

NUCLEAR REGULATORY COMMISSION

Title: Advisory Committee on Reactor Safeguards
Regulatory Policies and Practices ✓
Subcommittee

Docket Number: (not applicable)

PROCESS USING ADAMS
TEMPLATE: ACRS/ACNW-005

Location: Rockville, Maryland

Date: Friday, October 29, 2004

Work Order No.: NRC-084

Pages 1-121

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

ACRS OFFICE COPY
RETAIN FOR THE LIFE OF THE COMMITTEE

TR04

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

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

+ + + + +

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

SUBCOMMITTEE ON REGULATORY POLICIES AND PRACTICES

+ + + + +

FRIDAY,

OCTOBER 29, 2004

+ + + + +

ROCKVILLE, MARYLAND

+ + + + +

The Subcommittee met at the Nuclear Regulatory
Commission, Two White Flint North, Room T2B3, 11545
Rockville Pike, at 8:30 a.m., Dr. William J. Shack,
Chairman, presiding.

COMMITTEE MEMBERS:

WILLIAM J. SHACK, Chairman

GEORGE E. APOSTOLAKIS, Member

MARIO V. BONACA, Member

THOMAS S. KRESS, Member

VICTOR H RANSOM, Member

STEPHEN L. ROSEN, Member

JOHN D. SIEBER, Member

GRAHAM B. WALLIS, Member

1 ACRS STAFF PRESENT:

2 MICHAEL R. SNODDERLY

3

4 NRC STAFF PRESENT:

5 WILLIAM D. BECKNER, NRR

6 STEPHEN DINSMORE, NRR

7 GLENN KELLY, NRR

8 RALPH LANDRY, NRR

9 EILEEN McKENNA, NRR

10 MARK RUBIN, NRR

11 BRIAN SHERON, NRR

12 JENNIFER UHLE, NRR

13

14

15

16

17

18

19

20

21

22

23

24

25

A-G-E-N-D-A

	<u>Page No.</u>
Opening Remarks, WILLIAM SHACK, Chairman	3
Process for Making Plant Changes Based Upon New DBA LOCA, NRR,	
BILL BECKNER	4
GLENN KELLY	10
STEVE DINSMORE	98
General Discussion, WILLIAM SHACK, Chairman	100
Adjourn, WILLIAM SHACK, Chairman	119

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

8:30 a.m.

CHAIRMAN SHACK: The meeting will now come to order. This is the second day of a two-day meeting of the Advisory Committee on Reactor Safeguard, Subcommittee on Regulatory Policies and Practices. I am William Shack, Chairman of the Subcommittee.

Members in attendance on George Apostolakis, Mario Bonaca, Tom Kress, Vic Ransom, Steve Rosen, Jack Sieber and Graham Wallis.

The purpose of this meeting is to review the staff's draft proposed rule language of the Voluntary Alternative Rule to allow licensees to implement a redefined large-break loss-of-coolant accident and associated risk-informed emergency core cooling system requirements.

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

Michael Snodderly is the Designated Federal Official for this meeting.

The rules for participation in today's meeting have been announced as part of the notice of this meeting previously published in the Federal

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 Register on October 20, 2004. A transcript of the
2 meeting is being kept and will be made available as
3 stated in the Federal Register notice.

4 It is requested that speakers first
5 identify themselves and speak with sufficient clarity
6 and volume so they can be readily heard. We have
7 received no written comments or requests for time to
8 make oral statements from members of the public
9 regarding today's meeting.

10 We will now proceed with the meeting. I
11 will call upon Brian Sheron of the Office of Nuclear
12 Reactor Regulations to begin.

13 MR. BECKNER: Okay, I'm Bill Beckner, I'm
14 the Program Director of the new Research and Test
15 Reactors Program. I apologize, Brian called me, I
16 thought about this question for about five minutes, I
17 think I have a pretty good answer, I couldn't bring my
18 Part 52 expert here, but do you want to restate the
19 question just to make sure I understand exactly what
20 the question is?

21 CHAIRMAN SHACK: Why can't the rule be
22 applied to new reactors?

23 MR. BECKNER: Okay.

24 First of all, I think let's use the ABWR
25 for an example. ABWR has a design certification,

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 obviously. That's a rule, it's a done deal, it's not
2 going to change unless they went through the process
3 again. I brought this, since I couldn't bring the
4 expert I thought, yes, I've got extra copies.

5 This is a pretty good process of the
6 licensing process.

7 MR. ROSEN: Move it up closer to your
8 mouth, please.

9 MR. BECKNER: Okay.

10 MR. ROSEN: Maybe you ought to just put it
11 on, so then you won't have to be bothered with it.

12 MR. BECKNER: Okay.

13 Recognize to build an ABWR or any other
14 plant you actually need a license, probably a combined
15 license under Part 52. Now, if you read this thing,
16 a combined license can reference a design
17 certification, an early site permit, both or neither.
18 Okay, so one can come in with a combined license to,
19 say, build an ABWR, but not reference the design
20 certification. They'd have to submit all the
21 information that you normally submit for a license, it
22 would have to be reviewed by the staff and so forth.

23 The disadvantage of doing that, by not
24 referencing a design certification, is what can be
25 reconsidered during hearings, basically. So, yeah, it

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 probably would not be advantageous to try to build an
2 ABWR without referencing a design certification unless
3 you are making a lot of changes. That's my personal
4 opinion.

5 Now, clearly, too, you could get a license
6 and do an amendment after the fact. All right, but
7 the primary benefit of a design certification, or
8 making use of the design certification in a licensing
9 hearing, is to limit the issues that would have to be
10 reconsidered, or could be reconsidered, during that
11 licensing process.

12 Now, there's a question I couldn't answer,
13 you may talk about, what about hybrid, what about
14 referencing a certified design, but we'd like to
15 change this little piece, and I don't know the answer
16 to that. My expectation is that would probably open
17 it up to a lot of hearings also.

18 That's it in a nutshell, so it would be
19 possible, you could clearly build an AP1000, or AP600,
20 or an ABWR and license it without referencing that
21 certified design. Again, you'd lose that benefit
22 though. Okay.

23 CHAIRMAN SHACK: But, you know, I don't say
24 anybody would do that, but you are saying even a
25 license amendment would then open yourself up.

1 MR. BECKNER: Once you got your license it
2 would be like any other license amendment, like we do
3 for power uprates or for an existing plant, and again,
4 that's also subject to hearing process. So, the real
5 issue of making use of a standardized design is its
6 fix, it's not only what can be considered in a
7 hearing, but also any changes the staff could make,
8 too. That's the benefit, it's the finality of a lot
9 of the design issues.

10 MR. ROSEN: That's a very good answer, but
11 I'm not sure that's the question we asked.

12 MR. BECKNER: All right.

13 MR. ROSEN: I thought the question was, why
14 can't a new plant use the new 50.46?

15 MR. BECKNER: If we went through - the
16 answer is, if we went through a new design
17 certification process, for instance, if one of the
18 ESBWRs or another plant came in, they could choose to
19 reference the regulations in place at that time. So,
20 if we modify the regulations today, and I think
21 there's a six-month time period, the reference is to
22 regulations some period of time before the submittal.
23 So, yeah, a future design certification could make use
24 of this rule once that rule is in place.

25 MR. ROSEN: Okay, but not with any tests -

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 MR. BECKNER: But, ABWR -

2 MR. ROSEN: - like AP600 or AP1000.

3 MR. BECKNER: - AP1000 will have a rule
4 within a year or whatever, and that will be fixed.

5 MR. ROSEN: As long as that beats this,
6 then it can't use this.

7 MR. BECKNER: Correct.

8 MR. ROSEN: But, if this, for some reason,
9 beats the final certification -

10 MR. BECKNER: Well, AP1000 is out the door,
11 too, because we've got the final design.

12 MR. ROSEN: And, we've already evaluated
13 it.

14 MR. BECKNER: Right, but ESBWR, which maybe
15 the next one to shoot, they could, in theory, modify
16 their submittal to reference a revised 50.46.

17 MR. ROSEN: Okay, I get it.

18 MR. BECKNER: Okay, and again, anyone can
19 submit a license amendment or a license application
20 without referencing a design, it's just you lose all
21 that benefit.

22 MR. ROSEN: Yeah, and the question was,
23 okay, so if you are - if you've got a certification
24 before this comes out, say, AP600, you want to build
25 one of those, you say I'd like to use the 50.46, the

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 question was, well, that reopens the whole ball game.
2 It's like the arguments against the constitutional
3 amendments.

4 MR. BECKNER: Right, you would not
5 reference the design certification, you'd submit all
6 the information necessary and that would be subject to
7 staff review and also reconsideration at hearings.

8 MR. ROSEN: So, not just the issue of 50.46
9 if you did that, but potentially everything in the
10 certification.

11 MR. BECKNER: And again, Steve, my question
12 is I'm not sure about some hybrid of that. My guess
13 is that wouldn't work either, I don't know.

14 MR. ROSEN: But, you know, an ASLB could
15 decide to limit it to just this.

16 MR. BECKNER: That's true. That's true.

17 MR. ROSEN: And then, that could be
18 appealed and, you know, go through all that, and it
19 might end up that -

20 MR. BECKNER: It might be just about as
21 bad.

22 MR. ROSEN: - yeah.

23 MR. BECKNER: All right?

24 MR. ROSEN: Thank you.

25 MR. BECKNER: Okay, thank you.

1 I'll leave some copies of these. If you
2 haven't seen it, really, it is a good refresher, it's
3 not enough detail to probably answer this question,
4 but it is a good refresher. I'll leave these with
5 you.

