particular applicant wants
2 to include that condensate storage tank as part of the
3 mitigating strategies because it's a nice tank of
4 water. But it's not safety related, they need to
5 upgrade that tank.

6 I've heard that because the current
7 requirements just say to the design basis earthquake
8 that they're upgrading the tank to, pick a number,
9 .15g because that's currently my design basis
10 earthquake.

11 So, they got to spend a bunch of money and
12 upgrade it to .15g because that's all they're required
13 to. Reevaluated seismic hazard says that the expected
14 ground motion at a ten to the minus four recurrence
15 interval is not .15g, it's .3g. But they're not going
16 to upgrade it to .3g, they're only going to upgrade it
17 to 1.5g. How do you answer that?

18 MR. PIETRANGELO: You answer it, anytime
19 you get new information as a licensee, we do what we
20 always do. You evaluate the information to determine
21 whether it's significant or not or whether you need to
22 make a change to your facility. Right?

23 CHAR STETKAR: But because --

24 MR. PIETRANGELO: In other words,
25 Fukushima or not, in the process of updating the

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1 ground motion response specter before Fukushima
2 occurred. Right?

3 MEMBER RICCARDELLA: I don't think your
4 letter, as I read it, implied that you would design
5 the stuff for .15g. I think the --

6 MR. PIETRANGELO: Oh, yes.

7 MEMBER RICCARDELLA: -- the letter
8 implied you do it to .3g in that case.

9 CHAIR STETKAR: Not clear.

10 MEMBER CORRADINI: I think my point --
11 John's point is timing and iteration.

12 CHAIR STETKAR: My point is there are
13 people who are actually making decisions today to meet
14 that 2016 we won the war declaration that are saying
15 all we understand is that we're required to upgrade
16 this tank. We're going to spend real capital to
17 upgrade this tank to .15g because that's our
18 understanding of the design basis seismic motion.

19 When you question those people saying
20 well, you're reevaluated seismic hazard may be
21 considerable higher than that. They say yes, we know
22 that, but all we're required to do right now is this
23 and we'll work through it later when everything shakes
24 out.

25 And the concern is that becomes

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1 entrenched, there is then resistance to say that I
2 want to spend a lot more capital.

3 VICE CHAIR RAY: Well, wait a minute, wait
4 a minute. You referred to letter, let's just read
5 what the letter says.

6 Companies, and by the way, congratulates
7 on referring to companies instead of utilities. Very
8 set powers.

9 MR. PIETRANGELO: Someone else changed it
10 to companies.

11 CIVE CHAIR RAY: Listen, I had your
12 appearance about utilities all the time, or not
13 utilities, but anyway. Companies would use the
14 facilities design basis for external hazards in
15 developing a mitigating strategies.

16 For example, connections, storage
17 locations, et cetera, recognizing that these
18 assumptions and strategies may not provide the optimum
19 plant specific response in consideration of the
20 revised hazard information.

21 Okay, now, I think that's saying that
22 we're going to use the design bases to design -- the
23 design bases for equipment that I used for mitigating
24 beyond design basis events.

25 MR. PIETRANGELO: That piece has more to

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1 do with connection to safety related systems, to the
2 storage locations for where you put the Phase II
3 portable equipment.

4 VICE CHAIR RAY: Well, how does -- it just
5 says, for example four connections towards locations,
6 et cetera.

7 MR. PIETRANGELO: Right, right.

8 VICE CHAIR RAY: So, I'm not sure what
9 you're talking about, I guess. But, it does seem to
10 me like it would apply to the equipment itself, the
11 generators, the pumps and so on.

12 MEMBER SCHULTZ: There's significant
13 clarity that needs to be established to be established
14 in the next month or two associated with mitigating
15 strategies and this is a good example, I think, of one
16 area.

17 The staff is also struggling the same type
18 of issues and over the next four weeks, we have, as
19 you know, the Fukushima subcommittee meets with the
20 industry for two days and with the staff as part of
21 that and other people will be -- and the members of
22 the public will be attending that meeting.

23 And then we have more information of
24 mitigating strategies, none of which we've officially
25 received from the staff yet. So, we -- but all of

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1 these issues appear to be focused on assuring that we
2 do come up with a very good common understanding of
3 what we mean when we say how we're going to -- we are
4 going to respond. By that I mean the NRC, the
5 industry, the companies and the overall process.

6 And I don't think we're there yet and I
7 think it goes back to John's statement if we try to
8 rush too quickly and get things done by the end of
9 2016, we're going to get ourselves in a little bit of
10 a ball of wax.

11 MR. PIETRANGELO: Let me see if I can
12 explain it better.

13 I wouldn't read too much into that initial
14 statement because that's all we could do in 2012.
15 That's all we had and you couldn't just sit and wait
16 for the revised hazard information.

17 MEMBER SCHULTZ: And that's what we're
18 dealing with, too. There's a history here and people
19 tried to write thing as carefully as they could with
20 the intention. And there have been certainly
21 instances in the industry in the past where we have
22 looked back and taken a advantage of wording in
23 paragraphs and moved in the wrong direction.

24 MR. PIETRANGELO: Yes, and that --

25 MEMBER SCHULTZ: And we must be careful of

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1 not doing that here.

2 MR. PIETRANGELO: Well, that's why we
3 communicate on a biweekly basis with all the CNOs in
4 the industry on not only this topic but other
5 regulatory issues, obviously.

6 But you can't pass -- I don't the red-face
7 test when you get new information in later on a
8 mitigating strategy for beyond design basis external
9 hazard when you've got new information. You need to
10 evaluate it and you may need to revise your strategy.

11 All we're saying it was in 2012, we didn't
12 have that information. We had to make progress, we
13 had to move forward with it.

14 Also, look what the staff conclusions were
15 and our own conclusions were after Fukushima. We
16 still had reasonable assurance of safe, reliable
17 operation. We still yet to have a loss of all AC
18 power and external or ultimate heat sink from an
19 external hazard in our history in almost 4,000 reactor
20 years of operating experience.

21 So, we don't think this particularly
22 likely. We're adding another level whether it's
23 designed to the design basis or tweaked later with
24 revised information, we've still got another layer of
25 defense and depth to deal with the unknown. Right?

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1 And, you know, I think this differs from
2 maybe some of our international colleagues and how
3 they're treating this problem. You know, you see a
4 lot and I see it in, you know, we've been to Japan
5 several times. The focus is on, you know, design
6 changes to deal with the lessons learned from
7 Fukushima.

8 Ours is very much an operational response
9 here in the U.S. because we don't think that you can
10 design for every potential circumstance that gets you
11 into the loss of all AC power and loss of the ultimate
12 heat sink.

13 Really what this does principally, is
14 provide very skilled trained operators with additional
15 capacity to deal with some of these things. Because
16 if put in a bunkered control system in some criteria
17 like the French are planning to do, how do I know I'm
18 not going to get something bigger than whatever they
19 design to beyond the design basis.

20 I think I've got a --

21 VICE CHAIR RAY: Well, that is a
22 persuasive argument to me, but how do we develop
23 confidence long term in the operational response? I
24 mean we can have confidence in a design that's 10, 20,
25 30 years old because it is what it is.

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1 But, if we're talking about truly
2 mitigating satisfactorily sufficiently, a beyond
3 design basis event through operational techniques.

4 Where do we get that confidence that we
5 need that, okay, we've got that in place and what'll
6 be lasting.

7 MR. PIETRANGELO: I derive confidence from
8 knowing that the initial conditions are assumptions
9 for the mitigating strategies we've put in place were
10 very, very conservative.

11 Now, I get a real event where I don't have
12 to assume I lost all AC power and lost the ultimate
13 heat sink, I've got all my permanent plan equipment
14 plus what I put in place for mitigating strategies to
15 deal with that specific hazard. So, that's where we
16 get the confidence from. It is additional defense in
17 depth to deal with these situations.

18 VICE CHAIR RAY: Well, I would, you know,
19 it might be easier in some circumstances to make a
20 design change and be done with it.

21 MR. PIETRANGELO: And design changes are
22 being made. If I know that -- you know, let me give
23 you a different example.

24 Palo Verde crossties all their diesels
25 from Units 3 and 2 and 1, so you can get power,

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1 emergency AC power from any of the units. They could
2 not take credit for that in the initial conditions for
3 flex.

4 Indian Point has another diesel that's 50
5 foot higher than where their EDGs are. They could not
6 take credit for that in flex.

7 If I get a -- now, if I get to a point
8 where I've got the reevaluated hazard and I'm looking
9 at this again, I'm not starting at the initial
10 conditions, I'm starting with the whole plant.

11 So I think we've got tons of margin when
12 you consider all the things we have in the permanent
13 plant, additional design changes we're making either
14 crossties or flood seals on diesel doors or batteries
15 or whatever, to give us more confidence than we had
16 even previously.

17 VICE CHAIR RAY: Well, I'm talking too
18 much, so I'll quit. But the point is, I guess, that
19 a concern at least that I have, just speaking for
20 myself, is that we too easily rely on operational
21 response when there are design changes that are
22 simple, not terribly expensive, not more expensive --

23 MR. PIETRANGELO: And licensing will make
24 those, Harold, you know that.

25 VICE CHAIR RAY: What's that?

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1 MR. PIETRANGELO: We like margin, okay.
2 We like regulatory margin even more that regulatory --

3 VICE CHAIR RAY: But we don't seem to
4 acknowledge that anymore.

5 MR. PIETRANGELO: No, no, but I think it's
6 implicit and I remember back to when we revised the
7 reactor oversight process to add the mitigating system
8 performance index which dealt with reliability and
9 availability of key equipment.

10 We had people do diesels to gain margin on
11 the AC power piece of MSPI.

12 VICE CHAIR RAY: I did it.

13 MR. PIETRANGELO: There you go, so and
14 they didn't order you to do it, you just did it
15 because you wanted more margin.

16 Well, if there's a simple, easy fix, all
17 right, that doesn't cost a lot, don't do it because
18 they'll gain regulatory margin.

19 And if the staff will review the
20 disposition of all these assessments, if they think
21 they need to backfit somebody, that's in their purview
22 to do that. So, I think the system's in place to make
23 sure that this works properly.

24 But again, when you look at the backdrop
25 of all this, we feel very confident that we're adding

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1 an additional layer of protection. We've giving very
2 skilled operators another set of options.

3 One last thing, I don't if we talked to
4 this group about it not, when we took all the CNOs to
5 Japan to Fukushima, we also visited the Daini site.
6 Okay? It's the site nobody hears anything about.
7 They have one electrical offsite power line left and
8 were able, in the course of 30 hours, to string about
9 nine kilometers of cable and restore core cooling
10 back, a la flex, okay, with no preplanning, not
11 forethought and they did it and they were fortunate
12 that their plant manager or sit superintendent, you
13 know, knew where all the stuff was and really drove
14 the effort.

15 So the leadership, a lot of the softer
16 human factors, pieces of this, training, command and
17 control, you know, it's not all design -- that's my
18 point, it's not all design changes that are the proper
19 response to Fukushima and I think, given what we saw
20 also at Daini, we even added confidence that our
21 strategy was the right one for this and respondents.

22 HAIR STETKAR: That was number one.

23 MR. PIETRANGELO: That's number one. Glad
24 I didn't have any slides.

25 MEMBER SCHULTZ: I can see you've got a

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1 long list.

2 MR. PIETRANGELO: Okay, number two, and I
3 think you had some presentations earlier this week
4 from pilots on we call it cumulative impact, the
5 regulatory prioritization initiative, very, very
6 important, strategic importance as well because
7 ultimately, and I've said this in many different
8 forms, we're all very passionate about nuclear,
9 nuclear safety, nuclear technology. Most of us have,
10 you know, worked our entire careers in this field but
11 it's not a religion, it's a business and if you're not
12 profitable, you're going to go out of business and
13 we've seen that happen in the last year or two.

14 So, this cumulative impact is really
15 talking about making sure that we keep our eye on the
16 ball with safety and reliability and try to reduce
17 some of the undue burden, if you will, or even through
18 scheduling or deferral of certain activities, making
19 sure that the most safety significant things get done
20 first and are prioritized appropriately including both
21 regulatory requirements and licensee actions.

22 I mean we're going to talk about
23 subsequent license renewal in a second and long term
24 asset management to go from 60 to 80 years. But you
25 can't do that unless you're taking care of the

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1 equipment that you currently have.

2 And so, a lot of that has very high safety
3 benefit and reliability benefit to the enterprise. So
4 does every regulatory requirement go to the top of the
5 prioritization list or is there some process you can
6 use to appropriately categorize and prioritize those
7 activities in a way where it's a win-win, safety
8 benefits and you have a less burden on the plant
9 operators.

10 So, that's really what that portion of the
11 cumulative impact effort is about. It's integrated
12 scheduling based on that prioritization process.

13 There's a second piece of it and we'll
14 call it -- a lot of folks -- my entire division works
15 on some aspect of this and is trying to make sure that
16 we do things in the most efficient and effective way
17 in terms of implementing regulatory requirements.

18 So, we're looking at changes in some of
19 the ROP, Reactor Oversight Process activities whether
20 substance crosscutting issues or the threshold for
21 going from column two to column three.

22 We've got some history, some data now that
23 we can use as part of the ROP enhancement project that
24 the NRC initiated to go back and look at some of these
25 things to make sure we're still getting the right bang

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1 for the buck.

2 Another one's the component design basis
3 inspection. It's a team inspection, takes two to
4 three weeks at each site, very resource intensive. We
5 went back and looked at the data over the last several
6 cycles and there's, you know, very few greater-than-
7 green findings out of, you know, 800 odd findings.

8 And so, are you really getting, you know,
9 what you want to out of those inspections or should
10 they be better focused, let's say, on things you to do
11 for a subsequent license renewal.

12 Long live passive components that don't
13 get as much inspection or things that are now
14 obsolete, you can't go back to the original OEM and
15 replace it, you've got to put something new in, maybe
16 the inspection should be focused on making sure you
17 did the right engineering and review of design mods to
18 the plant.

19 So, it's suggesting that we switch the
20 focus to make sure we're getting the right bang for
21 the buck there from both the safety and an operator
22 focus standpoint.