6 CHAIRMAN SHACK: Steve, are you next up?

7 MR. KELLY: Good morning. My name is Glenn
8 Kelly. I'm with the PRA Branch in NRR. With me is
9 Stephen Dinsmore. We've prepared a presentation for
10 you today, regarding how we would go about evaluating
11 the acceptability of proposed plant modifications and
12 how we would expect the licensee, if we had an
13 inconsequential plant change that they wanted to make,
14 how they should go about making their plant
15 modifications.

16 The first thing that I wanted to note is
17 kind of reiterating what Brian Thomas - Brian Thomas
18 - Brian Sheron spoke to you about yesterday, was that
19 we don't want and won't accept unacceptable increases
20 in risk under this rule. So, one of the major things
21 that we want to assure is that any changes that are
22 made, that are reviewed by the staff, or that are made
23 under the inconsequential change process, that these
24 would be acceptably small increases in risk.

25 As under risk informed regulation, the

1 reason why we are doing risk informed regulation, as
2 I'm sure you are already aware, is we want to promote
3 safety by focusing the regulations on, basically,
4 those aspects of the plant or how the plant is
5 operated, they are really the most important as far as
6 risk goes, and so that the resources of the utility
7 and of NRC can be most wisely spent.

8 As part of that, as you've heard
9 yesterday, and heard during various presentations to
10 you before, the expected frequency of the largest
11 double-ended guillotine LOCA is believed to be very
12 small.

13 DOCTOR WALLIS: This is only part of the
14 equation, because you've got to take frequency and
15 consequences, and I guess what you are saying is that
16 the consequences of all these LOCAs are sort of
17 similar, so you can only judge by frequency? Because,
18 if the large-break LOCA has far worse consequences
19 than all other LOCAs, you couldn't just talk about its
20 frequency, could you?

21 MR. KELLY: That's correct.

22 DOCTOR WALLIS: So, you are sort of
23 assuming that all LOCAs are kind of equivalent in
24 terms of consequence?

25 MR. KELLY: No, they are not - actually,

NEAL R. GROSS

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

1 they are not all equivalent.

2 DOCTOR WALLIS: So, how do you put
3 consequence into this equation?

4 MR. KELLY: Well, you can, again, as we've
5 talked about, that there are two aspects associated
6 with calculating risk.

7 Mark?

8 MR. RUBIN: Yes, this is Mark Rubin from
9 the staff. I could, perhaps, give a little
10 perspective on it.

11 The focus was that the expected
12 frequencies of the large-break LOCAs, the ones that
13 yield to break, are very small, much smaller than
14 press assumed in WASH-1400 and many other studies.
15 But, the key incite from the severe accident study,
16 the severe accident risk from LOCA-initiated in
17 general are very low. So, you have to keep, you know,
18 of course, that in mind, too. LOCAs generally do not
19 dominate risk, and large-break LOCAs don't dominate
20 LOCA risk.

21 So, taken altogether, the indication is
22 that this is an area that got great regulatory
23 attention in the past, and we've discovered through
24 the severe accident methodologies that a lot of the
25 risk really exists in other areas, station blackout

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

1 for instance. We've had some risk-informed
2 rulemakings at WIS SBO because of these severe
3 accident incites that now we are getting back to the
4 basic regulations and trying to clean up some of the
5 discrepancies, and that's why we are going forward
6 with this program.

7 DOCTOR WALLIS: So, your real argument is
8 that the risk contribution of this thing is very
9 small, it's not just the frequency.

10 MR. RUBIN: A combination of both.

11 DOCTOR WALLIS: Yes, but if you just
12 mention frequency, it's only half the argument.

13 MR. DINSMORE: This is Steve Dinsmore from
14 the staff.

15 I think we also were aware that the
16 consequences of the large-break LOCA are being
17 controlled by these defense-in-depth calculations.

18 DOCTOR WALLIS: As long as you don't back
19 off on them.

20 MR. DINSMORE: Well, we discussed this
21 specifically in the slides what is going to be taken
22 care of through the defense-in-depth part of it. So,
23 the consequences are being controlled as well, so we
24 didn't put it on this slide.

25 DOCTOR WALLIS: So, they are being

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 controlled, they are not just only being controlled -

2 MR. DINSMORE: 70 percent probability.

3 DOCTOR WALLIS: they are not being ignored.

4 MR. DINSMORE: Yes, they are not being
5 ignored.

6 CHAIRMAN SHACK: See, I'd look at it a
7 little differently. I always find this reason
8 somewhat circular. The LOCAs make very low
9 contributions, because the system is designed to
10 handle LOCAs.

11 DOCTOR WALLIS: So, if you stop worrying
12 about the system -

13 CHAIRMAN SHACK: If you stop worrying, you
14 know, and if you make design changes you can, in fact,
15 increase the risk.

16 MR. ROSEN: Not if you say we are not going
17 to allow substantial changes in risk.

18 MR. RUBIN: Right, that's the key issue,
19 that whatever changes you make could, indeed, affect
20 a number of other severe accident sequences totally
21 unrelated to LOCA, and that's why an integrated risk
22 assessment, to the greatest extent we can, will be
23 made to look at the impact on the other accident
24 sequences, other initiators.

25 MR. KELLY: And, as we go through, we'll

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 talk about, besides core damage frequency and LERF an
2 additional metric that we are proposing that we
3 believe would help assure that we'd have adequate
4 defense-in-depth for the plants.

5 CHAIRMAN SHACK: Well, I mean, we'll all
6 get to the same answer, you know. I just make the
7 argument that it is really the fact that the DEGB LOCA
8 frequency is very small, as Tom pointed out yesterday,
9 if you assume it goes to failure the frequency is
10 probably small enough that you are still in the small
11 risk basis.

12 The defense-in-depth is really just in
13 case we are wrong about how frequent the DEGB really
14 is, and so we are covered in both ways. I mean, our
15 rationalist assessment is that the DEGB LOCA frequency
16 is very small, the defense-in-depth is there if we are
17 wrong about that.

18 MR. KELLY: We're going to talk about four
19 basic steps.

20 DOCTOR KRESS: You mentioned the third risk
21 method, is that light releases?

22 MR. KELLY: Yes, it is.

23 We're going to talk about four basic steps
24 to making plant modifications. The first is to define
25 your proposed change, identify the process you are

NEAL R. GROSS

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

(202) 234-4433

www.nealgross.com

1 going to make, then perform an engineering analysis
2 which includes PRA in your typical deterministic
3 evaluations, define your implementation and monitoring
4 programs, and then submit the proposed changes, if the
5 submittal is required.

6 So, when one goes about defining a
7 proposed change, we are looking for the licensee to
8 effectively indicate what are all of the aspects of
9 the plant that are going to be affected by this
10 change. This includes aspects of the plant's design,
11 other aspects of its licensing basis, operating
12 conditions, et cetera.

13 We want them to identify the SSCs,
14 procedures, et cetera, that will be changed, and when
15 we look at this, as we talked yesterday a little bit
16 about cumulative risk, when NRC looks at the changes
17 that are proposed over time under 50.46a, if we are
18 going to treat these as, in essence, when we are doing
19 the numerical comparisons, as a single change.

20 DOCTOR KRESS: Let me ask you a question
21 about that. It's bothered me a little in the past.

22 I can envision one change increasing the
23 risk and another change bringing it back down, but the
24 two changes may not be equivalent in terms of the
25 contribution to uncertainty.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 Do you have a way to deal with that,
2 because a set of changes together may not end up at
3 just the same risk point, it may add up with a
4 different uncertainty.

5 MR. KELLY: Well, that's correct.

6 DOCTOR KRESS: And, I don't know how to
7 actually deal with that in this process.

8 MR. KELLY: Well, I think that that's a
9 good point, and one of the aspects that goes along
10 with all of this is that, I think we've talked a
11 little bit already about defense-in-depth, and one of
12 the major reasons why we have defense-in-depth at
13 power plants is because of the inherent uncertainty in
14 certain aspects.

15 I believe is that if we saw that what was
16 being proposed was a set of changes that might be
17 significantly increasing the uncertainty associated
18 with the ability to plan, to prevent, or mitigate
19 serious accidents. We expect defense-in-depth would
20 be commensurately increased to take into account such
21 changes.

22 DOCTOR KRESS: That would be the logical
23 approach. So, I gather from that you are going to ask
24 for uncertainties associated with these changes,
25 uncertainties that we are going to see?

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 MR. KELLY: That's correct, in our proposed
2 rule we are asking the licensees to specifically
3 address uncertainties in their submittal.

4 MR. ROSEN: Now, Glenn, I must have blanked
5 out when you were talking about that third bullet.
6 Are you really saying that every time the licensee
7 comes in, if a licensee was doing this repetitively,
8 to ask for a change he has to go back to the very
9 beginning of time and, basically, add them all up and
10 show that the total continues to be insignificant? Is
11 that what you -

12 MR. KELLY: Well, in essence, what you are
13 looking at is, I could take an example, I have my PRA
14 for my plant today, and it's not too difficult to put
15 some things in the event trees and fault trees such
16 that I can turn on various gates on and off with
17 certain commands so that I can effectively model or
18 take out of the model things that I've done for
19 50.46a. So that, if I'm not longer, for example,
20 taking credit for my accumulators I can - I don't want
21 to get too much into details, but you can effectively
22 put it into the model directly, the PRA model, such
23 that over time as I change the model it's just I'm
24 adding one more piece here that I can turn on or turn
25 off, so that when I look today I can say, okay, here

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 we are today with my plant, here's how I'm going to
2 change it, and I'm going to model it that way. And
3 then, I can go back to my plant before I had all the
4 changes, and I can run the PRA in both situations, and
5 see what's the differential core damage frequency.