23 MEMBER CORRADINI: What's the vehicle that
24 you are advocating to do that then?

25 MR. PIETRANGELO: Currently, the vehicles

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1 are, if it's a commitment you made to a certain Reg
2 Guide or other commitments you made on the docket, you
3 can change that commitment unilaterally with the NRC,
4 but you have to notify the NRC.

5 This process that we're trying to -- well
6 we've piloted it and now we're finalizing the guidance
7 on, hopefully, we'll get endorsed by the NRC, I think
8 gives a more consistent basis for that type of a
9 change.

10 Now, there's other changes like you need
11 a license amendment for but the same principle
12 applies. If you went through this process that the
13 NRC's reviewed in the pilot, reviewed the guidance and
14 endorsed the whole process, it should make the part,
15 it should make the path towards implementing the
16 change easier for you or exemption.

17 You know, there's only so many, I think,
18 you know, you can't defer this thing out to 20.75,
19 okay. At a certain point, say this is really not
20 safety significant for my plant and I don't think I
21 need to do this.

22 And let me give credit where credit is due
23 here. Before they left, Commissioners Apostolakis and
24 Magwood came to us and said, you know, we broad-
25 brushed a lot these requirements generically. We know

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1 the site risks are different, the designs are
2 different, the environmental hazards are different and
3 they don't all cut the same way at each of the plants,
4 shouldn't we allow a process that allows those plant
5 specific differences to be taken into account for
6 implementation.

7 And I want to make sure we have that
8 principle going forward, and even bring some of the
9 same process maybe up front into the generic
10 prioritizations of some of these issues.

11 MEMBER CORRADINI: Was part of that,
12 though, a PRA so you know how to risk --

13 MR. PIETRANGELO: Can be? That's the
14 right context for it.

15 MEMBER CORRADINI: Okay.

16 MR. PIETRANGELO: I believe --

17 MEMBER CORRADINI: Because that's where I
18 was hoping you'd go so you went there.

19 MR. PIETRANGELO: Yes, that's proper
20 context. Right? We already have very good levels, we
21 sent in something to the staff, I think this time last
22 year, kind of an inventory of where everybody's PRAs
23 were across the industry. I hope you all got a copy
24 of that.

25 MEMBER CORRADINI: It was last December.

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1 MR. PIETRANGELO: Yes. So, we know whose
2 got what, who's been peer reviewed to what level. And
3 so, you know, voluntarily there's no requirements for
4 a PRA, voluntarily we've done extensive work in our
5 industry to improve our state of knowledge with PRAs
6 and without a regulatory requirement.

7 So, it bothered then Commissioner
8 Apostolakis that new plants had a requirement to do
9 PRAs and existing plants didn't. It doesn't bother
10 me, I mean we have -- we do have plants -- we do have
11 PRAs for current plants. Okay?

12 And I argued until the very end with
13 Commissioner McGaffigan on the need for that
14 requirement at the time. I didn't think there had to
15 be a regulatory requirement, we were already doing it.

16 And it's not the tool you regulate, it's
17 the outcome you want to regulate and PRA is always in
18 my view, been a very good tool to combine plant
19 experience, operating experience and a comprehensive
20 way to see the system interactions. So, we're very
21 much in favor of that and I think, again, this
22 regulatory prioritization initiative is the proper
23 context to consider the scope of the PRA you use to do
24 that prioritization and the insights you get from it.

25 MEMBER SCHULTZ: Do you see the benefit

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1 coming from that sufficient to move the industry
2 further into utilization of risk methodology?

3 MR. PIETRANGELO: One of the things I've
4 bot Mr. Butler working on is a lessons learned paper
5 from the pilot that says what is the value proposition
6 for this. Okay?

7 So, I think every CNO is going to want to
8 know the answer to that before they invest further in
9 the process. So, we're going to tee that up probably
10 in December. We look forward -- I think the staff's
11 SECY is due to the Commission in March and hopefully
12 by this time next year we've got several plants
13 implementing this.

14 Okay, I mentioned subsequent license
15 renewal before and the reason that's so important to
16 us, obviously, the build-out or nuclear renaissance
17 didn't happen the way, you know, a lot of people
18 prognosticated it to happen back in the mid-2000s and
19 for obvious reasons.

20 So, we've got, you know, five new units
21 under construction and hopefully Watts Bar 2 at this
22 time next year will be very close to being commercial.

23 But we're not going to replace as quickly
24 as we thought. And, again, as I said before, unless
25 these first few projects are very successful in terms

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1 of budget schedule.

2 The other thing I think is essential to a
3 second generation is our industry needs to learn how
4 standardize better. We were lousy at it the first
5 generation. There's hardly any plant in the country
6 that's a model or a replica of another one. So we've
7 got 100 units out there that are all different. And
8 my boss likes to say only in the United States can you
9 say, yes, we're for standardization, you've got six
10 different designs going through the design
11 certification. Okay?

12 Some, that's okay, we're competitive but
13 -- so that's going to be slow. So, it puts more of a
14 emphasis on, you know, what do when you get to the end
15 of 60? And can you go to 80?

16 And so, we've been engaged with EPRI, with
17 DOE, with NRC RES, I'm trying to make sure that we
18 have a technical basis first to be able to make a case
19 to go from 60 to 80.

20 And I remember back to, you know, we
21 didn't do the first license renewals. We wouldn't
22 have gotten the first license renewals done had we not
23 started in the early '80s with the same kind of
24 research. So, we've got some catching up to do, we're
25 actually, I think a little behind that schedule.

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1 I was very pleased to see the Commission's
2 decision on -- that they didn't think rule making was
3 necessary for Part 54, that the current framework
4 would work for going from 60 to 80. You know, we
5 still had 27-odd units who hadn't gone through the
6 first renewal yet. Had you opened the rule at that
7 point, we were worried about the stability in process
8 for those units because it's only one rule.

9 So, we're moving forward with that. A
10 couple of new renewed licenses have been issued since
11 the continued storage decision was made. I think
12 there's several others in the pipeline now. We will
13 not rest on 40 to 60 until everybody who wants license
14 renewal, you know, is through that process.

15 But 60 to 80 is upon us. It'll be when we
16 hit, you know 2019, it'll be only ten years before the
17 next license will expire and so we want to make sure
18 we have the technical bases in place. We've got some
19 lead plants, we've got tremendous interest in the
20 industry on this kind of asset preservation at the CEO
21 level.

22 I think they all recognize that, you know,
23 it's going to be very difficult in certain markets to
24 put new generation in place. No matter what it,
25 nuclear, fossil. So, you know, being able to extend

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1 the lives of these assets and sustain them is very,
2 very important.

3 So, we didn't have any trouble getting
4 lead plants for this activity. And so, we think the
5 first application is probably going to go in probably
6 in '17 or '18 and we're doing all the spadework now to
7 be ready for that. So, very, very important.

8 New plants, we talked a little bit about
9 and I don't know if I need to say too much more about
10 those.

11 Part 52 has been a steep learning curve.
12 You know, we got through the initial, you know, design
13 certification and issuance of the COLs on Vogtle and
14 Summer. It wasn't the ideal process that was imagined
15 when, you know, Part 52 was put in place where you
16 bank a site, you had a design certification on the
17 shelf, you took your site, you took your design,
18 plopped it in there, go through the process in two
19 years.

20 A lot of this was being done in parallel
21 with early site permits and some didn't even have an
22 early site permit, SCANA didn't Vogtle.

23 So, we really haven't tested the complete
24 efficiency of the process, if you will, with these
25 first couple that are being built. But we did get

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1 through the COL process. Now, all the attention turns
2 to, you know, can you get these safely and reliably
3 constructed? Can we, as an industry, demonstrate --
4 I think we've demonstrated we can operate the plant
5 safely and reliably? Can we license and construct
6 them equally safely and reliably?

7 So, as I said, we're on a steep learning
8 curve. We're concerned about change process for new
9 plants, it's Tier 2* category that was kind of
10 invented, you know, in the middle of that entire
11 process that you still need amendments for certain
12 things that really didn't raise to the level of, you
13 know, tech spec or a Tier 1 requirement, yet it was
14 kind of, you know, additional information on a drawing
15 or whatever that you make a change to that and they
16 think, oh, we have to -- we need a license amendment
17 for that? And that really bogs the system down.

18 I mean we've tried to put processes in
19 place to deal with those expeditiously but still, in
20 a build out scenario and they're not even to the
21 systems part of this yet, it's still mainly the civil
22 elements in this.

23 If there's things that change that have
24 absolutely no safety significance and we're submitting
25 license amendments on those kinds of things, that's

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1 troubling because diverts attention from what you
2 really should be focusing on.

3 So, I think Southern has taken the lead on
4 this in submitting an amendment and exemption to try
5 to use some criteria to evaluate Tier 2* information
6 for whether you need an amendment or not. That's
7 going through the process.

8 I think the subsequent plants are trying
9 to take Tier 2* out of play. It's either Tier 1 or
10 Tier 2, okay, and make it that clear. But I think it
11 will bear on the schedule as well as the cost of these
12 new units if this process doesn't work well.

13 The other element of new plants is small
14 modular reactors. I think it's pretty clear now that
15 it's difficult if not impossible to build a big plant
16 in a competitive market. You know, you just can't
17 wait 11 years of 12 years and get a return on the
18 investment, nobody's going to bet their company on
19 that.

20 And one of the primary reasons that the
21 projects in Georgia and South Carolina are moving
22 forward is because they were able to recover
23 construction work in progress, so that makes it. And
24 they've got public service commissions that I think
25 recognize all the value attributes that those plants

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1 have. Whereas, the competitive markets right now
2 don't and we're trying to do something about that but
3 it's very, very tough to do, we don't have a lot of
4 control over that.

5 So, small modular reactors could be a
6 potential solution to that and that the financing of
7 a module by modules incremental. But there's
8 regulatory issues that have to be determined. How do
9 you meet the same -- basically the same requirements
10 with a small modular reactor.

11 From an NEI perspective, we're trying to
12 address some of the generic issues that every small
13 modular reactor design would have to address as our
14 way of adding value to that.

15 But I think at the end of the day, we've
16 got to demonstrate that you can overcome the economy
17 of scale that a big plant has with small modular
18 reactors and it'll be about not what the -- perhaps
19 the building cost is but what the ultimate cost of
20 electricity is from those small modular reactors.

21 So, very, very important, you know, and
22 that's -- think we're looking probably in the 2020s
23 for those hopefully to start coming online.

24 The last thing I wanted to touch on then
25 we'll just open it up for any questions, to me, it's

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1 a common element of at least four of the five things
2 I talked about that I don't see happening in the right
3 way today is digital instrumentation and control.

4 We're still basically using the same
5 technology from 40 or 50 years ago and I don't know
6 how you go from 60 to 80 years or how you reduce the
7 number of operators in the control room in a small
8 modular reactor without a much heavier reliance on
9 digital instrumentation and control.

10 I don't know how you leverage -- if we
11 can't use this better today as a way of reducing costs
12 at the plants. You know, online surveillances, all
13 the data, all the benefits you get from the
14 technology, we're not getting. Okay? That's a reason
15 why we're -- from a cost, you know, competitive
16 standpoint, we're like playing with two hands tied
17 behind our back because every fossil unit practically
18 has digital built into it now.

19 So, to me, this is something that is
20 strategic for us. We're kind of doing an assessment
21 right now of what's in play. We've got several
22 vendors who are going to help us with this, EPRI and
23 I'm going -- and I've told this to the new director of
24 NRR, Bill Dean, that, you know, I would like to work
25 with the staff and find a way to kind of cut through

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1 this because we should be much further along than we
2 are on digital I&C than we are now.

3 MEMBER CORRADINI: You're looking for
4 replace -- I don't completely appreciate.

5 MEMBER REMPE: Replace a partial upgrades.

6 MR. PIETRANGELO: We do partial upgrades,
7 I'm talking replace. You know, these components are
8 getting harder and harder to replace for really
9 generic --

10 MEMBER SKILLMAN: And there are plants
11 that have done full replacements. They've done it and
12 new RPS, new ESAS, and we know how to do it.

13 MEMBER BLEY: But some of the things you
14 mentioned, Charlie's talked to us about and you see
15 out in other industries where you can actually
16 dynamically adjust operating limits and some safety
17 limits based on cooling water temperatures, you know,
18 condensate temperatures, things like that, a whole
19 variety of things and we're doing none of that
20 anywhere that I know of.

21 MR. PIETRANGELO: So, to me at this --
22 we've got to think big about this one because a lot of
23 these priorities are strategic priorities I talked
24 about, I don't see how you get there without a much
25 greater reliance in a digital technology.

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1 MEMBER BROWN: Which priorities
2 explicitly, what do you think it's going to bring to
3 the table other than better data recording, logging of
4 information, if something trips, you find out what the
5 precursor data was the postcursor data was and all
6 that of kind. What do you think's going to come?

7 MR. PIETRANGELO: I think --

8 MEMBER BROWN: You've got to have an idea
9 of what you're going to do with it otherwise you're
10 just putting something in to just do what the other
11 stuff did. You've got to look and see what's going to
12 be valuable to your plant and if you --

13 MR. PIETRANGELO: I totally --

14 MEMBER BROWN: Otherwise, you're going to
15 spend a lot of money and you've got make sure you
16 understand what that investment's going to buy you.

17 MR. PIETRANGELO: Yes, so there's got to
18 be a value proposition, you're absolutely right.

19 MEMBER BROWN: Yes, and what Dennis was
20 talking about, if it enhances your ability to operate
21 the plant in a degraded condition or to protect the
22 plant in a degraded condition, that's one thing.

23 I mean if you're not like a naval platform
24 where you're out in the middle of the ocean somewhere
25 or underwater, you don't shut down the reactor because

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1 you have a few things that go whacko on you. You
2 can't do that with these plants.

3 MR. PIETRANGELO: But it just, to me,
4 there's an order of magnitude difference in the level
5 of monitoring you can do on the health of the systems
6 --

7 MEMBER BROWN: That's absolutely true, but
8 you've got to figure out what that is and how it's
9 going to benefit you in terms of your operations.