6 MR. RUBIN: Maybe I could add something.

7 Doctor Rosen, were you asking the changes,
8 the larger changes, or just the inconsequential group
9 of changes?

10 MR. ROSEN: No, I was just asking what that
11 third bullet meant, how are you going to measure that?

12 MR. RUBIN: Yes, these are considered under
13 the 1.174 approach these are considered a single
14 bundle to change, due to the rule, and, yes, they will
15 be looked at, and totally they must meet the accepted
16 criteria of at most a small increase.

17 DOCTOR WALLIS: Is this going to be at
18 different times, you make some changes this year, next
19 year, and the next year, you add them all up?

20 DOCTOR KRESS: Well, I think the 1.174
21 process automatically tracks that.

22 MR. RUBIN: If it's a related change, and
23 we've defined this as part of the rule process as
24 being a related bundle change. Even if they're done
25 over years apart, you have to keep track of the 50.46a

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 related changes, and that in combination shouldn't
2 increase, they shouldn't cause more than a small
3 increase in risk, which should be developed in the reg
4 guide, and some will be negative. We expect some will
5 be improvements in safety and we are suggesting some
6 quantifiable, some not quantifiable.

7 MR. ROSEN: So, effectively, a plant will
8 have a budget, a budget, each plant will be granted a
9 budget by this thing of some element of risk, and they
10 can - additional risk, incremental risk - and they can
11 use it as they choose over the remaining life of the
12 plant.

13 MR. RUBIN: Kind of Kyoto, perhaps, on
14 greenhouse gases, but, in any event -

15 MR. ROSEN: I'm not an expert on Kyoto,
16 you'll have to use another analogy.

17 MR. RUBIN: Yes, they'll have a quota.

18 DOCTOR APOSTOLAKIS: Let me understand
19 this, what you are saying. I make, say, three
20 changes, you guys approve them, I get a delta CDF
21 that's positive. Then three years down the line I
22 propose another change, related to 50.46. The way I
23 understand it is that this new change will have to be
24 evaluated in the context of the modifying plan,
25 because you have already made three changes.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 MR. DINSMORE: No.

2 DOCTOR APOSTOLAKIS: No?

3 MR. DINSMORE: You'd have to compare back
4 to the original configuration.

5 DOCTOR APOSTOLAKIS: So, that was my
6 question, so you are going to calculate now a delta
7 CDF which will be the combination of all four changes,
8 the three that have been approved and the new one?

9 MR. DINSMORE: Yes.

10 DOCTOR APOSTOLAKIS: Well, that goes
11 against 1.174.

12 MR. RUBIN: There will be two calculations.
13 Based on the as-built plant with the previous changes,
14 they'll take the new proposed change and calculate the
15 delta, and that will probably have to show that it's
16 a small increase in risk, at most, or maybe even
17 improvement. But, they also will have to take the
18 changes in combination.

19 DOCTOR APOSTOLAKIS: Even though they are
20 three years apart.

21 MR. RUBIN: Even though they are three
22 years apart, with the most current model.

23 DOCTOR KRESS: But, they are already in
24 combination because they are reflected in the current
25 state of the CDF.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 MR. RUBIN: But, not as a group of 50.46.

2 DOCTOR KRESS: Well, what do you do with
3 that information then?

4 DOCTOR APOSTOLAKIS: You are comparing to
5 the current baseline.

6 MR. RUBIN: What we don't want is a
7 creeping increase in risk in aliquots of 10^{-5} CDF that
8 over time -

9 DOCTOR KRESS: But, 1.174 automatically has
10 a break.

11 MR. RUBIN: 1.174 is a regulatory guide and
12 not a rule.

13 DOCTOR KRESS: Oh, I see.

14 MR. RUBIN: And, it was our intent and
15 expectation that we would not get this creeping risk
16 effect, but there is no regulation to prohibit it.

17 The Committee and staff discussed just
18 this very issue about six or seven years ago. And,
19 the experience we've gained in many years of risk-
20 informed licensing applications has been, in fact,
21 there has not been a creeping increase in risk, all
22 the changes have been small. In total, the impact to
23 the risk-informed changes globally have been small or
24 neutral or reductions in some cases, but now we are in
25 rule space, and in rule space we are saying the draft

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 proposal is that there should always be a revalidation
2 that all the changes in total, with the most current
3 model, take them in and out of the model and make sure
4 that the total impact is no more than a small increase
5 in risk.

6 CHAIRMAN SHACK: But, I'm left with this
7 argument that it's okay to change my risk by 1×10^{-5}
8 under 50.44, but it's not okay to add another 1×10^{-5}
9 under 50.46, even though the total risk is the same at
10 the end of the process.

11 If I've made some change under 50.46, and
12 I've added 1×10^{-5} , I've used up my full quota of
13 50.46 risk, but I can go off and change something else
14 under 50.44 and up my risk by 1×10^{-5} and that's
15 okay. But, I can't go back and add another 1×10^{-5}
16 under 50.46. I don't know why I color the risk.

17 MR. DINSMORE: It's kind of set up, we've
18 been doing this for all the applications, we've been
19 consistently applying this process.

20 For each set of related applications, you
21 are right, you can select different types of
22 applications, and you can add those up independently.
23 But, within an application we keep track of the
24 cumulative effect of the changes.

25 The best example is this integrated leak

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 rate testing, where they came in, they started with
2 three times in ten years, they got permission to do it
3 once in ten years, then they came back in and said we
4 want to do it once in 15 years. We compared that once
5 in 15 to the original three in ten, not to the changed
6 one in ten.

7 So, we've been doing this with all the
8 applications, and it's correct that if they select
9 from completely different applications they can always
10 come up to this boundary for each application.

11 DOCTOR KRESS: I was under the impression
12 that this rule was directly tied to 1.174. Is that a
13 false information?

14 MR. DINSMORE: No. Well, it is, because -
15 we believe it is, because what we are doing is we are
16 grouping all the changes that you are allowed to do
17 because of this rule as one application. So, in that
18 respect it's identical to what we've been doing with
19 IST, ISI, all these other applications. We take each
20 application and we keep it in a box, and we control
21 what's going on within that box.

22 MR. RUBIN: If I could add, this is, I
23 believe, directly in line and consistent with the
24 bundling application concept in 1.174, and all we are
25 doing here is defining 50.46 changes are a bundle.

NEAL R. GROSS

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

1 DOCTOR BONACA: It seems to me what you are
2 really doing, I mean, you are saying that whatever
3 plan, some of them will stay with according to
4 Appendix K, some will stay with the current best
5 estimate, and some of them will choose to go risk-
6 informed, but the current baseline as the other plans
7 that stay with current Appendix K, the existing
8 baseline is still alive. I mean, you are still using
9 it as a reference point to anchor the changes you make
10 through the risk-informed process, and I agree with
11 that concept.

12 DOCTOR APOSTOLAKIS: But, is that stated
13 explicitly in 1.174 that you do that?

14 MR. KELLY: Reg Guide 1.174 indicates that
15 the - again, Reg Guide is a guide, it's not a
16 requirement, and it speaks about that, in essence, the
17 maximum change would be allowed under that guidance
18 would be an increase in core damage frequency of 10^{-5}
19 per year. We could allow a higher increase, but it
20 would be something that would require additional
21 consideration.

22 DOCTOR APOSTOLAKIS: But, bundling requests
23 that are made over a period of years.

24 MR. KELLY: Reg Guide 1.174 does talk about
25 tracking the cumulative risk.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 DOCTOR APOSTOLAKIS: Tracking.

2 MR. KELLY: It's in the back, right, it
3 talks about tracking it.

4 DOCTOR APOSTOLAKIS: But, it doesn't say
5 that the cumulative risk should be less than 10^{-5} , it
6 says for each application I think it should be less
7 than 10^{-5} .

8 MR. RUBIN: But, here we have a situation,
9 as Doctor Sheron pointed out, there is expectation in
10 the industry, some of the improvements in risk
11 reduction, and that was the entire concept of the
12 bundling effect in 1.174, to allow credit for
13 decreases to compensate for increases in related
14 applications, and only allowed in 1.174 in a related
15 application, a related - where there's commonality
16 driving the changes.

17 And here, the commonality is 50.46a, the
18 change in the regulatory -

19 DOCTOR APOSTOLAKIS: Essentially then, what
20 you are saying is that the way you are interpreting
21 the risk-informed changes is that the most you can get
22 from this rule, for example, is 10^{-5} .

23 MR. RUBIN: Yes, sir.

24 DOCTOR APOSTOLAKIS: We don't care when you
25 get it, but that's your ultimate maximum benefit.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 MR. RUBIN: Yes, but the expectation would
2 be pluses and minuses as the process goes forward.

3 MR. ROSEN: And, that's true for every
4 plant, regardless of their initial CDF. It's the
5 same, it's a one-size-fits-all.

6 DOCTOR BONACA: But, what is the maximum
7 benefit? I mean, I don't understand that, benefit to
8 what, increased risk is a benefit. I mean, it's a
9 stop to me, okay, it means there is built in the rule
10 an expectation that the changes never - not
11 necessarily, you know, they will not go beyond the
12 stop, but in reality you expect some benefit.

13 DOCTOR APOSTOLAKIS: Anyone who proposes a
14 change because of positive CDF obviously does it
15 because they are benefits associated with it. I think
16 that that's what they mean, it's not that they are
17 increasing risk just for fun, it's a benefit.

18 DOCTOR WALLIS: I like this, because now
19 there's some incentive to promote safety. They want
20 to make these changes which increase risk, they've got
21 to cash in these promote safety things that everyone
22 has been talking about, but there's no incentive to do
23 them unless you have something like this.

24 MR. DINSMORE: If they hit the limit, the
25 only way to make future changes is to do as Doctor

NEAL R. GROSS

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

(202) 234-4433

www.nealgross.com

1 Wallis said, make some positive changes.

2 DOCTOR WALLIS: So, you really are going to
3 account for more safety by making use of this.

4 MR. ROSEN: Sure, but let me track this
5 third bullet now one more step, this one-size-fits-all
6 piece of it. A plant that now have a CDF of $1E^{-5}$
7 versus a plant that now has a $1 \times 1E^{-4}$ CDF let's say,
8 the $1E^{-5}$ CDF plant can double its risk, right?

9 MR. KELLY: That's correct.

10 MR. ROSEN: The $1E^{-4}$ plant takes a 10
11 percent.

12 MR. KELLY: Right, because it already has
13 - the reason is that it already has a significantly
14 larger baseline risk. I mean, if you go to Reg Guide
15 - again, the rule, as it is currently proposed,
16 indicates that there should be sufficiently small
17 increases in core damage frequency, large early
18 release frequency, and late release frequency - Mark,
19 did you want to say something?

20 MR. RUBIN: Yeah, I just wanted to add, in
21 track down with 1.174 it was clearly identified that
22 plants that went $1E^{-4}$ or above we looked very
23 carefully at, and we would not expect or be very
24 receptive to the maximum allowed delta CDF and delta
25 loop changes in those areas.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 DOCTOR APOSTOLAKIS: Actually, the maximum
2 is 10^{-6} then, a step down.

3 MR. RUBIN: Yes. The definition is only
4 very small changes would be allowed. The definition
5 in the Reg Guide is - $1E^{-6}$, of course, it's not a rule,
6 it's a Reg Guide, but that concept probably should be
7 carried through as we develop the final rule. I mean,
8 very good point.

9 MR. KELLY: The statement of consideration
10 as it currently exists has examples that lay this out
11 very similar to what's in Reg Guide 1.174, that lays
12 out an example of one way that the staff would
13 consider increases in risk to be acceptable. And, as
14 part of that the SOC currently reflects the idea that
15 if your baseline CDF is too high, that we would frown
16 on any additional increases.

17 MR. ROSEN: Let me turn the argument over
18 for a minute, because I think you've made your point
19 about baseline risks that are high.

20 How about baseline risks that are low?
21 The plant that has already invested a lot of money to
22 get its CDF way down, say $1E^{-5}$, it now comes in with
23 a change that says it wants to double the risk. Is
24 the staff going to go, oh, my God, the sky is falling?

25 MR. RUBIN: No.

NEAL R. GROSS

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

1 MR. ROSEN: Or, is the staff going to say,
2 well, yeah, you have invested a lot in getting it
3 down, and you are much better than the average plant
4 and -

5 MR. RUBIN: Yes.

6 MR. ROSEN: - now you want to take a
7 little bit back?

8 MR. RUBIN: Yes, sir, that is what we are
9 going to say, and that's consistent with our current
10 risk-informed process, is this was, again, debated
11 heavily when 1.174 was developed, as you probably
12 remember, and the decision was that we would go with
13 absolute deltas and that the plants that were much
14 lower in risk would be allowed this same incremental
15 changes at a maximum as any other plant.

16 DOCTOR APOSTOLAKIS: An issue that arises,
17 though, is, okay, so it seems that you have a number
18 of things when you say from 50.46 delta CDF is 50.44,
19 other things, then how you define these things is
20 important, right? Sometimes it's obvious, you have a
21 rule 50.46, okay, anything that's related to large
22 LOCAs is one thing. Then you have another one just
23 for tech specs, all the tech specs are in one place?

24 MR. DINSMORE: We're still in the process
25 of defining the bins. Most of them are pretty easy to

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 define.

2 DOCTOR APOSTOLAKIS: Yeah.

3 MR. DINSMORE: There might be some that
4 are, for example -

5 MR. ROSEN: Wait a minute, wait a minute.

6 DOCTOR APOSTOLAKIS: Let him finish.

7 MR. DINSMORE: - for example, if somebody
8 comes in, which has happened, and they want to reduce
9 some type of tornado protection requirements, and they
10 use risk to say it, if the same client came in and
11 wanted to do the same thing with some other tornado
12 protection requirements we'd probably call that a bin.
13 It's not real -

14 DOCTOR APOSTOLAKIS: So fire is one bin?

15 MR. DINSMORE: Maybe, we haven't worked all
16 that out.

17 MR. ROSEN: That's not what Mark said,
18 that's why I wanted a time out here. Mark was saying
19 the commonality is 50.46, not slices of 50.46, topical
20 areas within it.

21 DOCTOR APOSTOLAKIS: No, no, no, we are
22 talking about broader applications. If they apply
23 this philosophy to everything, what is bundling?
24 Which changes do you bundle together? Sometimes it's
25 obvious, 50.46, okay, anything related to that. But,

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 they are not going to tech specs.

2 MR. RUBIN: If I could add, the bundling
3 concept is much less rigorously defined for non-rule
4 applications. Typically, it would be related to a
5 specific application, they come in with a diesel
6 generator AOT change, which 30 day, a 21 day, maybe
7 they are really pushing the delta CDF limits on this
8 change, but there's a seismic vulnerability to the
9 diesel structure of the cooling systems, and they fix
10 that at the same time. We've actually seen those, so
11 there's an improvement. That's a bundle change, they
12 add the pluses and minuses, we look at the deltas.

13 We don't have a bundle of tech spec
14 changes. On some occasions, when there's a real
15 commonality that goes over years, like the ILRT type
16 A changes, very clearly it's the same issue, every 15
17 years, or three out of ten, or one out of ten, we do
18 consider that a bundle change, as did Steve Ginsmore,
19 but the concept of bundling is much more restrictive
20 for general applications than we are making it here.

21 Here, it's rule related, and it's going to
22 be defined very precisely.

23 DOCTOR KRESS: If I've got five different
24 bundles, five different types of changes, I can have
25 a 10^{-5} delta CDF in each one of them?

NEAL R. GROSS

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

(202) 234-4433

www.nealgross.com

1 MR. KELLY: As of right now you can.

2 DOCTOR KRESS: So, the total depends on how
3 many bundles I have and how I define them?

4 MR. DINSMORE: But you can't go over the
5 10^{-4} .

6 DOCTOR KRESS: Oh yeah, you might hit that
7 limit.

8 MR. KELLY: Right, and the reason, this is
9 something that, you know, assuming some day we get to
10 the rest of option three, which is risk informing of
11 Part 50, it may be at that point we'll have a process
12 where we've got clearly defined, what is the allowed
13 overall increase in risk at your plant, and we'd
14 manage it that way.

15 But, at this point, because what we have
16 is a series of independent risk-informed applications
17 we -

18 DOCTOR KRESS: So, if I'm a licensee
19 wanting to take advantage of the new 50.46 rule, I've
20 got to sit down and carefully choose what changes I'm
21 going to go for, because I've going to be limited in
22 the number of them I can do.

23 MR. ROSEN: That's right.

24 DOCTOR KRESS: Limited by an arbitrary 10^{-5}
25 in that bundling. You know, why shouldn't that bundle

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 be given more than 10^{-5} ? Why is 10^{-5} an operate level
2 for that particular bundle?

3 DOCTOR BONACA: Why should any - it seems
4 to me that we have building expectations here that the
5 regulatory process, through bits and pieces, will
6 allow increases of risks here, and there, and
7 everywhere. There is no regulation right now that
8 requires any licensees, even with the plants at 10^{-4}
9 are higher, to reduce their risk through some
10 initiatives. I don't understand why we are building
11 this expectation that, in fact, they will be allowed
12 margins for increases in risks here, and there, and
13 everywhere, and now they are talking about maybe in
14 the future we'll bundle them together. I disagree
15 with the concept.

16 I think we are building expectation on the
17 industry in the wrong direction. I think that they
18 should risk inform, okay, but the risk information
19 should really, in my judgment, should come to a break
20 even risk, there should be almost no risk increase.
21 Otherwise, we are building a regulatory process -

22 DOCTOR KRESS: We came down several times
23 in our letters saying it is appropriate to trade off
24 risk for reducing unnecessary burden, so long as that
25 tradeoff falls within acceptable ranges, and that

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 acceptable range in our mind was what was outlined in
2 1.174.

3 MR. ROSEN: That's right, you can't go
4 back.

5 DOCTOR BONACA: No, I'm not saying you
6 ought to go back.

7 DOCTOR KRESS: you are changing your mind.

8 DOCTOR BONACA: No, because you are putting
9 a limit, okay, then I think it's really misconstruing
10 the meaning -

11 DOCTOR KRESS: 1.174 has limits in it.

12 DOCTOR BONACA: I understand that. The
13 limits were intended, in fact, that - the way we are
14 talking about this it seems to me we are building an
15 expectation that I'll be allowed this much of this,
16 this much of this, I can -

17 CHAIRMAN SHACK: No, but there is an
18 absolute stop sign.

19 DOCTOR BONACA: What is it?

20 CHAIRMAN SHACK: 10^{-4} .

21 DOCTOR WALLIS: I don't see the problem
22 you've got with that, we talked about bundling some
23 years ago, all this was explained, they are doing
24 exactly the same now with bundling as they did before.

25 DOCTOR APOSTOLAKIS: No, it's not exactly

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 the same.

2 DOCTOR WALLIS: But, this particular rule
3 change, there's got to be some incentive for industry
4 to improve safety by all those changes, which they
5 talk about but they won't do unless there's some
6 incentive.