10 MR. PIETRANGELO: Yes, so as part of this
11 effort, I think we have to exactly what you're saying
12 is what's the value proposition? Does it buy me more
13 than the analog currently does? The maintenance I do
14 to that analog, the reengineering I do for components
15 that are obsolete. Am I going to be able to do the
16 same thing 20 years from now?

17 MEMBER BROWN: Well, just a minute, if you
18 think you're components in the digital world are not
19 going to go obsolete, you're going to have boxes that
20 you --

21 MR. PIETRANGELO: I understand.

22 MEMBER BROWN: I mean just look at your
23 smartphone, right?

24 MR. PIETRANGELO: Right.

25 MEMBER BROWN: Every year you get a new

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1 one.

2 MR. PIETRANGELO: But, you know what --

3 MEMBER BROWN: And the microprocessors
4 disappear, I mean those are new every three or four
5 years, you get a new one.

6 But, there's things you have to deal with
7 that you're going do if you're looking at them on a
8 failure. Now, my personal opinion is they don't fail
9 as often and the adjustments are easy, there's no
10 knobs to tweak and stuff like that. That's where your
11 alignments calibrations, your ability to not have to
12 take stuff out of service to align it. You can do a
13 lot of stuff with that.

14 The diagnostics help you a lot in terms of
15 judging its health.

16 MR. PIETRANGELO: You sound like a
17 commercial for digital technology.

18 MEMBER BROWN: Always do.

19 MEMBER CORRADINI: That's today, try
20 tomorrow.

21 MEMBER BROWN: I haven't even gotten
22 started.

23 MEMBER CORRADINI: No, that's great.

24 CHAIR STETKAR: But Charlie, if somebody
25 brings you that box and characterizes it as it's sort

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1 of a box and trust it do all the good stuff that you
2 want it to do.

3 MEMBER BROWN: No, no, no. But that you
4 don't get lost in the viewpoint that these things are
5 not going to be reviewed. There are the initial
6 entries on this stuff were when I first got here six
7 and a half years ago and one of the new plants were
8 going to look --

9 At my first subcommittee meeting, I had
10 been here for two months and they walked in and said
11 here's our designs. It was parameter, you know,
12 detectors, a box, I&C, trip signal, that was it.
13 Nothing else, I mean literally there was nothing -- it
14 was like sucking blood out of rocks to get enough
15 detail to understand you're going to have
16 independence, deterministic processing and look at
17 control of access. What you going to for hackers?

18 MEMBER BLEY: Well, if you're going think
19 big about this, I don't know if you can with all the
20 vendors and different indices around but I think
21 Charlie knows this about what they did in the Navy,
22 they tailored the stuff to what they needed.

23 So, when they built a protection system,
24 it's simple, which it can be, but if we're buying off
25 the shelf stuff that you can use to run a coal plant,

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1 you know, then you've got stuff that you have a lot of
2 trouble with.

3 So, maybe somebody ought to be thinking
4 that way. Can we might tailor this stuff?

5 MR. PIETRANGELO: My thought has always
6 been the nuclear safety application for this is
7 relatively straightforward. Stop, start, open, close.
8 We don't modulate --

9 MEMBER BROWN: It would be very simple,
10 yes.

11 MR. PIETRANGELO: Very, very simple.

12 MEMBER BROWN: Well, that's the difference
13 between those plants and the naval plants, you're not
14 launching aircraft, you're not transient operations,
15 you don't have -- your operating bands, you're going
16 to be in one place, you're not going to do something
17 in other places.

18 And so, you can't use -- I don't want to
19 say that absolutely -- that is not necessarily the
20 proper value metric that you want to look at for your
21 applications.

22 CHAIR STETKAR: But if you want a load
23 follow these puppies --

24 MEMBER BROWN: If you want to do that,
25 that's a totally --

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1 CHAIR STETKAR: It could give a little bit
2 have --

3 MEMBER BROWN: That's a totally different
4 issue. You'd be amazed at what you can do with the
5 digital equipment if you want to do load following.

6 You might find you can get better fuel
7 performance if you're doing certain things because the
8 one thing it does break is what I would call the
9 accuracy of your systems are much, much better. And
10 you don't have to include as much uncertainty when
11 you're doing it so that you can really probably milk,
12 you know, another five percent out of something and
13 you don't change anything else.

14 VICE CHAIR RAY: But I mean, Tony, I
15 think, you know that the bigger issue is if you're
16 actually talking to, you know, your members and
17 vendors with this kind of vision, part of the message
18 that they need to hear is when they bring something to
19 the regulator and say we have this type of application
20 that we've designed this system to do it, they'd
21 better have enough information such that from a
22 regulatory perspective, the review can be done.

23 MR. PIETRANGELO: It's only a factor you
24 have to --

25 VICE CHAIR RAY: That's the lessons that

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1 we've learned to be in particular where we are.

2 MEMBER BROWN: That was the difficulty we
3 were running into with this technology. But they said
4 it's changing so fast, we can't bother to tell you
5 what it looks like because it won't look like what
6 we're telling you in five years which is baloney on an
7 architecture standpoint.

8 VICE CHAIR RAY: Tony?

9 MR. PIETRANGELO: Yes?

10 VICE CHAIR RAY: I want to go back to the
11 beginning if I can of this segment.

12 Subsequent license renewal, I would
13 presume that in the initial 40 years plus 20, the deal
14 -- regulatory deal, was the foundation of the
15 investment cost recovery would be a done deal.

16 So then what we're looking at in
17 subsequent license renewal is an opportunity.

18 Now, to me, the rules that, I'll call them
19 regulatory stability which I definitely believe in.
20 Where does it apply during first 40 and now by
21 default, the additional 20 up to 60.

22 The rules that apply to reevaluating of,
23 let me use the word design basis again because I'm
24 going to believe that the license terminates and you
25 have essentially in subsequent license renewal to get

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1 it reissued.

2 You don't want to have to do what I think
3 the industry claims that it does, and that is keep the
4 licensing basis current for everything that anybody
5 ever thought of as a new piece of information that
6 might affect the plant.

7 So, in having run hydro facilities that
8 were well over a hundred years old, I know that when
9 you renew the license you stop and go back and look at
10 everything. You don't simply say, well, it's all up
11 to date, just give me an extension.

12 So, I'm obviously headed toward the
13 question of reevaluation of the, mostly I'm thinking
14 of site design basis, not the general design criteria
15 kind of stuff.

16 Am I reading the industry position
17 correctly in that it is that no, no, we keep this up
18 to date all the time, there's nothing at 60 years that
19 needs to be reassessed in say the European way or the
20 every ten years way that the near term taskforce talks
21 about? Am I reading that correctly?

22 MR. PIETRANGELO: Yes.

23 VICE CHAIR RAY: Okay. Can you add
24 anything, I mean my premise was that almost inevitably
25 you want to do that because the deal that you worked

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1 originally was kept stable during the entire period.
2 You've got your investment back, this isn't a question
3 of changing the deal midway through?

4 MR. PIETRANGELO: I don't think it's about
5 the deal, though, Harold. I think it's about your
6 license changed from the minute you got it, every day,
7 probably. Okay?

8 You make changes to your licensing basis
9 every day under 50.59. You submit amendments every
10 year that are changing your licensing basis. There's
11 new information -- there's generic letters, bulletins,
12 other things that make you change licensing basis.

13 So, it was a list a living thing and it
14 was up. It is -- continues to be updated on a regular
15 basis and reported back to the agency. So, the
16 contract continues to be amended as you go. Okay?

17 Renewal, I think for very good reasons,
18 looked at long lived passive components and did a lot
19 of research on what those are and how they age and
20 degrade. And the key issues right now are going to be
21 vessel integrity, concrete, cables, you know, so
22 that's where the focus with DOE and EPRI now.

23 And we've got to demonstrate that, you
24 know, we're keeping those structure systems and
25 components functional and operable for the challenges

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1 they might see.

2 VICE CHAIR RAY: But why wouldn't you say
3 yes, it's fair that we reevaluate the environmental
4 hazards?

5 MR. PIETRANGELO: We will and we do.

6 VICE CHAIR RAY: At the time --

7 MR. PIETRANGELO: At the time we get the
8 new information.

9 VICE CHAIR RAY: Subsequent --

10 MR. PIETRANGELO: I'm not wait for ten
11 years if I have new information.

12 VICE CHAIR RAY: Oh, yes you do, come on.
13 That was my point is we -- look I've lived in this
14 world just like you have. And lots of people come up
15 with stuff that there's a new fault out here and so on
16 and so forth. And you say, wait a minute, the chances
17 of that being significant in the term of my license,
18 I should not have to go out and investigate that.

19 But when I get to the 60 year point, my
20 God, to say I've done everything that needs to be done
21 coming up that point, I just find it hard to --

22 MR. PIETRANGELO: I agree with you that --

23 VICE CHAIR RAY: -- resolve that.

24 MR. PIETRANGELO: -- you can't react to
25 every study that's ever done by any, you know,

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1 universal --

2 VICE CHAIR RAY: Seismologists and the
3 academic --

4 MR. PIETRANGELO: -- or whatever. So,
5 part of this, we think, you've got to determine who
6 the technical authority is in this day. Is it USGS
7 for seismic information? It is NOAA for flooding and
8 other hazards? Who's the technical source because you
9 don't have enough people or time to react to every
10 piece of information that comes up.

11 It's go to come through something credible
12 and EPRI's going to be our screen for that. And
13 currently in place with EPRI to look at, you know,
14 where -- how we're going to analyze some of that
15 information and which ones you do say, hey, that one's
16 significant. I need to screen that for applicability
17 to my plant. And if I pass through the screen, I'm
18 going to do even more sophisticated --

19 VICE CHAIR RAY: If I'm 30 years into a 40
20 year license, the last thing I want to do is go look
21 at what USGS is doing. You know, if somebody forces
22 me to do it, okay, but not otherwise.

23 And I just think that the quid pro quo for
24 regulatory stability ought to be, at some point,
25 opening their books and saying okay, what's out there?

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1 What do I need to go out and investigate even if it
2 involves offshore surveys or whatever the hell it
3 might involve?

4 MR. PIETRANGELO: Right.

5 VICE CHAIR RAY: And I just find it hard
6 to imagine that to me, there's this inconsistency
7 between I don't want to exposed to every claim that
8 there's some new thing I have to go out and
9 investigate during the term of my license and even 20
10 years beyond that.

11 But at some point it seems like you ought
12 to do it.

13 MEMBER CORRADINI: Can I ask Harold a
14 question different? If you don't feel it's
15 appropriate to do it on a subsequent license renewal,
16 what sort of frequency are you looking to EPRI to
17 reevaluate and re-baseline so that if something comes
18 up it goes above some sort of noise level you actually
19 want, so what is the frequency there?

20 MR. PIETRANGELO: I don't know yet because
21 I haven't heard that part of it yet. I just know that
22 they've been tasked to look at this aspect of that.
23 So we've got some work to do with work to do in this
24 area.

25 MEMBER CORRADINI: But I think the

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1 regulator plays a major role in this too, Harold.

2 MR. PIETRANGELO: Harold, you're right, I
3 think that something that comes through our regulator
4 that research has done some work on and it gets vetted
5 with the Standards Committees and you guys and others
6 stakeholders has more credibility to a licensee than
7 something done, you know, anywhere.

8 So, there's ways we're looking at this to
9 say that had a pedigree that you ought to pay
10 attention to and has credibility.

11 VICE CHAIR RAY: I just think you, for
12 what it's worth, it's gratuitous I know, but be
13 careful about saying we keep everything up to date all
14 the time. That can be a two edged sword.

15 MR. PIETRANGELO: There was another item
16 I had written down here.

17 CHAIR STETKAR: But are you interested in
18 this?

19 VICE CHAIR RAY: Well, no, but I mean this
20 is a current issue.

21 MR. PIETRANGELO: It and I actually read
22 your transcript on this topic and use of qualitative
23 factors in regulatory analysis. That is an issue of
24 great importance to us as well.

25 For some of the same reasons, I stated

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1 before, I think a lot of new people coming into the
2 industry and into the NRC, a lot of decisions have
3 been made in the past about what's safe enough and
4 what you need to more about.

5 I think the process for considering new
6 requirements needs to be stable and predictable and
7 well defined. I think the staff paper that went up on
8 this that you all looked at promises to do that. You
9 didn't have the guidance so you really couldn't pass
10 judgment on it. So I can't either.

11 But I will tell you that we're looking at
12 it closely and we do not want a repeat of what
13 happened during the filter bed experience. I think
14 that kind of raise the specter of this issue. I think
15 there's additional spotlight that's going to be -- we
16 understand there's a GAO study that is due out here
17 pretty soon on the way the NRC does regulatory
18 analysis and cost estimation.

19 So, when we have new people coming in,
20 especially at the regulatory agency, we can't tell
21 them well, you know, you can't have a new idea or you
22 can't challenge something or decision from the past.
23 You can't, but you better do it in process. Right?
24 And the process needs to be well defined and sound and
25 reviewed by the right people.

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1 So, we have great interest in this issue
2 as well and look forward to your deliberations on it,
3 too, because again, you know, we've got a lot of stuff
4 in place already. We're putting additional layer of
5 protection in place with mitigating strategies and
6 that needs to be considered when you're looking at any
7 addition requirements beyond that.

8 MEMBER SCHULTZ: So, are you putting that
9 into -- have you got a team that is looking at way in
10 which to incorporate that properly in the overall
11 evaluation of what happens next? Because that's a
12 very important point to consider.

13 MR. PIETRANGELO: Yes, sir, we do.

14 MEMBER SCHULTZ: And in fact, it's likely
15 to be considered early next year in building
16 strategies as we move forward.

17 MR. PIETRANGELO: That's right, that's
18 right. We do have a team looking at it, we do.

19 MEMBER SCHULTZ: Good, good.

20 MR. PIETRANGELO: I think this is where
21 good cost estimation comes into play, good risk
22 analysis comes into play. And it should be a
23 transparent process that all stakeholders can see.
24 So, I think development of guidance on qualitative
25 factors is a good thing and make it more consistent.

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1 MEMBER SCHULTZ: Well, I'm also thinking
2 good processes associated with quantitative evaluation
3 is more --

4 MR. PIETRANGELO: No doubt.

5 MEMBER SCHULTZ: -- because in that go
6 around we had difficulties associated with both
7 features. The fact that the quantitative evaluation
8 was mixed and inconsistent depending on who you spoke
9 to and then confounding that was a discussion related
10 to qualitative factors and I'm sure you, if you read
11 our discussion related to it, it's that of course on
12 considered qualitative factors and in the evaluation.
13 But you shouldn't do that in absence or in addition to
14 quantitative evaluation and look at them separately
15 and see which one weighs out because you'll never get
16 the right answer.

17 MR. PIETRANGELO: Right, right.

18 CHAIR STETKAR: Tony, here's a very
19 personal feedback and we've got 20 minutes yet. As
20 you mentioned, we did earlier this week, Monday, had
21 a presentation that we -- from the industry on the
22 risk-informed prioritization process.

23 MR. PIETRANGELO: Right.

24 CHAIR STETKAR: And that was a closed
25 session so I don't want to go into any details of what

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1 we heard to protect that information. Actually, I
2 guess it was open, though, it was open, thanks. So I
3 can -- good, that helps.

4 What I personally would caution is that we
5 heard from the folks doing those pilot studies an
6 awful lot of qualitative conclusions, very little
7 quantitative despite the fact that they ostensibly
8 used risk assessments. Much of the final conclusions
9 were not based on use of quantitative information.

10 Sometimes they said well, we had the risk
11 assessment but we didn't feel it was necessary to
12 exercise it. Other cases, they said, well, our risk
13 assessment didn't really cover this area so we made
14 some judgments.

15 So, from the industry's perspective, it
16 has to cut both ways --

17 MR. PIETRANGELO: It does.

18 CHAIR STETKAR: -- if you want some rigor
19 from the regulators in terms of a combination of
20 qualitative and quantitative assessments as a basis
21 for regulatory analysis, if there are incentives
22 coming back the other way from the industry, there
23 ought to be that same level of rigor applied to both
24 qualitative and quantitative assessments.

25 MR. PIETRANGELO: Those are great

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1 comments, I agree with you. There's an effort I
2 didn't talk about because it's still in the early
3 stages on -- we formed a risk-informed steering
4 committee, so has the NRC. We're meeting on a monthly
5 basis about now. Two projects have been defined,
6 treatment of uncertainty and decision making.

7 And we'd love to come and talk to you more
8 when that effort has kind of --

9 CHAIR STETKAR: We're -- yes, I mean that
10 subcommittee level, we're trying to pursue that at the
11 appropriate time. I think it's a little early.

12 MR. PIETRANGELO: And besides being a
13 double-edged sword, and I think what I read in the
14 transcript on qualitative factors, I think also played
15 into this and sometimes you have to invest a lot more
16 in the quantitative to get a good result. Okay?

17 And if you can -- if you're comfortable
18 with what the conclusion or insight as qualitatively,
19 you can kind of get there faster. That's a double-
20 edged sword as well.

21 CHAIR STETKAR: That's -- well, developing
22 that, I think part of what we were trying to telegraph
23 in our letter is that the use of qualitative
24 information, there's no problem with. The strongest
25 is if you can combine both.

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1 MR. PIETRANGELO: Right.

2 CHAIR STETKAR: If you do, however,
3 realize solely on qualitative information or judgment,
4 there still a process by which you can do that.

5 MR. PIETRANGELO: Right.

6 CHAIR STETKAR: And I think that's kind of
7 what the industry is saying.

8 MR. PIETRANGELO: Right.

9 CHAIR STETKAR: That's why I'm saying back
10 to the industry that if a lot of the prioritization
11 process, the thought process that goes into this risk
12 informed prioritization or whatever you want to call
13 it, of necessity I think in many cases will need to
14 rely on qualitative judgment. There is still a
15 process and a level of rigor that can be applied to
16 that part of the equation and so far, I haven't see
17 that.

18 MEMBER SCHULTZ: Just to add one more
19 point to the pilot studies that we heard on Monday, we
20 saw in the discussions a lot of value that was being
21 described and discussed in the evaluations coming in.

22 At the same time when results were
23 presented about how things had changed as a result of
24 the pilot study, it wasn't apparent that a lot of
25 change, you know, a few schedules here had slipped and

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1 the reason was that when the high level results were
2 presented, it was well, we took the top ten things we
3 wanted to prioritize and we worked on those.

4 And the main value that they got from it
5 was not schedules and, you know, cost savings but
6 rather what they learned in performing that process in
7 terms of improving those projects, but there's a real
8 value that wasn't presented because the whole system
9 of plant projects was not investigated in the pilots.

10 In other words, they had done the whole
11 system instead of the top ten or the top 20, it could
12 have shown that so much was set aside so that the top
13 ten or top 20 things could be focused upon.

14 CHAIR STETKAR: I think in some --

15 (SIMULTANEOUS TALKING)

16 CHAIR STETKAR: In fairness though,
17 because I know a little bit more about it, in fairness
18 I think that that's a bit of an aberration of the
19 pilot roles because they selected typically 20
20 projects.

21 MEMBER SCHULTZ: Yes, but that's why I
22 wanted to mention it because there had been may
23 initiatives that have gone through the pilot processes
24 and people look at the pilots and say, well we didn't
25 learn much. That's not true. A lot is learned and we

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1 saw a real benefit there but I think we want to make
2 sure that the value of the pilots is expended.

3 MR. PIETRANGELO: So that's in Mr.
4 Butler's value paper on this because that's good one.

5 CHAIR STETKAR: Yes, we only saw three, we
6 didn't see all six of them and I don't know the mix of
7 the other three that we didn't see nor in our
8 presentation was it real clear in terms of the process
9 that was used to select the particular 20 that they
10 were dealing with.

11 MEMBER SCHULTZ: In the example --

12 CHAIR STETKAR: There may be more --

13 MEMBER SCHULTZ: The examples we saw were
14 well, these are the projects we thought would be good
15 for the project because they were important and now
16 we're going to prioritize those important feature. So
17 anyway.

18 I think they're probably examples if you
19 -- John can point to other examples that better
20 illustrate that broader issue.

21 MR. PIETRANGELO: This process, though,
22 really -- we have some history with this kind of a
23 process dating back to maintenance rule implementation
24 when we an expert panel that looked at the safety
25 significance of the components within the scope of the

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1 rule to apply what level of monitoring they were going
2 to get.

3 So, we're good with expert panels in our
4 use of those at the plants. It's a process that the
5 companies are familiar with and we try to bank on that
6 for this as well.

7 MEMBER POWERS: We had some -- there was
8 some questioning about the use of expert panels in our
9 discussion.

10 MR. PIETRANGELO: You've got to make sure
11 you've got experts.

12 MEMBER POWERS: Well, I certainly agree
13 with you that it is an area that the nuclear industry
14 is pioneered and uses it quite effectively. But it
15 can degrade over time.

16 MEMBER SKILLMAN: Tony, I've got a
17 question for you. In your opening comments, you
18 mentioned the United States energy supply is 20
19 percent nuclear and ten percent nameplate. I don't
20 understand ten percent nameplate. What was that
21 please?

22 MR. PIETRANGELO: Of all the capacity out
23 there, of all the generation, ten percent of it is
24 nuclear, yet we supply 20 percent of the actual
25 supply.

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1 MEMBER SKILLMAN: Okay, now I understand,
2 thank you.

3 MEMBER SCHULTZ: You mean the capacity
4 it's only -- we only have ten percent of the capacity?

5 MR. PIETRANGELO: Yes, we provide 20
6 percent of the electricity.

7 MEMBER SCHULTZ: Because we some of that's
8 really expensive to run.

9 MEMBER BANERJEE: Because we are
10 baseloaded.

11 MEMBER SCHULTZ: Huh?

12 MEMBER BANERJEE: Because we are
13 baseloaded?

14 VICE CHAIR RAY: Yes, I mean it's a
15 dispatch career, but we're down on the left side.

16 CHAIR STETKAR: Is there anything -- any
17 of the members have anything more for Tony?
18 Questions? Comments? If not, because this is an ACRS
19 meeting and it is indeed an open meeting, I'd like to
20 take a couple of minutes before we thank Tony to ask
21 if there is anyone in the room, members of the public
22 who might have any comments that they'd like to make?
23 At the same time, we'll open up the bridgeline and see
24 if there's anyone out there who would like to make a
25 comment, I will take a couple of seconds.

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1 Tony's -- you talk about modern
2 technology, you'll see in a moment how modern our
3 technology is here.

4 Nobody on? Okay.

5 With that, Tony, thanks a lot. This is
6 really useful. I honestly I think we go too long
7 between these meetings. I don't recall, I think we've
8 had one -- I've been on the committee seven years now
9 and I seem to recall one in the seven year period.
10 This is the second. I would hope that we can get
11 together a little bit more frequently.

12 MR. PIETRANGELO: We're just down the
13 road.

14 CHAIR STETKAR: Yes. It's just a matter
15 of coordinating schedules. How difficult could that
16 be?

17 MR. PIETRANGELO: Thank you for the
18 opportunity.

19 CHAIR STETKAR: Again, thanks a lot, I
20 think this was really a productive session.

21 As far as we're concerned, we are now I
22 believe adjourned, off the record for today and come
23 back at -- I'll give you --

24 (Whereupon, the above-entitled matter went
25 off the record at 2:36 p.m.)

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**Advisory Committee on Reactor Safeguards
Full Committee Meeting**

**Technical Brief on
Regulatory Guidance on the
Alternative PTS Rule (10 CFR 50.61a)**



**Gary L. Stevens, Sr. Materials Engineer
Mark T. Kirk, Sr. Materials Engineer**

*Office of Nuclear Regulatory Research
Component Integrity Branch*

**Thursday, November 6, 2014
NRC Headquarters
Rockville, MD**

Objective

- **NRC issued 10 CFR 50.61a in January 2010**
- **NRC is developing guidance for licensee application of 10 CFR 50.61a**
 - **Regulatory Guide (RG)**
 - **Draft Regulatory Guide DG-1299, “Regulatory Guidance on the Alternate Pressurized Thermal Shock Rule”**
 - **Supporting technical basis NUREG**
 - **Draft NUREG-2163, “Technical Basis for Regulatory Guidance on the Alternative PTS Rule (10 CFR 50.61a)”**
- **NRC staff request ACRS review for release of both documents for public comment**

Outline

- **Background**
- **Overview of the Alternate PTS Rule**
- **Stakeholder Feedback**
- **Regulatory Guidance**
- **Estimated Schedule for RG and NUREG Publication**

BACKGROUND

Why was 10 CFR 50.61a developed?

The 10 CFR 50.51a Limits

(Chapter 1 of NUREG-2163)

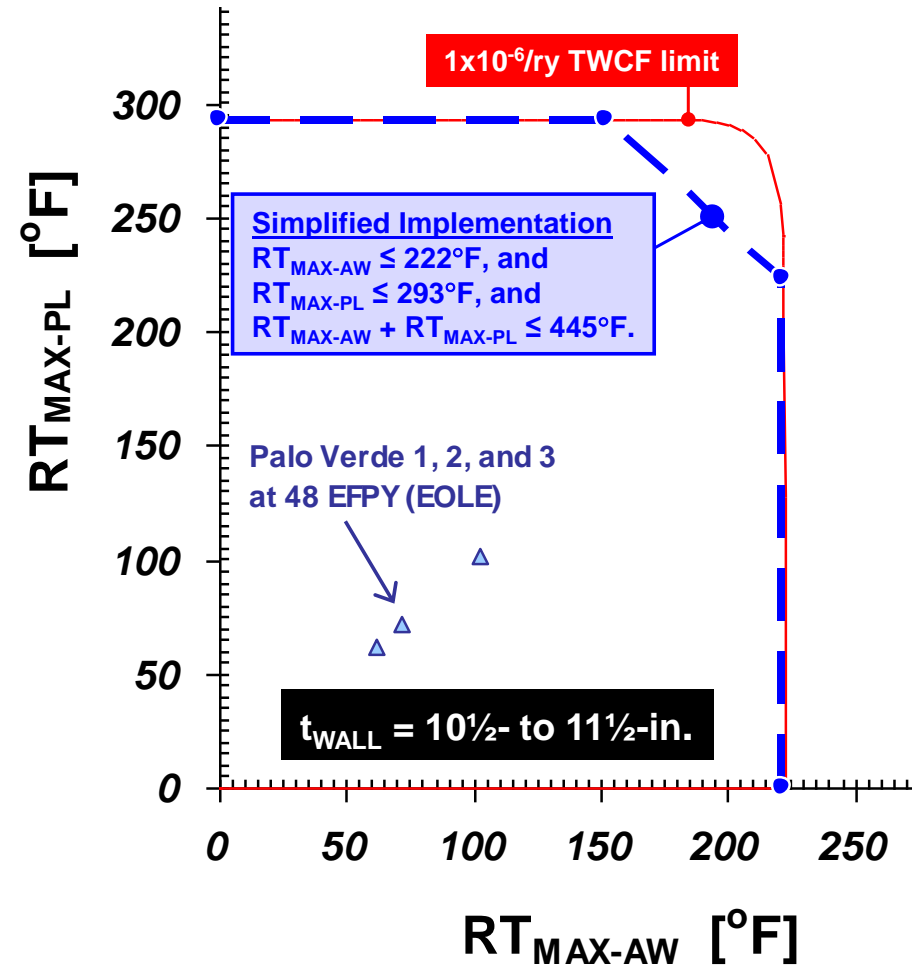
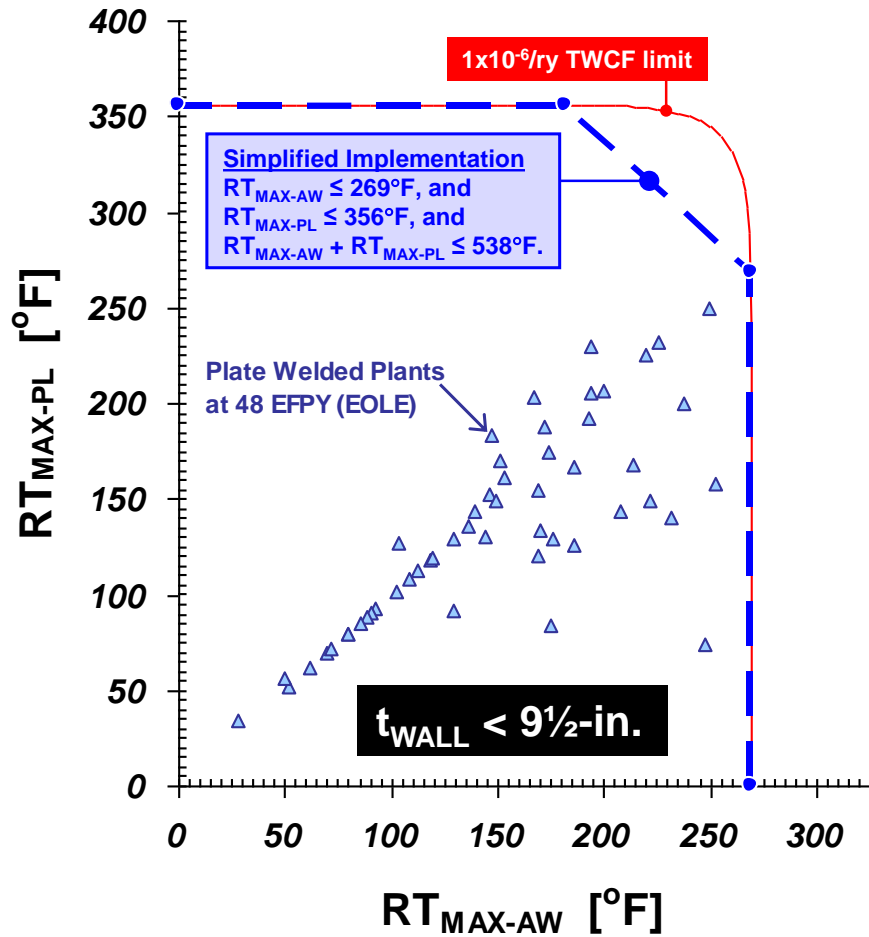
Which plants might use 10 CFR 50.61a?