7 DOCTOR APOSTOLAKIS: But, no, when it was
8 presented to us, I'm not saying that - maybe it's a
9 clarification, I don't know, but when it was presented
10 to us the issue of bundling was presented like, you
11 know, what do you do if a licensee submits three
12 requests that are related to the same issue, okay,
13 should you consider them as one request or three
14 separate requests? Because all three may lead to kind
15 of 3×10^{-5} change, whereas each one would be
16 approvable. And, we decided at that time that maybe
17 bundling is okay.

18 But, this idea of bundling all the changes
19 related to one issue, no matter when they are
20 submitted, you might call it an interpretation of
21 that, because it's not really deviating that much, but
22 it's an interpretation that at least some of us here
23 have not -

24 DOCTOR WALLIS: But, George, how otherwise
25 would you give credit for improvements in safety?

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 DOCTOR APOSTOLAKIS: What does that mean?

2 DOCTOR WALLIS: Well, because now if you've
3 improved you can trade that off, if you get 10^{-5} one
4 year plus, and then you get a minus the next year, it
5 means you are back to zero and you can -

6 DOCTOR APOSTOLAKIS: But, how can you
7 improve? I mean, this -

8 DOCTOR WALLIS: It's like a bank account,
9 you improve safety, you decrease your CDF, then you -

10 DOCTOR APOSTOLAKIS: So, you do something
11 to decrease the CDF.

12 DOCTOR WALLIS: Right, and you trade that
13 off against the next change. It's good to me, it's a
14 bank account, put it in, take it out.

15 MR. ROSEN: Well, with one nuance, Graham,
16 I think you might have some small misperception. Some
17 of the changes that have been proposed by licensees
18 that you see in the NEI document we reviewed, are
19 changes the licensees want to do to reduce burden, but
20 they also reduce risk.

21 DOCTOR WALLIS: That's fine.

22 MR. ROSEN: And, so that, to say that they
23 won't do them because - they are not going to do any
24 changes that reduce risk -

25 DOCTOR KRESS: They can use their bank

NEAL R. GROSS

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

1 account then.

2 MR. ROSEN: - there's an incentive there
3 for them to do it, simply -

4 DOCTOR WALLIS: Sometimes there is, so
5 that's fine.

6 MR. ROSEN: It's a simpler way to run the
7 plant that's less likely to -

8 DOCTOR WALLIS: Maybe they can get some
9 credit towards other changes they want to make, bundle
10 it. What's wrong with that?

11 MR. ROSEN: No, there's nothing wrong with
12 it, I just want to make sure that it's understood that
13 there are changes licensees want to make that reduce
14 burden, but also reduce risk.

15 DOCTOR WALLIS: Well, I think they should
16 be rewarded, and I think they are if they can bundle
17 those with something else.

18 MR. DINSMORE: I think, Doctor Apostolakis,
19 you are right. The 1.174 does not clearly lay this
20 out, but if you looked in the individual Reg Guides,
21 the ISTI aside, and I have the text here, I don't know
22 if you want to -

23 DOCTOR APOSTOLAKIS: Go ahead.

24 MR. DINSMORE: - it's clear what's going
25 on. For the IST, in-service testing, it says, "The

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 cumulative impact of all IST program changes, initial
2 approval plus later changes, should comply with the
3 acceptance guidelines." For greater QA it says, "If
4 during the categorization process it becomes apparent
5 that the initial categorization is modified to such an
6 extent that the boundary results may be non-
7 conservative a new boundary calculation should be
8 performed."

9 Tech specs is a little more complicated,
10 it says, "When AOTs and multiple safety systems are
11 extended, the likelihood of simultaneous outages and
12 multiple components increases, this issue is addressed
13 as part of the implementation considerations." In
14 other words, they control it by controlling what you
15 can take out at the same time.

16 In-service inspection says, "Risk-informed
17 ISI programs should be evaluated periodically as new
18 information becomes available that could impact the
19 ISI program." That's a little more fuzzy, but it
20 pretty much tells you the same thing.

21 So, they all pretty clearly lay out that
22 we expect to keep track of what's going on within the
23 individual bundles.

24 DOCTOR APOSTOLAKIS: Well, maybe, I don't
25 know, you should find a place to state that clearer

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 that this is what you doing, because if we are
2 surprised, I mean, I can imagine that many other
3 people would be.

4 MR. RUBIN: I think it's described more
5 completely in the statement of considerations, and we
6 certainly will take another look and see if it needs
7 more amplification.

8 DOCTOR APOSTOLAKIS: Yeah.

9 MR. ROSEN: I think you can do that, you
10 can say that individual applications or silos, the
11 real risk is controlled, and then you need to say
12 something about what the aggregate of all the silos
13 and all the applications, how you control that. We
14 have to make it very specific.

15 DOCTOR APOSTOLAKIS: Is there another
16 revision of 1.174 coming up? We had one, right?

17 MR. RUBIN: There's not one planned as far
18 as I know. Yeah, there was a revision done about a
19 year ago.

20 DOCTOR APOSTOLAKIS: Yeah, because that
21 would be a place really to state it clearly, there is
22 this interpretation of all this.

23 DOCTOR BONACA: The reason why I said what
24 I said, you know, I'm thinking of a plant that's five
25 in 10^{-5} , and if the strategy was, you know, I'm going

NEAL R. GROSS

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

(202) 234-4433

www.nealgross.com

1 to try to relax this, relax that, so with LOCA I can
2 go to six in 10^{-5} , and with 44 I can go to seven
3 10^{-5} , and so it might keep creeping up. I don't think
4 that was the intent at all of Reg Guide 1.174.

5 You have the stop there, but it wasn't the
6 intent, and that would be a strategy which I would
7 consider totally unacceptable on the part of the
8 plant.

9 MR. RUBIN: Yes, you are absolutely
10 correct, Doctor Bonaca, and that was -

11 DOCTOR BONACA: And, that's why I just made
12 the statement, because that shouldn't be construed
13 that there is an allotment of that much risk that you
14 are going to spend here, and there, and everywhere.
15 I think your effort should be the one of having no
16 increase in risk in any one of these - because if I go
17 into risk-informing because you have some benefits and
18 some benefits to safety, and they wash out, and you
19 get some better.

20 Now, you may increase in some cases, and
21 it's small enough that it's acceptable, but again,
22 that's different from the strategy described here as
23 an example would be.

24 DOCTOR APOSTOLAKIS: But, 1.174, I mean,
25 that issue was discussed at the time, and the question

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 was raised, okay, so by increasing by 10^{-5} , after a
2 number of years will all be near the goal. And, the
3 answer from the staff was no, this would not be
4 allowed. But, this is different from saying now we
5 have bins, and we go, you know - anyway, I'm not
6 saying that this is not appropriate, it's just that
7 it's kind of -

8 DOCTOR WALLIS: But, you are surprised.

9 DOCTOR APOSTOLAKIS: I am surprised, yeah.
10 That doesn't mean it's - you know, it may be - it may
11 turn out to be a pleasant surprise. I'm not saying
12 anything, I'm just trying to digest it.

13 CHAIRMAN SHACK: Well, I think Graham has
14 a good point, it gives you an incentive to kind of
15 budget your bank account.

16 DOCTOR APOSTOLAKIS: There should be
17 somewhere a statement of this, and maybe some
18 explanations, because you are right, Steve, I mean, if
19 I go to one of the guys at your site if it's clearly
20 stated, but I'm not sure - only people interested in
21 that change would read that.

22 DOCTOR WALLIS: This would help, I think.

23 DOCTOR APOSTOLAKIS: You need it in the
24 general regulatory guide.

25 DOCTOR WALLIS: This would help the public

NEAL R. GROSS

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

1 perception, too, otherwise you give the impression
2 that all you are doing is relaxing regulations. You
3 are actually providing an incentive for increased
4 safety in some other way. I think you want to make
5 the most of that. It seemed to be missing from the
6 earlier documents, now it's coming in more.

7 DOCTOR APOSTOLAKIS: As a matter of fact,
8 I would suggest that maybe you guys present that at
9 the next PSA conference in San Francisco, as a first
10 step. I'm serious, there should be a written document
11 when you are actually stating this.

12 DOCTOR KRESS: I recall an ACRS letter
13 which George Apostolakis had a lot of input into, I
14 recall a letter from ACRS that George Apostolakis had
15 a lot of input into, in which we talked about risk
16 acceptance metrics in three regions. One region would
17 define completely unacceptable to be above in terms of
18 risk, a middle region which was a region which cost
19 benefit changes are allowed, and a third region which
20 is called completely unaccepted, you can move around
21 in that all you want to, completely accepted I mean.

22 Now, this is just completely contrary to
23 that concept which we, I think, bought up on, because
24 we are talking about - we are in that region which
25 cost benefit changes ought to be allowed, and we're

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 saying, no, we are restricting it very, very, very
2 much.

3 DOCTOR APOSTOLAKIS: We're restricting it.

4 DOCTOR KRESS: Yes, we are.

5 DOCTOR WALLIS: But, the costs will drift
6 towards the unacceptable region if you don't have some
7 balancing tool.

8 DOCTOR KRESS: As long as it doesn't cross
9 the line.

10 MR. KELLY: I'd just like to point out that
11 what we currently have written in the SOC almost comes
12 word for word out of the Guide 1.174. So, if you
13 liked it in 1.174, you are going to like it here.

14 Perhaps, you'd like to move on to -

15 DOCTOR WALLIS: Are you going to tell us
16 what an income sequential change is?

17 MR. KELLY: We will get there, yes.

18 MR. ROSEN: Maybe.

19 DOCTOR BONACA: I think ACRS has to talk
20 about this issue again, because some of us were not
21 there when you wrote that letter.

22 DOCTOR APOSTOLAKIS: But, the letters don't
23 change as membership changes.

24 DOCTOR WALLIS: We can write another
25 letter. When we learn something that improves our

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 knowledge we can change our minds.