Why was 10 CFR 50.61a Developed?

- **Produces unnecessary burden**
 - Technical improvements suggest strongly that current RT_{NDT} limits of 300 °F and 270 °F are more conservative than needed to maintain safety.
- **Does not necessarily increase overall plant safety**
 - Focus on unnecessarily conservative RT_{NDT} limits can divert resources from other more risk-significant matters.
- **Plant-specific analysis not a practical option**
 - Difficult to perform and review. Completeness and success criteria unclear.
- **Creates an artificial impediment to license renewal**
 - Unnecessarily conservative RT_{NDT} limits alter perception of the safe operational life of a nuclear power plant.

→ *Causes work that produces no real benefit* ←

RT Limits Compared to Plant RT_{NDT} Values



10 CFR 50.61a RT Limits

TABLE 1—PTS SCREENING CRITERIA

Product form and RT _{MAX-X} Values	RT _{MAX-X} limits [°F] for different vessel wall thicknesses ⁶ (T _{WALL})		
	T _{WALL} ≤ 9.5 in.	9.5 in. < T _{WALL} ≤ 10.5 in.	10.5 in. < T _{WALL} ≤ 11.5 in.
Axial Weld RT _{MAX-AW}	269	230	222
Plate RT _{MAX-PL}	356	305	293
Forging without underclad cracks RT _{MAX-FO} ⁷	356	305	293
Axial Weld and Plate RT _{MAX-AW} + RT _{MAX-PL}	538	476	445
Circumferential Weld RT _{MAX-CW} ⁸	312	277	269
Forging with underclad cracks RT _{MAX-FO} ⁹ ...	246	241	239

Which Plants Might Use 10 CFR 50.61a?

- **Four plants are currently projected to reach 10 CFR 50.61 limits during their 60-year operating periods:**
 - **Beaver Valley 1 (2033)**
 - Submitted July 2013 (ML13212A027); under staff review
 - **Palisades (2017)**
 - Submitted July 2014 (ML14211A520); under staff review
 - **Diablo Canyon (2033)**
 - **Indian Point 3 (2025)**
- **Several (perhaps about ten) plants would likely require 10 CFR 50.61a for 80 years of operation based on reaching the 10 CFR 50.61 limits**
- **Additional plants may elect to use 10 CFR 50.61a for economic reasons**

OVERVIEW OF THE ALTERNATE PTS RULE

(Chapter 2 of NUREG-2163)

Conditions for Use of 10 CFR 50.61a

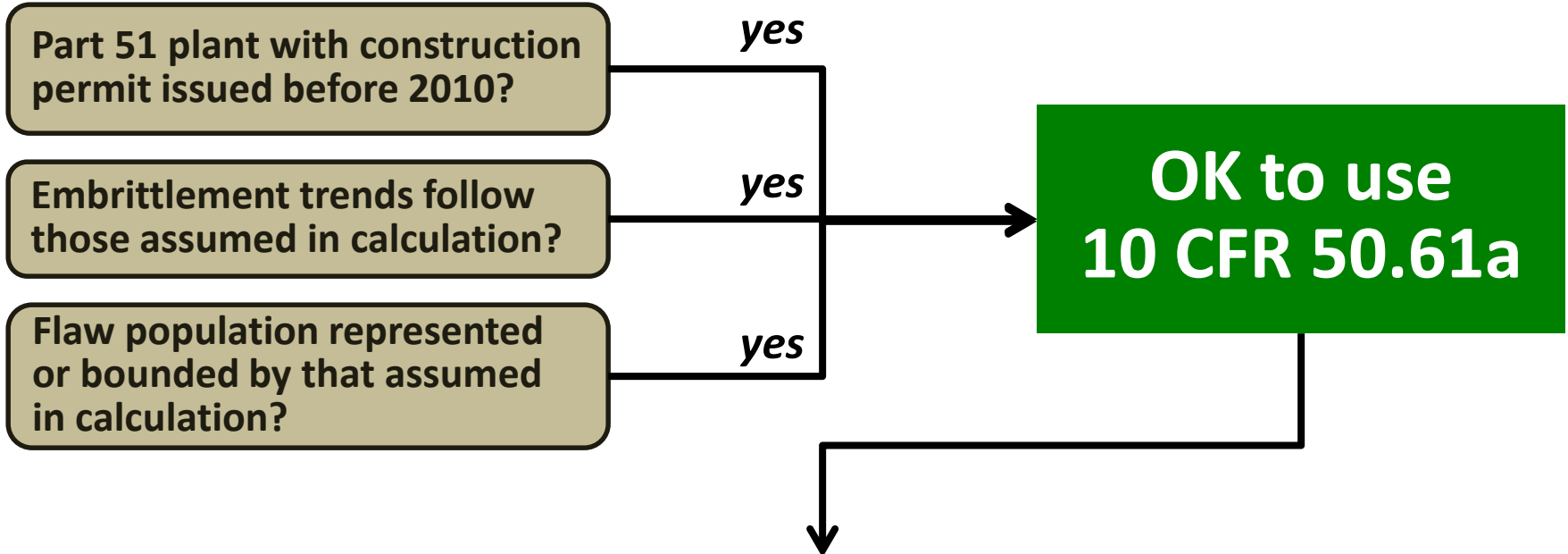


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Comparison of 10 CFR 50.61 to 10 CFR 50.61a

Less restrictive reference temperature (embrittlement) limits enable longer operations, but gating criteria must be satisfied to use the new rule.

	10 CFR 50.61 <i>REQUIRED</i>	10 CFR 50.61a <i>VOLUNTARY</i>
Reference Temperature Limits	More restrictive	Better informed, Less restrictive
Plant-specific surveillance data check	Required – 1 test	Required – 3 tests
Plant specific inspection for flaws	Not required	Required

STAKEHOLDER FEEDBACK

(Chapter 3 of NUREG-2163)

Stakeholder Feedback

- **The NRC solicited input from interested stakeholders on a 10 CFR 50.61a Reg. Guide**
 - 3 public meetings in 2011
- **EPRI’s Materials Reliability Program (MRP) recommended several technical approaches for NRC to consider**
 - Documented in Report No. 1024811, “Materials Reliability Program: Proposed Resolutions to the Analytical Challenges of Alternate PTS Rule (10 CFR 50.61a) Implementation (MRP 334),” January 2012.
 - 7 areas, 15 specific recommendations
 - Intent was to reduce licensee and NRC burden for implementing 10 CFR 50.61a by providing consistent, acceptable levels of safety
 - NRC addressed EPRI’s recommendations in Table 3 of NUREG-2163

REGULATORY GUIDANCE

Criteria Relating to the Date of Construction and Design Requirements
(Chapter 4 of NUREG-2163, Position 1 of DG-1299)

Construction Date

- **Rule & RT limits based on analysis of three currently operating PWRs**
 - Risk-dominant transients
 - Materials of construction
- **The effect of new reactor designs & new materials of construction on these limits have not been assessed**
- **Therefore the applicability of the Alternate PTS Rule restricted to construction permits issued before February 2010**
- **Licensees may choose to demonstrate applicability to specific reactor designs of their interest**

REGULATORY GUIDANCE

Criteria Relating to the Evaluation of Plant-Specific Surveillance Data
(Chapter 5 of NUREG-2163, Position 2 of DG-1299)

Goal

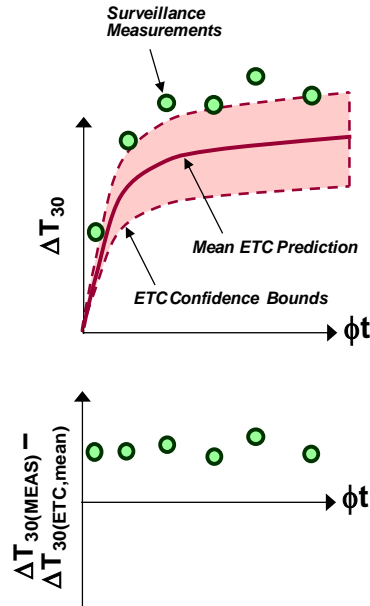
- **To ensure that applicant's surveillance data are well, or conservatively, represented by the embrittlement trend correlation (ETC) in 10 CFR 50.61a**
 - **ETC used in the probabilistic fracture mechanics (PFM) calculations that provide the basis for the RT_{MAX-X} limits**

3 Statistical Tests

- Must have 3 or more ΔT_{30} values
- Must consider
 - All beltline plates/welds/forgings for which data is available (not just “limiting” data)
 - Data from “sister plants” if available
- Only flags under-estimates
- 3 tests determine different deviations from expected trends

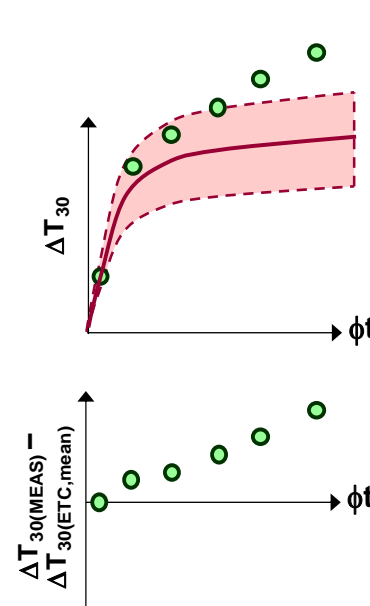
Mean Test

Determines if measurements are uniformly offset from ETC



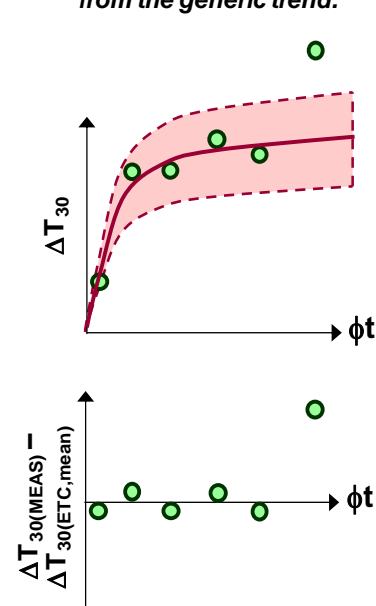
Slope Test

Determines if measurements diverge from the generic trend



Outlier Test

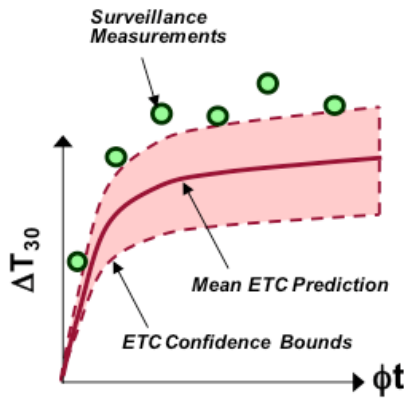
Determines if one or two measurements are offset from the generic trend.



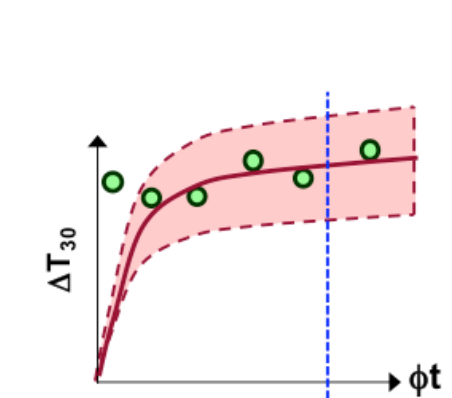
What if the data fail the test?

- Before considering adjustments, consider the accuracy & appropriateness of the input data
 - $RT_{NDT(u)}$, # of Charpy values, composition & exposure variables, notch orientation, comparative trends analysis

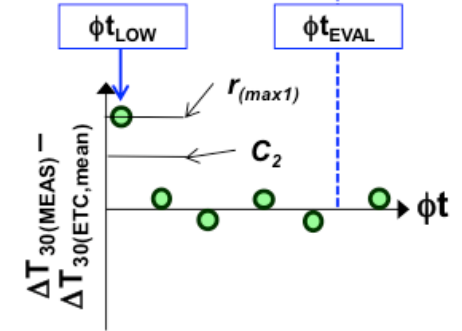
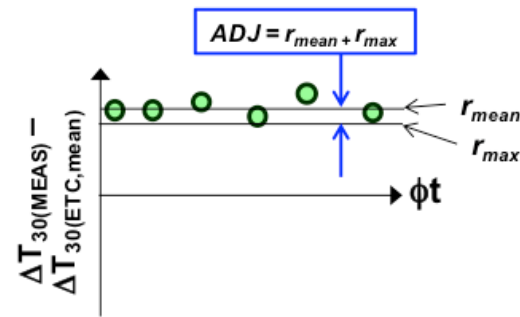
Mean Test Failure



Low Fluence Outlier Test Failure



- Adjustment Procedures
 - Mean test: Add ADJ
 - Slope test: Use greater slope indicated by the surveillance data
 - Outlier test: Can ignore a failure at a fluence < 10% of that for the PTS evaluation provided 3 or more data remain



REGULATORY GUIDANCE

Inservice Inspection (ISI) Data and Nondestructive Examination (NDE)
Requirements

(Chapter 6 of NUREG-2163, Position 3 of DG-1299)

NDE Requirements

Reason for Requirements

TABLE 2—ALLOWABLE NUMBER OF FLAWS IN WELDS

Through-wall extent, TWE [in.]		Maximum number of flaws per 1000-inches of weld length in the inspection volume that are greater than or equal to TWE_{MIN} and less than TWE_{MAX}
TWE_{MIN}	TWE_{MAX}	
0	0.075	No Limit
0.075	0.475	166.70
0.125	0.475	90.80

TABLE 3—ALLOWABLE NUMBER OF FLAWS IN PLATES AND FORGINGS

Through-wall extent, TWE [in.]		Maximum number of flaws per 1000 square-inches of inside surface area in the inspection volume that are greater than or equal to TWE_{MIN} and less than TWE_{MAX} . This flaw density does not include underclad cracks in forgings.
TWE_{MIN}	TWE_{MAX}	
0	0.075	No Limit
0.075	0.375	8.05
0.125	0.375	3.15
0.175	0.375	0.85
0.225	0.375	0.29
0.275	0.375	0.08
0.325	0.375	0.01
0.375	Infinite	0.00

Satisfying the tables ensures that the population of flaws in the vessel is well represented, or bounded, by the population of flaws assumed in the tech-basis calculations.


NDE Requirements

Examination Requirements

REQUIRED	OPTIONAL
<p>Qualified examination in accordance with ASME Code, Section XI, Mandatory Appendix VIII</p>	<p>NDE uncertainty</p> <p>(NDE techniques tend to oversize smaller flaws, thereby distributing detected flaws into larger bins where the allowed number of flaws is smaller)</p>
<p>Verification that axial flaws greater than 0.075" TWE at the clad/base metal interface do not open to the RPV inside surface</p>	

NDE Requirements

How Requirements are Invoked

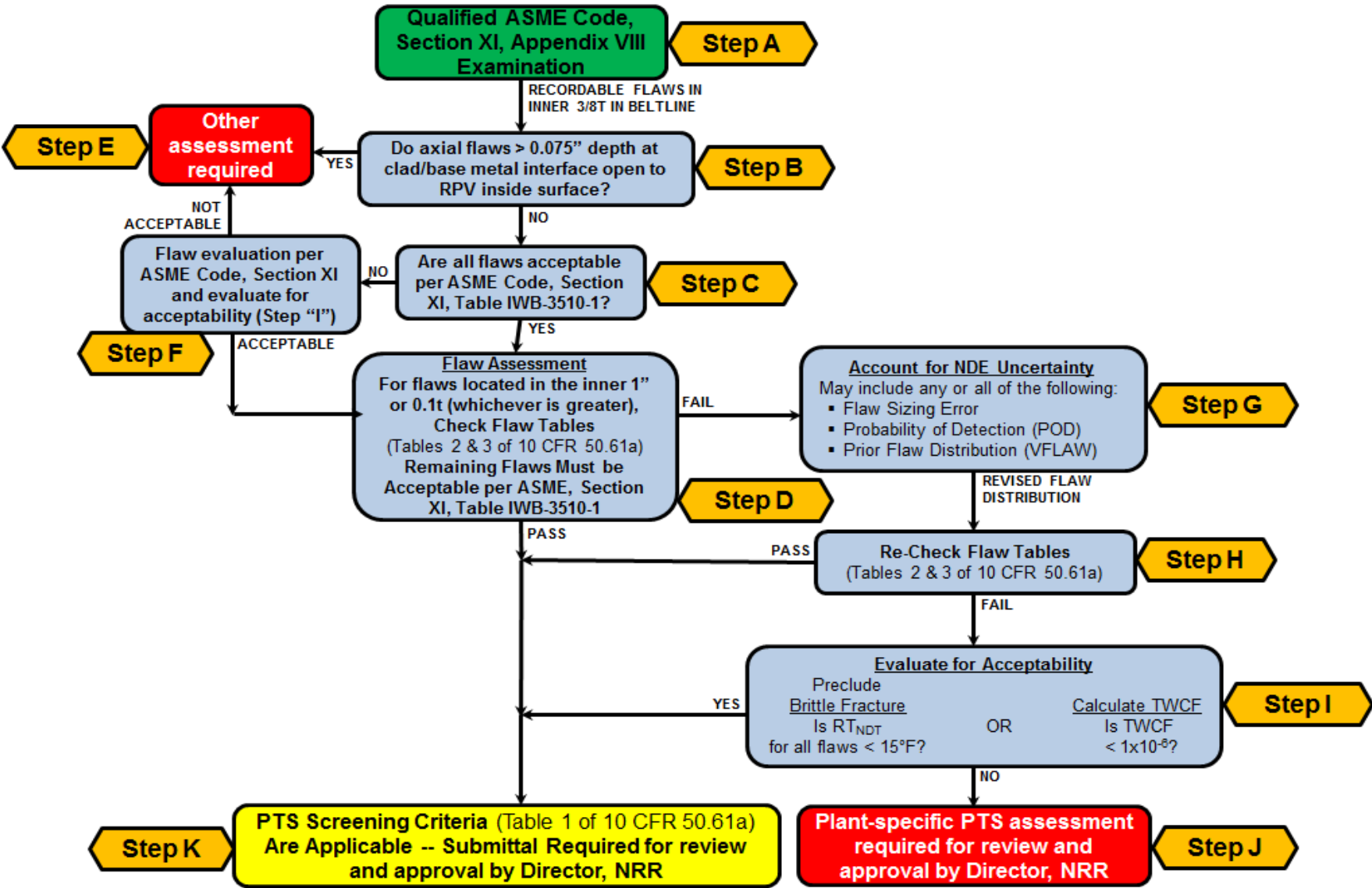


Description of Flaws	How are they Assessed
Surface connected on ID, depth greater than 0.075-in. beyond the cladding	Flaw specific assessment of TWCF contribution
Embedded, within 1-inch of inner-diameter	<ul style="list-style-type: none">Assess compliance with flaw tablesIf flaw tables are exceeded assess TWCF contribution
Embedded, between 1-inch and $3/8t$ from ID	<ul style="list-style-type: none">Assess to ASME Code, Section XI, Table IWB-3510-1Assess for TWCF contribution if flaw exceeds Table IWB-3510-1
Embedded, beyond $3/8t$ from ID	No assessment required if flaw acceptance criteria of ASME Code, Section XI, Table IWB-3510-1 is satisfied.

Thermally-driven stresses produce greater risk-significance for flaws closer to the ID. Assessment requirements are more stringent for these flaws.

NDE Requirements

NDE Results Evaluation Process



REGULATORY GUIDANCE

Criteria Relating to Alternate Limits on Embrittlement
(Chapter 7 of NUREG-2163, Position 4 of DG-1299)

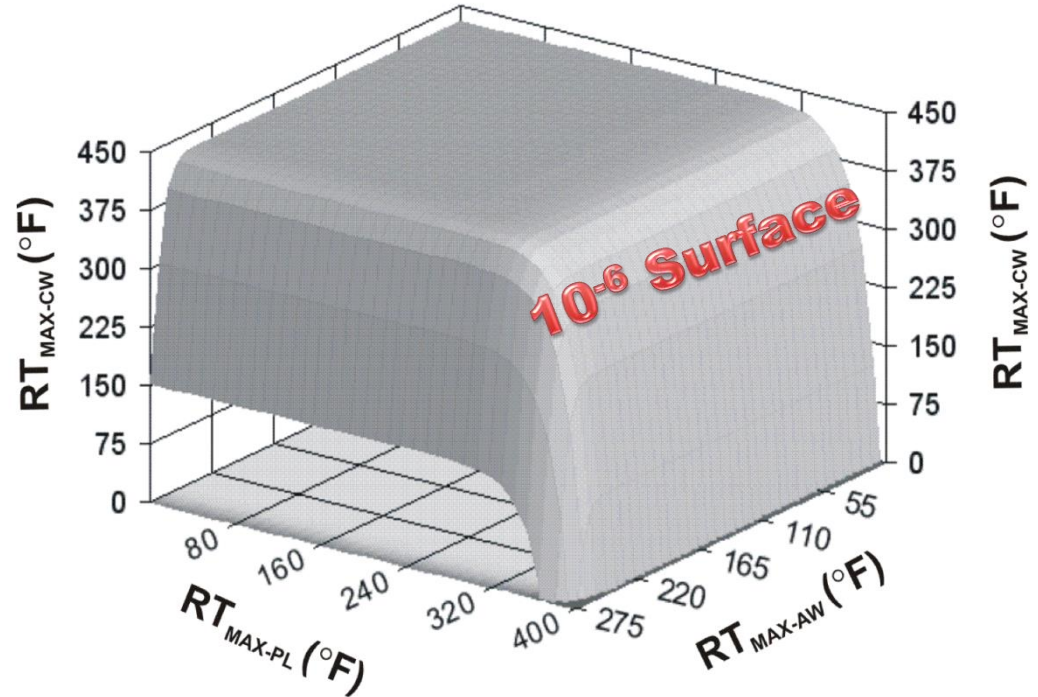
Alternate Limits on Embrittlement

Why Are They Needed?

- Paragraph (c)(3) of 10 CFR 50.61a allows for plant-specific analyses to justify operation if projected RT_{MAX-X} values exceed the PTS screening limits
- NRC staff elected to develop one method of acceptable guidance for meeting this provision
- Similar feedback was provided by stakeholders

Alternate Limits on Embrittlement

- RT limits table in 10 CFR 50.61a established by inverting this equation
- Simplifications needed to express equation in tabular form
- Licensees can use formula instead of table



$$TWCF \text{ Limit} = 10^{-6} > TWCF_{AWF} + TWCF_{PF} + TWCF_{CWF} + TWCF_{FO}$$

Axial Weld Flaws
Plate Flaws
Circ Weld Flaws
Forging Flaws

REG. GUIDE PUBLICATION

Estimated Schedule

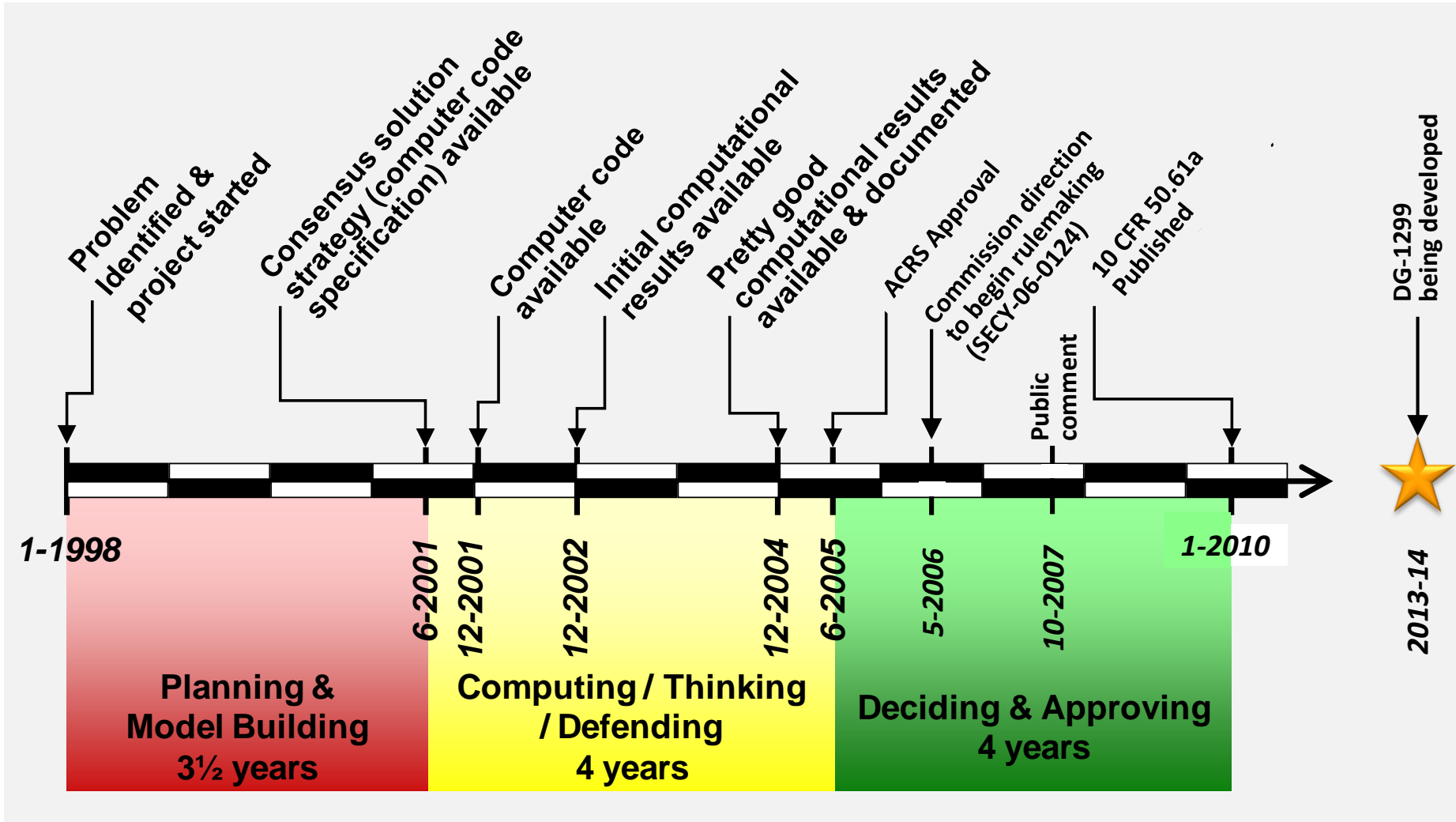
Schedule

- **DG-1299**
 - Program office review complete; comments addressed
 - ACRS review – minimum 2 weeks *
 - OGC review – minimum 4 weeks *
 - Published for public comment – ~2 weeks
- **NUREG-2163**
 - Program office review complete; comments addressed
 - ACRS review – minimum 2 weeks *
 - OGC review – minimum 4 weeks *
 - Tech. Pubs. review – ~4 weeks *
 - Published for public comment – ~2 weeks
- **Best-Estimate Publication Schedule**
 - Public comment (60-day period) – February 2015
 - Publish final documents – Summer 2015

Questions or Comments?