2 CHAIRMAN SHACK: We're resolute.

3 DOCTOR WALLIS: That's right.

4 CHAIRMAN SHACK: Onward.

5 MR. KELLY: Okay.

6 The rule permits two basic plant change
7 processes. The first is where a licensee would submit
8 for our review and approval the changes that it wants
9 to make. We'd look at the PRA, we'd look at their
10 changes that they propose, we'd determine whether they
11 had met the criteria, defense-in-depth, and things
12 like that. And then, if we were satisfied they'd get
13 a license amendment to give them the go ahead to make
14 the changes.

15 The second process would be one where a
16 licensee comes in and requests the authority
17 initially. The first step is that they would
18 initially request the authority to be able to make
19 these inconsequential changes. In order for us to
20 grant that authority, they'd come in with a submittal
21 that demonstrates to us their process that they would
22 be using for looking at these inconsequential changes.
23 We'd look at their PRA in a much more robust manner,
24 because now normally on a specific proposal that
25 they'd come in in under a license amendment request

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 we'd be most interested in those areas that appear or
2 that are dealing directly with the changes that are
3 proposed.

4 Under the inconsequential change, we'd
5 have to look at a broader range of the PRA, because
6 they would have been asking normally for the ability
7 to make inconsequential changes in many, many
8 different areas of the plant, and we want to make sure
9 that that process, as well as the PRA, were up to
10 snuff as far as that goes.

11 Once we'd given approval to them, then a
12 licensee, looking at these changes, would be allowed
13 to make these inconsequential changes without prior
14 NRC review and approval.

15 Again here, they would have to bundle
16 these inconsequential changes, and they would have to,
17 subject to our audit, be prepared to demonstrate that
18 these changes that they made without our approval
19 were, and continue to be, inconsequential.

20 MR. ROSEN: Now, there's a difference
21 between doing it without your approval and doing it
22 without your knowledge. Would you require them to
23 inform you that we have - for example, the licensee
24 writes you a letter saying under the inconsequential
25 change thing we've made the following changes without

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 your prior approval, thank-you very much.

2 MR. RUBIN: That's a very interesting
3 question. We hadn't really thought a lot about that.
4 I believe what we originally envisioned was, no, the
5 information would be available on site for audit, but
6 it's an interesting issue.

7 If I could provide some perspective of why
8 this in the draft rule, there were some stakeholder
9 comments that there would be numerous related 50.46a
10 changes that would be truly so inconsequential, not
11 only couldn't they be quantified in any risk model,
12 but qualitatively they would have no impact at all.
13 They'd be, perhaps, instrumentation changes, some
14 small set point changes.

15 DOCTOR BONACA: Which we could expect to be
16 covered under 50.59?

17 CHAIRMAN SHACK: Why do you need this
18 50.59?

19 MR. KELLY: The reason is, under 50.59 you
20 have to meet all the regulations. Here you have an
21 opportunity to do something different than what's in
22 the regulations.

23 MR. ROSEN: As long as you brought up
24 50.59, with respect to my earlier comment about being
25 informed, 50.59 at least used to require you to inform

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

(202) 234-4433

www.nealrgross.com

1 the Commission of changes you've made under its
2 authority.

3 DOCTOR BONACA: Once a year.

4 MR. ROSEN: Once a year, yes.

5 In this case, you don't even have that, so
6 that's pretty permissive. I would suggest you might
7 want to take a look at some of that.

8 MR. RUBIN: That's a very good point,
9 Doctor Rosen, we'll take under consideration.

10 DOCTOR APOSTOLAKIS: I don't understand
11 what you just said, 50.59 requires that we comply with
12 all the regulations, but this one doesn't?

13 MR. KELLY: Well, the difference is here
14 that we've changed - in essence, let me rephrase what
15 I said.

16 DOCTOR APOSTOLAKIS: Good idea, do that
17 again.

18 MR. KELLY: You still have to comply with
19 the regulations.

20 DOCTOR APOSTOLAKIS: All right.

21 MR. KELLY: The difference is that in
22 50.46a you are operating under a slightly different
23 set of regulations than you are under 50.46.

24 MR. RUBIN: Glenn, let me add one
25 additional perspective, and then the real expert

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 sitting here next to me will give the proper answer.

2 50.59, the assessment of 50.59 is based on
3 the likelihood and consequences having a very small
4 impact, but they are design basis accidents only.

5 Here, the 50.46a process requires the
6 assessment of, well, is your impact on severe
7 accidents and the mitigation of the beyond TBS going
8 to meet your accepted criteria or be inconsequential?

9 So, the assessment here is broader than
10 50.59 currently requires, because it looks into severe
11 accident sequences. So, that's the significant
12 difference.

13 Now, Eileen, you can help me.

14 MS. McKENNA: This is Eileen McKenna from
15 the staff.

16 Mark is exactly right, 50.59 is the
17 deterministic design basis, and this is trying to get
18 a little more at the other aspect of it.

19 The Committee may recall, you know, back,
20 I don't know, six, seven years ago there was some
21 initial box about risk informing 50.59, and I think
22 the thinking at the time was, well, you really
23 couldn't risk inform the change control process unless
24 the requirements themselves were actually risk-
25 informed requirements.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 So, now that we are seeing that we
2 actually have, as Glenn was saying, as part of the
3 rule that there are certain risk acceptance criteria
4 that need to be satisfied, that making the process by
5 which you assess your changes if you bring that kind
6 of information into the picture, of course, Doctor
7 Rosen is correct, that 50.59 does require periodic
8 summary reports of changes that were made. I think
9 the other thing is that, you know, we also have FSAR
10 updating kind of information, so there is some way of,
11 getting knowledge, but we really have to, I think,
12 think about whether it makes sense for us to ask for
13 the same kind of reports on inconsequential as we do
14 under 50.59.

15 MR. ROSEN: No doubt you could dig it out
16 with your other inspectors or with your inspections,
17 it's only a question of how easy it should be.

18 MS. MCKENNA: Right, and that's something
19 we're taking under consideration.

20 MR. KELLY: Doctor Rosen, you had asked
21 before about whether there was a definition for what
22 constitutes inconsequential, and what our current
23 thinking is, and, well, if you go back to 50 - or,
24 excuse me, to Reg Guide 1.174, it talks about in your
25 lowest region when your core damage - if the increase,

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 proposed increase was less than 10^{-6} per year, that
2 that would be allowed regardless of whatever your
3 baseline risk was.

4 And, our preliminary thinking is that if
5 a licensee came in with a risks that cumulatively were
6 at the 10^{-6} or less level, that that would constitute
7 an inconsequential risk. So, as long as they kept
8 their overall inconsequential changes in total to be
9 less than 10^{-6} we would feel that that's something
10 that didn't require a lot of regulatory oversight.

11 DOCTOR APOSTOLAKIS: So, they would have to
12 keep track of all the site changes for the life of the
13 plant, right?

14 MR. KELLY: That's correct, because, I
15 mean, we were told by industry that these are really
16 inconsequential changes, and if they are really
17 inconsequential changes it shouldn't be such a big
18 deal to -

19 DOCTOR APOSTOLAKIS: But, a lot of these
20 probably would not be amenable to quantification.

21 MR. KELLY: That's correct, much of it
22 would be a qualitative type thing, where they would be
23 coming in and explaining why it really has no effect
24 at all on -

25 MR. RUBIN: Excuse me, Glenn, they will not

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 be coming in, but when they come in with their
2 original submittal on their process, their capability,
3 their PRA adequacy, to make these determinations that
4 will include the application of qualitative risk
5 determination and safety margins, defense-in-depth
6 evaluation methods, and they'll need to convince us
7 that they have a broad enough method that they can
8 make these determinations that are truly
9 inconsequential, and this we got from our
10 stakeholders, where there were a number of things that
11 weren't going to have any impact at all, I mean zero,
12 essentially.

13 But, we want to make sure that their
14 methods are adequate. If there's some limitation in
15 their PRA scope, or their ability to apply non-
16 quantifiable methods, and convince us they have a
17 robust decision process, we may limit the changes they
18 can make in this inconsequential bin and make them,
19 for example, no external event analysis, that they
20 have something in that area and they haven't convinced
21 us that their margins, their qualitative methods are
22 adequate, they'll have to come in, and we may limit
23 it.

24 DOCTOR APOSTOLAKIS: But, there is an
25 inherent limitation, in the sense that you cannot have

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 a quantitative estimate of the - but you will have to
2 rely on your judgment and the licensee's judgment.

3 DOCTOR KRESS: Well, from that viewpoint,
4 George, if I have a whole mess, as we say in
5 Tennessee, a lot of inconsequential changes, at what
6 point do I add up all these and say they are no longer
7 inconsequential, if they are only qualitative? How
8 about qualitative?

9 DOCTOR APOSTOLAKIS: I guess it would have
10 to - you would have to trust the judgment of the
11 staff.

12 DOCTOR KRESS: So, when you have different
13 staff members -

14 DOCTOR APOSTOLAKIS: You cannot quantify
15 everything.

16 MR. ROSEN: Well, clearly, you are going to
17 reach this condition very soon, because most of these
18 inconsequential changes will be changes on things that
19 aren't modeled. So -

20 DOCTOR APOSTOLAKIS: Right.

21 MR. ROSEN: - you are going to not have a
22 way to quantify it.

23 DOCTOR APOSTOLAKIS: Or they are not
24 modeled well.

25 MR. ROSEN: Well, or modeled at all, you

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 know, like vents and drains on a primary system.