BACKUP SLIDES

10 CFR 50.61a Timeline

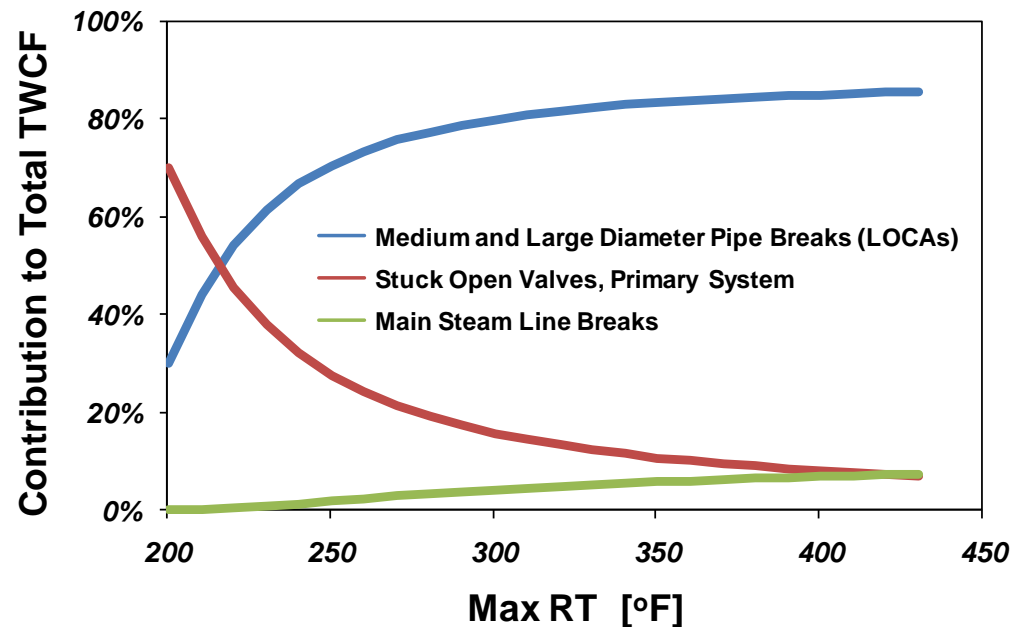


Key Results

- **What operational transients most influence PTS risk?**
- **What material features most influence PTS risk?**
- **Are these dominant material features / transients common across the fleet?**
- **New limits on embrittlement based on risk-informed calculations**

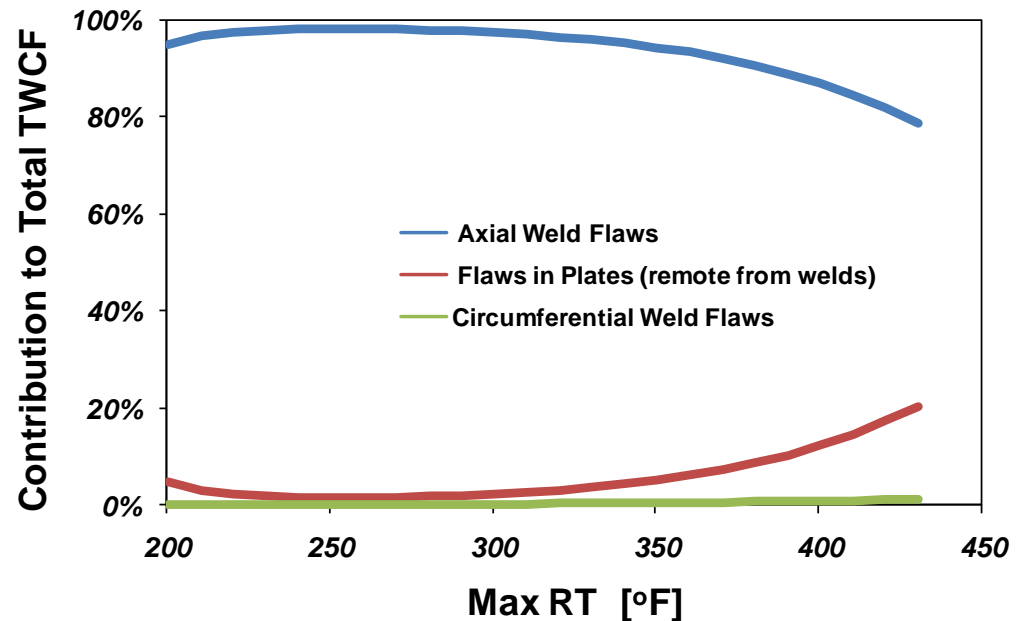
Important Transient Classes

- **Primary side faults dominate risk**
 - Due to low temperature on primary side (35°F)
- **Very severe secondary faults (MSLB) make a minor contribution**
 - Primary side temperature cannot fall below 212 °F, so material still tough even at high embrittlement
- **All other transient classes produce no significant risk**
 - Challenge is low even if transient occurs



Important Material Features

- **Axial cracks dominate risk, circumferential cracks do not**
 - Circ cracks arrest due to vessel geometry
 - Axial cracks are much less likely to arrest
- **Thus, the properties of materials associable with axial flaws dominate**
 - Axial weld properties
 - Plate properties
- **A 3-parameter characterization of RPV embrittlement unifies results across all study plants**
 - Failure probabilities are associated with the responsible material/ flaw features

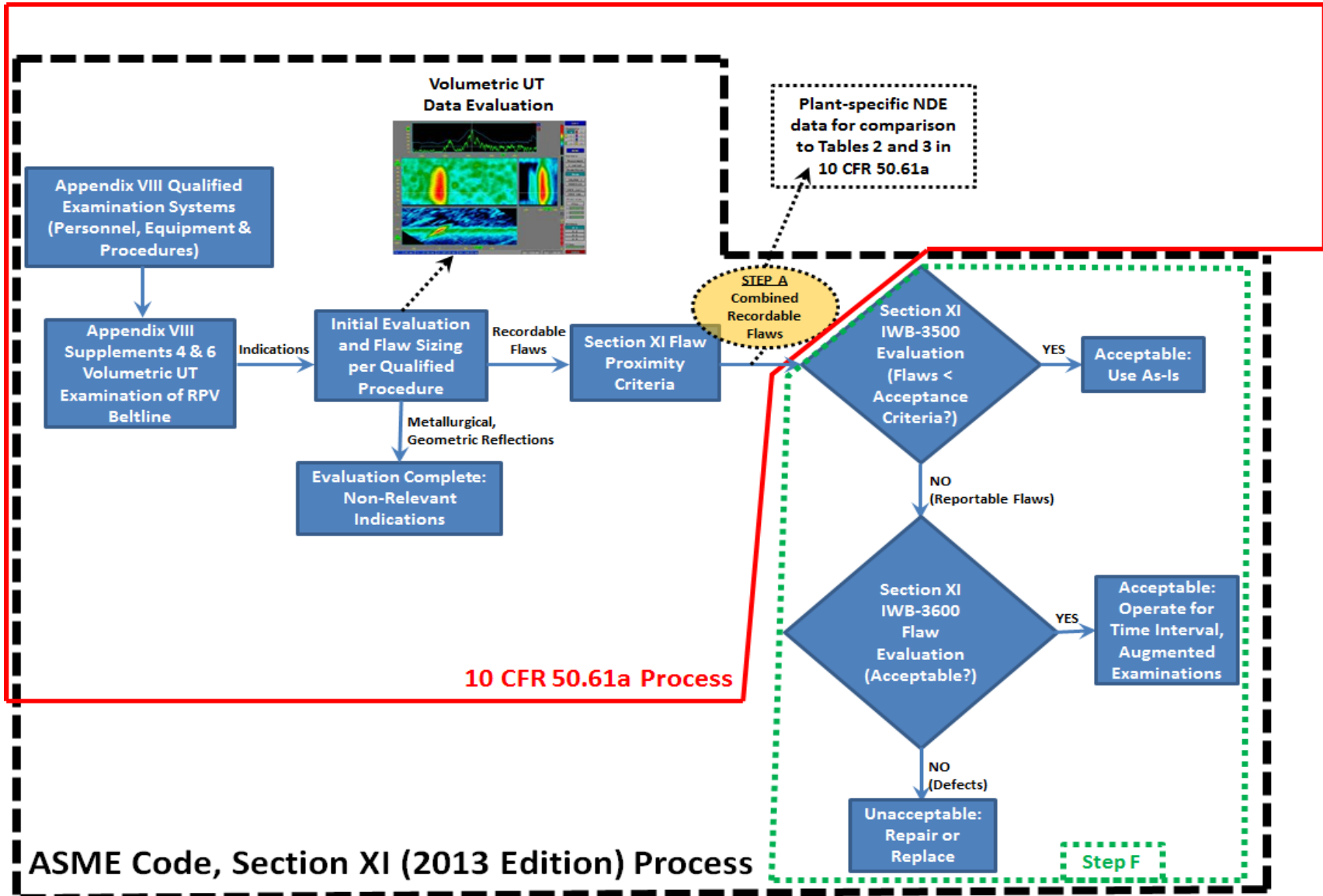


Stakeholder Feedback

- **EPRI's 7 areas of recommendations:**
 1. **Use of sister plant data when performing surveillance data statistical tests.**
 2. **Adjustment of ΔT_{30} when Mean and Outlier Tests are failed on a plant-specific or heat-specific basis.**
 3. **Adjustment of ΔT_{30} when the Slope Test is failed.**
 4. **Criteria that can be used to identify situations in which heat-specific adjustment to generic ΔT_{30} trends need not be considered.**
 5. **Calculation of through wall cracking frequency (TWCF) and comparison to risk limits if RT_{MAX-X} limits are violated.**
 6. **Determining whether flaws should be considered as plate or weld flaws when comparing to 10 CFR 50.61a flaw limits.**
 7. **Qualitative and quantitative solutions when 10 CFR 50.61a flaw limits cannot be satisfied.**

NDE Requirements

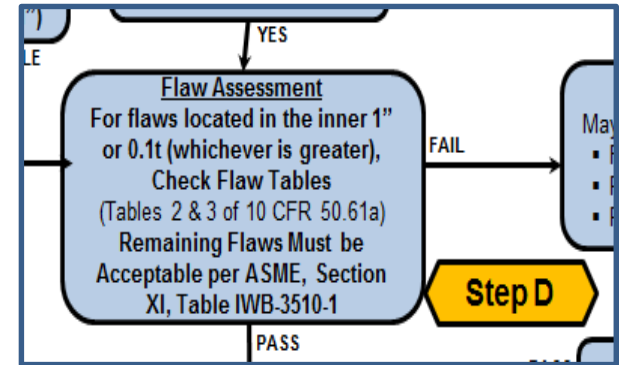
Results for Comparison to Flaw Tables



NDE Results Evaluation

Step D – Flaw Assessment

- **Guidance and sample problem provided in Chapter 6.3 of NUREG-2163**
 - **Determine plate and weld flaws ***
 - **Identify flaws in inner 1" or 10% of wall thickness**
 - Compare to 10 CFR 50.61a flaw tables
 - **Identify flaws beyond 1" or 10% up to inner 3/8 of wall thickness**
 - Compare to Table IWB-3510-1

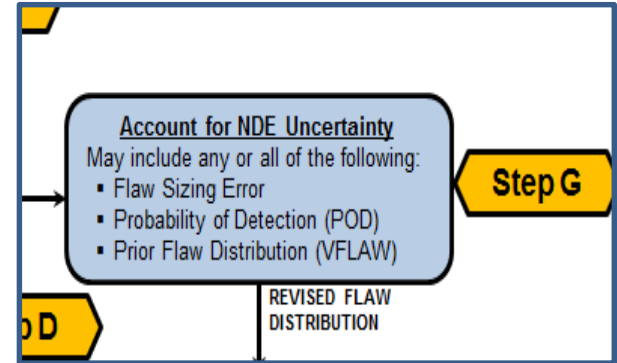


- * **Based on flaw position using design or ISI drawings of weld, with consideration given to heat affected zone.**

NDE Results Evaluation

Step G – NDE Uncertainty

- NDE uncertainty may be accounted for, but is not required
- Guidance for accounting for NDE uncertainty is provided in Chapter 6.4 of NUREG-2163
 - Includes guidance on elements and NDE techniques associated with ASME Code examinations *
- May re-distribute as-detected flaws and allow for acceptable flaw table comparison
 - Flaw sizing errors
 - Oversizing of smaller flaws (+)
 - Probability of Detection (POD)
 - Account for detection uncertainties (-)
 - Prior Flaw Distribution **
 - Adjust the VFLAW distribution used in PTS tech. basis based on plant-specific considerations (+)



* Based on PNNL Report 19666, “Evaluation on the Feasibility of Using Ultrasonic Testing of Reactor Pressure Vessel Welds for Assessing Flaw Density/Distribution per 10 CFR 50.61a, Alternate Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock,” June 2014 (ML14162A001).

** Detailed Bayesian statistical methods included in Appendix C of NUREG-2163.

NDE Results Evaluation

Step I – Evaluate for Acceptability

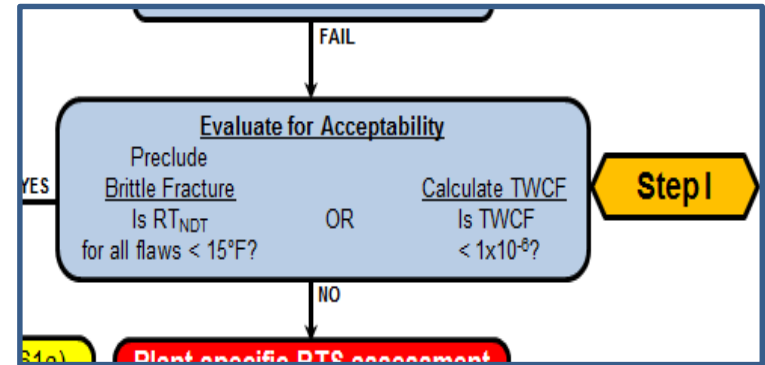
- If flaw table comparison is unsuccessful, licensees can perform additional evaluation to demonstrate acceptability
- Guidance is provided for two options:

- Preclude Brittle Fracture *

- Based on a lower bound PTS transient temperature of 75°F, upper shelf behavior is assured if $RT_{NDT} + 60 \leq 75^\circ\text{F}$
- Demonstrate that flaw-specific RT_{NDT} are less than or equal to 15°F

- Calculate TWCF

- Perform plant-specific PFM analysis **



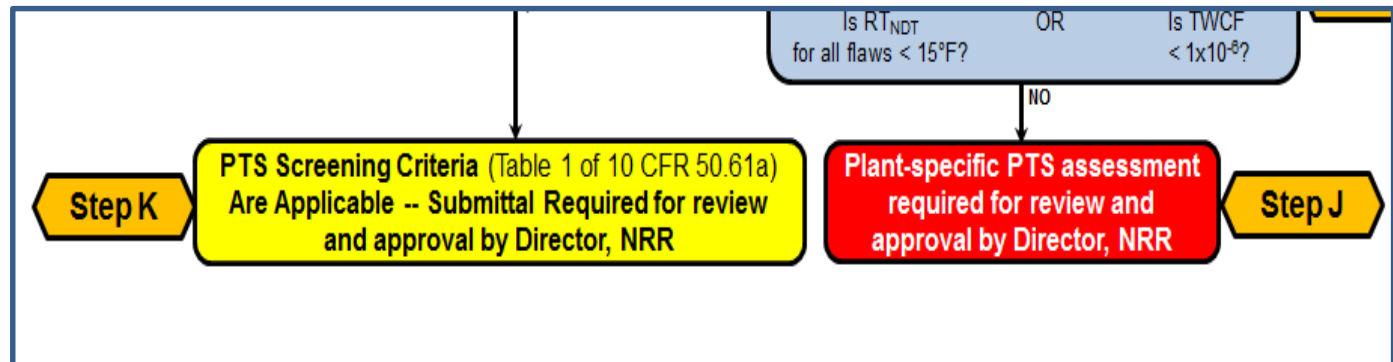
* Guidance on precluding brittle fracture and a sample problem are provided in Chapter 6.2.1 of NUREG-2163.

** Guidance on considerations to include in a plant-specific PFM are provided in Chapter 6.2.2 of NUREG-2163.

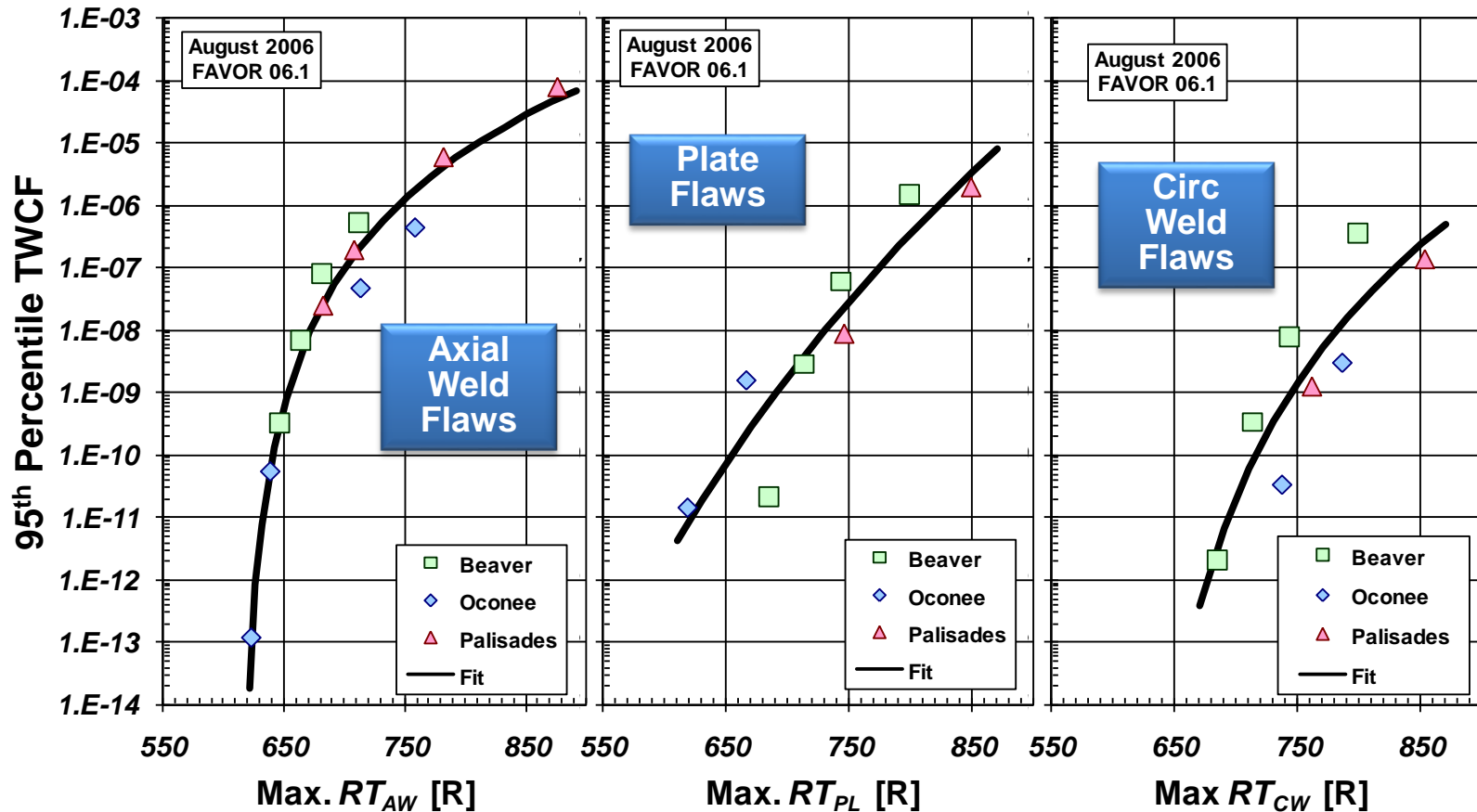
NDE Results Evaluation

Steps J and K - Submittals

- **Use of 10 CFR 50.61a PTS screening criteria requires submittal for review and approval by Director, NRR**
- **For plants that do not satisfy PTS Screening Criteria, plant-specific PTS assessment is required**
 - **Must be submitted for review and approval by Director, NRR**
 - **Guidance is not provided for this case**
- **Subsequent requirements (i.e., after submittal) are defined in paragraph (d) of 10 CFR 50.61a**



Alternate Limits on Embrittlement



RT limits based on bounding curve fits to PFM results



U.S.NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

Protecting People and the Environment

Proposed Updates of Licensing Policies, Rules, and Guidance for Future Reactor Applications

Joe Williams, Senior Project Manager
George Tartal, Senior Project Manager
Office of New Reactors
November 6, 2014

Purpose

- Brief ACRS on an upcoming Commission paper describing staff proposals for updating policies, rules, and guidance for future reactor applications

Scope of Paper

- Request Commission decisions
 - Confirm certain existing policies apply to new 10 CFR 50 applications
 - Direct rulemaking effort
 - Align new reactor requirements in 10 CFR 50 with 10 CFR 52
 - Part 52 lessons learned
- Describe guidance updates

Alignment of Parts 50 and 52

- Focus has been on new reactor licensing reviews using Part 52
- Part 50 and associated guidance have not been updated to reflect all current expectations

What is the need?

- Entities are considering use of Part 50
- Need to document Commission expectations to inform decision making
- Time required for rule changes and associated infrastructure prior to receipt of an application

Issue Identification

- Comparison of application requirements under 10 CFR 50 and 10 CFR 52
- Review of policy statements and decisions
- Experience gained in recent new reactor licensing activities
- Stakeholder feedback

Issue categories

- Advanced reactor policies applied only to Part 52
- New reactor licensing rules not applied to new Part 50 applications
- Application and review guidance updates needed to address Part 50 processes

Policy source documents

- Severe accident policy statement
- Commission papers and SRMs
 - SECY-89-013
 - SECY-90-016
 - SECY-93-087
- Paper requests that Commission confirm these policies also apply to new Part 50 applications

Rules not applied to new Part 50 applications

- TMI Action Plan requirements
- Probabilistic risk assessment description
- Severe accident prevention and mitigation features
- Fire protection program description application requirements

TMI Action Plan requirements

- Severe accident policy statement expectation
- DC and COL applications are required to address “technically relevant portions” of 10 CFR 50.34(f)
- New Part 50 applications are excluded
- Staff recommends that requirements be applied consistently to all new reactor applications

Probabilistic risk assessment

- Severe accident policy statement set PRA expectations
- SECY-93-0087 recommended DC and COL applications submit a description of the PRA and its results
- Incorporated into 10 CFR 52.47, 10 CFR 52.79, and 50.71(h)
- Recommend that all new reactors be required to
 - Develop, maintain, and upgrade a PRA
 - Submit a description of the PRA and its results
 - Include reliability assurance program per SECY-95-132

Severe accident design features

- Severe accident policy statement described general expectations
- Discussed in SECY-90-016 and SECY-93-087
- Only Part 52 applicants are required to provide information on these features
- Recommend that policy statement expectations be extended to all new reactor applications

Fire protection program description

- SRMs for SECY-90-016 and SECY-93-087 approved enhanced fire protection
- COL applications must provide description and analysis of fire protection plan and design features
- Part 50 applicants must address 10 CFR 50.48, but there are no explicit application requirements in 10 CFR 50.34
- Recommend consistent application content requirements

Other SECY-93-087 policy issues

- Some issues addressed only in Part 52 context
 - Leak-before-break
 - Steam generator tube rupture
- Recommend applying approved positions to all new reactor applicants

Application and review guidance

- Recent guidance updates have focused on Part 52
- Address effects of regulatory changes since the last CP was issued

SAMA for CP EIS

- CP safety findings are generally preliminary, but EIS findings are final
- No precedent for consideration of severe accident mitigation alternatives in CP
 - No application guidance
 - No guidance or precedent for EIS

Mitigative Strategies and Response Procedures (10 CFR 50.54 (hh))

- Application content guidance
 - 10 CFR 50.54(hh) and 10 CFR 50.34(i) do not distinguish between CP and OL
 - 10 CFR 50.35, “Issuance of construction permits”
 - Preliminary information for CP
 - Final, as-constructed, information for OL
- Maintain alignment if rule changes

Aircraft Impact Assessment (10 CFR 50.150)

- Application content guidance
 - 10 CFR 50.150 does not distinguish between CP and OL
 - AIA application requirements
 - 10 CFR 50.34(a)(13) for CP
 - 10 CFR 50.34(b)(12) for OL
 - 10 CFR 50.35 allows preliminary information for CP
- PSAR change control guidance

Other Guidance Updates

- Interim Staff Guidance (ISG) documents
- Reliability assurance program (RAP)
- Regulatory treatment of non-safety systems (RTNSS)
- Information on required programs

Implementation

- Rulemaking or other process (e.g., order or license condition)?
- Guidance updates
 - Need to establish level of detail for information submitted and associated finding for
 - Construction permit
 - Operating license

Part 52 Lessons Learned Rulemaking

- Staff proposes resumption of Part 52 lessons learned rulemaking effort
 - Corrections
 - Clarifications
 - New requirements
- Addresses actions proposed by self-assessment reports

Next steps

- Current status
- Implement Commission direction
- Engage ACRS on future rulemaking and guidance development efforts

References

- Policy statement “Severe Reactor Accidents Regarding Future Designs and Existing Plants” 50 FR 32138
- SECY-89-013, “Design Requirements Related to Evolutionary Advanced Light Water Reactors”
ML003707947
- SECY-90-016, “Evolutionary Light Water Reactor Certification Issues and Their Relationship to Current Regulatory Requirements” (ML003707849) and SRM (ML010170143)

References, continued

- SECY-93-087, "Policy, Technical, and Licensing Issues Pertaining to Evolutionary and Advanced Light-Water Reactor (ALWR) Designs" (ML003708021), and SRM (ML003760768)
- SECY-94-084, "Policy and Technical Issues Associated with the Regulatory Treatment of Non-Safety Systems in Passive Plant Designs" (ML003708068), and SRM (ML003708098)
- SECY-95-132, "Policy and Technical Issues Associated with RTNSS in Passive Plant Designs (SECY-94-084)", (ML003708005)

References, continued

- “New Reactor Licensing Process Lessons Learned Review: 10 CFR Part 52,” (ML13059A240)
- “Title 10 of the Code of Federal Regulations Part 52 Implementation Self-Assessment Review: 1 Year Post-Combined License Issuance,” (ML13196A403)