2 MR. DINSMORE: We have ways to deal with
3 50.69 and the South Texas Extension Project, there's
4 a series of questions that people go through. So, we
5 do have ways to systematically deal with these.

6 MR. ROSEN: But, they are qualitative.

7 MR. DINSMORE: Yeah, qualitative.

8 MR. ROSEN: Right.

9 MR. DINSMORE: And, we would assume that
10 this would be a similar type of arrangement.

11 MR. ROSEN: Well, that's fine, but just
12 those are good questions, I'm very familiar with them,
13 but if you expect to get a number of 1E to the minus
14 something you are fooling yourself.

15 MR. RUBIN: We don't expect to get a
16 number, but there may be, in this whole group of
17 inconsequential changes, there may be a few that are
18 quantifiable, and we say, if there are, quantify them
19 and keep them on your record sheet.

20 MR. ROSEN: Well, the question is, for
21 example, does this component affect any emergency
22 operating procedure? That's not quantifiable, but
23 it's known, and if it doesn't, well, you get one
24 answer.

25 DOCTOR WALLIS: Well, the inconsequential

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 measure is risk, and it's less than 10^{-6} , is that what
2 I've heard?

3 MR. KELLY: Yes, increase in core damage
4 frequencies.

5 DOCTOR WALLIS: But, I understood from
6 yesterday that there are certain things like this 2200
7 degrees which have nothing to do with the risk and
8 don't map onto it, so someone could make a change
9 which doesn't show up in the PRA, and doesn't change
10 risk apparently, but allows the temperature of 2400
11 degrees.

12 DOCTOR APOSTOLAKIS: If you work with the
13 margins, yeah, the margins are not -

14 MR. KELLY: Well, in addition to -

15 DOCTOR APOSTOLAKIS: - so there's
16 something else going on.

17 MR. KELLY: - in addition to considering
18 the potential effect on core damage frequency
19 estimates, licensees will have to also, in performing
20 their inconsequential process -

21 DOCTOR WALLIS: So, there are other
22 measures of consequence.

23 MR. KELLY: - look at Jennifer's things,
24 because if you look here at the last bullet on this
25 slide it says the licensee evaluation process is going

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 to be the same for both changes, in a sense of they
2 are going to have to go through and consider the
3 effects on peak clad temperature, the effects on -

4 DOCTOR WALLIS: So, inconsequential will be
5 something like Jennifer's 300 degrees?

6 MR. RUBIN: Let me, if I can step in here,
7 that area, as was pointed out by the Committee just
8 now, this won't have a direct effect on risk, because
9 the changes in the thermal-hydraulic areas will still
10 be shown through the evaluations methods that Doctor
11 Uhle and Ralph Landry are implementing, to show that
12 there's still sufficient margin of thermal-hydraulic
13 success, meaning you still have a resulting coolable
14 geometry available, so you don't have an accident
15 progression sequence, and there's no challenge to
16 public safety.

17 So, even though there may be some
18 reductions in margin, the confidence is still high
19 enough that there won't be an impact.

20 DOCTOR APOSTOLAKIS: As long it remains
21 high, you are right.

22 DOCTOR WALLIS: So, you're going to define
23 what you mean by margin specifically, and point out
24 that there are thermal-hydraulic margins, maybe there
25 are some fuel damage margins, there's certain things

NEAL R. GROSS

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

(202) 234-4433

www.nealgross.com

1 you measure which you then use to interpret this
2 maintenance of margins? Margins have always been a
3 somewhat vague term in the past. You are now going to
4 define margins areas where you actually have measures
5 of margin?

6 DOCTOR UHLE: This is Jennifer Uhle from
7 the staff. The way we perceive this whole thing to
8 work would be when a licensee could make a change
9 without getting, you know, NRC approval, you know,
10 this pre - essentially, they had the screening of the
11 PRA tool to make sure that they have an adequate
12 program in place, and then a licensee is allowed again
13 the 300 degrees that they wouldn't have. They could
14 make a change and just report annually, you know, what
15 that change was to us, so the only time where a change
16 could be made without NRC reviewing it and approving
17 it would be following this inconsequential risk, as
18 well as them still being below that 300 degree change.

19 And, in addition to that, to ensure that
20 by margin we mean the plan is still below 2200, 17
21 percent, and the other three success criteria that
22 hand in hand with the 300 degrees is that also all the
23 success criteria are still met.

24 DOCTOR WALLIS: So, the Reg Guide or
25 something will have a list of thermal-hydraulic

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 margins and some containment margins, yesterday we
2 heard the containment pressure might go above the
3 design pressure, there's going to be a list of
4 specific things which you check to see if the margins
5 are still maintained, rather than having a vague
6 statement about margins, there will be specific things
7 listed, and there will be measures of those margins?

8 MS. McKENNA: Let me say something -

9 DOCTOR WALLIS: So we know what we are
10 doing and the licensee knows what he's doing?

11 MS. McKENNA: - before you get to the
12 margins questions, I think -

13 DOCTOR WALLIS: Well, I'm just asking this.
14 Can anyone give me a straight answer?

15 MS. McKENNA: Well, first I wanted to say
16 that with respect to the revisions of the rule on
17 inconsequential changes it states specifically the
18 changes have to meet the acceptance criteria laid out
19 in the rule, which include things like the 2200
20 degrees, the change in risk, the containment integrity
21 provisions, all those things still have to be met.

22 As Jennifer was saying, there's also
23 specific provision that the change, the amount of
24 change in the model related temperature of the 300
25 degrees clearly doesn't make any sense to make a

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 change that will have to be immediately reported to
2 the NRC as being a big enough change or requiring a
3 reanalysis, you know, to do that on their own. So,
4 that's specific in the rule, that those things have to
5 be met, and that it be inconsequential.

6 DOCTOR WALLIS: I'm just saying, I think
7 the rule is going to be written so that it's very
8 vague about margins, and so I want to know where we
9 find these margins, where are they defined?

10 DOCTOR UHLE: Our definition of margins, I
11 alluded to this yesterday, is that the licensee's
12 calculation indicates that the temperatures are below
13 the acceptance criteria.

14 DOCTOR WALLIS: That's just one margin.

15 DOCTOR APOSTOLAKIS: The problem with that
16 is that yesterday we heard statements like, oh, some
17 of the calculations are 2100 degrees. Then I think
18 somebody else said, you are beginning to see damage at
19 2300 degrees, because everybody agrees 2200 is a
20 conservative limit.

21 Now, when you talk about numbers like
22 that, I would really like to understand a little
23 better what the probability is that they are going to
24 have damage.

25 If you are talking about calculations that

1 give you peak temperature of, I don't know, 2000 or
2 1950, then I believe the margin is large and it
3 doesn't really matter.

4 And, we did some calculations recently at
5 MIT, under NRC sponsorship I might add, and it really,
6 I mean, trying to put the margins into the PRA, most
7 of the time if the margins are very large it doesn't
8 matter. But, for nu reactors, for example, it does
9 matter. The event sequences, the event trees, change
10 again, because now, you know, you have the sequence,
11 and at the end you have the issue of whether the
12 actual - something we call dysfunctional failures,
13 where the temperature in this case would actually
14 exceed under certain conditions the damage
15 temperature, or if it's a pressure or whatever. So,
16 you get a bifurcation of the tree.

17 Most of the time for LWRs it does not, and
18 the probability that it will go in the right direction
19 is very high. But, in some cases, I don't know, it
20 might matter. For future reactors it does matter,
21 because you don't know, okay, these uncertainties are
22 large enough so it does matter.

23 So, I'm pretty comfortable with most of
24 the event trees we have now, that they are not really
25 affected significantly by the margin, because the

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 probability is very high. But, when I hear statements
2 like yesterday from Mr. Sieber and others that, gee
3 whiz, you know, you don't have several hundred degrees
4 difference, so you may have only 100 or 150 or
5 something, that I don't know. Somebody have to look
6 into it.

7 The margin - the probability may still be
8 large enough that you will not have a failure, because
9 see that's the problem with the margins, as they are
10 defined in the deterministic world, as long as you
11 below the limit it's okay, the probabilistic world
12 says no, there is a probability you will exceed it.
13 So, it depends a lot on the uncertainty you have about
14 the estimates of 100 and the failure limits on the
15 other.

16 DOCTOR KRESS: You have to have probability
17 distributions.

18 DOCTOR APOSTOLAKIS: There's a big issue
19 now with the failure limit in - fuels, right? In that
20 case, I would go back to -

21 DOCTOR KRESS: Do you put probability
22 distributions on the limits also?

23 DOCTOR APOSTOLAKIS: Yes.

24 DOCTOR KRESS: To get the overall?

25 DOCTOR APOSTOLAKIS: Yes, yes.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 DOCTOR WALLIS: Well, that makes sense, we
2 talked about that yesterday, if thermal-hydraulics
3 were properly modeled in the PRA you could just rely
4 on the PRA, you wouldn't have to have these separate
5 definitions of margins.

6 DOCTOR APOSTOLAKIS: That's correct, if
7 everything was -

8 DOCTOR WALLIS: What I'm trying to
9 determine is where do I go, when I read the rule I
10 don't think I'm going to get a definition of margins,
11 I think I'm going to get some overall statement about
12 maintaining margins. I think that's not good enough,
13 so I want to - when I see the Reg Guide that's when I
14 decide whether or not you've made a proper definition
15 or margins and know what you are doing, and the
16 licensee will know what the rules are. Is that the
17 case? I'm just trying to sort this out.

18 MR. KELLY: Well, we haven't started on the
19 Reg Guide yet.

20 DOCTOR WALLIS: So, I won't know when you
21 are going to clearly define margins.

22 DOCTOR APOSTOLAKIS: In this context, I
23 think they are using it the traditional way. As long
24 as the calculation is -

25 DOCTOR UHLE: Yes, it's deterministic, it's

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 merging the deterministic with, you know, these in the
2 PRA, and a margin, what you are saying that you have
3 adequate margin, we have the safety limits, and that
4 there's this perceived margin between the safety
5 limits and then when you would actually have -

6 DOCTOR WALLIS: That's no margin, that's
7 simply meeting a criteria, being below 2200, it
8 doesn't say anything about margin to me, it could be
9 2199, I'd say the margin is one degree.

10 DOCTOR UHLE: But, it's perceived that the
11 2200 17 percent gives you 100 percent confidence that
12 you are not getting -

13 DOCTOR WALLIS: You never have 100 percent
14 confidence.

15 MR. RUBIN: It gives you such high
16 confidence -

17 DOCTOR UHLE: High probability.

18 MR. ROSEN: - such high confidence that it
19 could be modeled -

20 DOCTOR WALLIS: Okay, but this will be
21 defined somewhere later on.

22 DOCTOR UHLE: The definition -

23 DOCTOR WALLIS: I'm going to look for it.

24 DOCTOR UHLE: - okay, but I'm going to
25 tell you what -

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 MR. ROSEN: That's fair warning, I think,
2 you know.

3 DOCTOR WALLIS: That's all I need to know,
4 I don't really have to have -

5 DOCTOR UHLE: I can tell you what the
6 definition is, and the definition is, if you meet the
7 success criteria that is indicating that you have a
8 sufficient margin.

9 DOCTOR WALLIS: But, you are saying this
10 to me, I want to see it in writing, and I want to see
11 it clear. I want to see that some time.

12 DOCTOR UHLE: I think if you read the
13 transcript it will be in writing.

14 DOCTOR WALLIS: I'll look for it in the Reg
15 Guide, that's all I'm saying. Word descriptions now
16 don't mean anything until you've written it down, and
17 that is your clear end statement, then we can review
18 that.

19 I've said enough, I just told you, I'm
20 going to look for it.

21 DOCTOR APOSTOLAKIS: Let me add something,
22 I think in the traditional interpretation, as long as
23 you are below everything is okay.

24 People know that the failure agreement is
25 a conservative choice. People know that the

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 calculation means and computer codes are conservative,
2 like Appendix K stuff. So, we say, as long as you are
3 below they don't say, but they mean, there is a high
4 probability that you will not have a failure.

5 And, what happens in the deterministic
6 world is, when one of these assumptions is challenged
7 for whatever reason, people go back and look, and I
8 think that's what's happening with the enthalpy in the
9 high burner fuel case. A lot of people say, now wait
10 a minute, the failure limit, what is it?

11 Ideally, we should do what Graham just
12 said, ideally we should assign distributions, take the
13 difference and so on, so you will know that if you are
14 exactly one degree below here is the probability of
15 failure, if you are 200 degrees below here is the
16 probability of failure.

17 This is not done right now, except in some
18 rare cases, as I said yesterday, in the containment,
19 for example, civil engineers who usually do these
20 calculations they also have a tradition, in fact,
21 longer than ours, on probabilities, and they give you
22 bunches of curves, fragility curves and so on, and
23 then you calculate the peak curves on ground
24 acceleration, and automatically you get the result of
25 the convolution.

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

(202) 234-4433

www.nealrgross.com

1 But, we don't do that routinely, because
2 even if you did, as I said, we did some calculations,
3 the probability that you have a functional failure is
4 very low under normal evaluation. Okay? It's very
5 low, so it doesn't really affect the end result.

6 DOCTOR UHLE: Can I just add one thing,
7 and, hopefully, this will provide a bit more comfort,
8 is that the PCT reported, remember, is only for the
9 hot pin, so this is not the average temperature in the
10 core, it is the hot pin.

11 So, that is providing you extra, if you
12 want say, margin.

13 DOCTOR APOSTOLAKIS: The message I think is
14 that you will hear about this again in future meetings
15 of this Committee.

16 CHAIRMAN SHACK: I'm just going to suggest
17 that we take a break for 15 minutes. We've been sort
18 of going at it for a long while this morning, and I'm
19 sure George is ready for a break.

20 (Whereupon, at 9:44 a.m., a recess until
21 10:03 a.m.)

22 CHAIRMAN SHACK: This is a Subcommittee
23 meeting by definition, a quorum of one. Onward.

24 MR. KELLY: On our next slide, what we
25 wanted to talk about is the coolable geometry, and

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 what - and some implications about how we deal with
2 coolable geometry.

3 Just kind of going over the rationale for
4 why we did what we did, as you've noticed the
5 requirements for evaluation of what's acceptable have
6 been relaxed in the region beyond the TBS. And, in
7 particular, you no longer, basically, have to assume
8 single failure in that area.

9 The reality is that also at plants the
10 risk significant SSCs, your emergency service water,
11 LPSI, emergency diesel generator, will be removed from
12 time to time for test and maintenance, among other
13 things, or you run it and you find that it's broken
14 and they have to do some work on it.

15 How do we assure, under those
16 circumstances, because we are assuming when we do the
17 analysis in the TBS area that everything works. So,
18 how do you deal with that? Well, that's where we go
19 to the next slide.

20 DOCTOR WALLIS: Well, coolable geometry,
21 according to Jennifer, still meant 2200 degrees and
22 all that kind of stuff?

23 MR. KELLY: As of this time, that's exactly
24 what it means, until someone comes in with adequate -

25 DOCTOR WALLIS: Is the Reg Guide going to

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

(202) 234-4433

www.nealrgross.com

1. be a bit more specific about what you mean by coolable
2 geometry?

3 MR. KELLY: We will - I have to let
4 Jennifer answer that.

5 MR. RUBIN: And, in Jennifer's absence,
6 Doctor Landry will be answering that question.

7 Hi, Ralph, have a seat.

8 DOCTOR APOSTOLAKIS: Do you need to hear
9 the question, Ralph?

10 MR. LANDRY: Do I get to hear the question
11 or do I just answer.

12 MR. RUBIN: Is there going to be more in
13 the Reg Guide on the coolable geometry as it is now
14 defined in the material?

15 MR. LANDRY: In the Reg Guide, we do intend
16 to give a great deal more description of what
17 constitutes coolable geometry.

18 Now, yesterday we tried to talk about
19 that, Jenny tried to talk about it, and I talked about
20 it, what we mean by coolable geometry. And again,
21 what we keep coming back to is the statement that
22 coolable geometry, as we can define it today, is the
23 speed limit of 2200 degrees Fahrenheit and 17 percent
24 maximum local oxidation.

25 In light of the information that we have

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 today, that is what we define as coolable geometry.
2 That may change next year as the Office of Research
3 puts together all of the work that they've been doing
4 in assembling a better understanding, or a different
5 understanding, of what is the real relationship
6 between ductility, temperature and oxidation, from all
7 the fuel work that they are assembling right now.

8 DOCTOR WALLIS: So, you might have actually
9 a more physical basis eventually, based on the
10 ductility and the integrity and some other things,
11 rather these surrogates.

12 MR. LANDRY: That's correct, they may have
13 - we haven't seen the result yet, so we don't know
14 what they will put together for this topic, and we
15 don't want to preclude where they are going, or make
16 a statement in a rule that we have to then in a year
17 go back and change. So, we simply made the statement,
18 coolable geometry, and we wanted to explain in the SOC
19 and we'll explain and expound upon further in the Reg
20 Guide of what we mean by coolable geometry, so that we
21 have some leeway, that when we get the information
22 from Research in another year we can change those
23 guidance materials without having to change the rule.

24 DOCTOR WALLIS: I think when you do this,
25 you have to make a statement about what consequences

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 you are trying to avoid.

2 MR. LANDRY: That's correct.

3 DOCTOR WALLIS: And, that is really the
4 starting point, and when you actually work back from
5 that maybe you can determine what kind of ductility
6 you need.

7 MR. LANDRY: That's correct, and I believe
8 that that will help with getting that definition will
9 come in the Research material next year.

10 DOCTOR KRESS: Your consequences are
11 implied as only gap releases, that's an implied
12 consequence already. You don't allow gap releases,
13 but you don't want the pictures to go to points that
14 you are getting more than that.

15 MR. LANDRY: Well, in the 50.46 development
16 in the early '70s, the point was that when you exceed
17 2200 degrees Fahrenheit, and/or 17 percent oxidation,
18 you lose ductility to the point that - these failures
19 we're positive, or we're sure will give us a core or
20 a cladding that could be cooled without shattering,
21 what the difference is between this value and the
22 actual point of shattering we didn't want to define
23 and say, well, it's 2300 and 18 percent, or something
24 of that nature.

25 If you remember the interim rule was 2300

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 degrees and 17 percent, and the final rule backed off
2 from that and said, let's put a little more margin and
3 go to 2200 degrees and 17 percent, because we know
4 that when you get above this range you start to lose
5 ductility at a faster rate.

6 DOCTOR KRESS: The problem I've always had
7 with that is, it's not 2200 or 17 percent, there is a
8 relationship between the ductility, the temperature
9 and the percent oxidation.

10 DOCTOR WALLIS: And the time.

11 DOCTOR KRESS: And the time, and the time
12 that's involved in the percent oxidation, but there's
13 a relationship between them, and I'm not sure that you
14 are going to end up with - I mean, those two values
15 aren't necessarily representative of all the sequences
16 that have time, temperature, that's different - the
17 sequence is a different kind of picture. You are
18 going to get different ductility value, depending on
19 how long you sit and get a picture, you can end up
20 with 2200 and 17 percent and lose all ductility, is
21 what I'm trying to say.

22 MR. LANDRY: We agree with you, Tom, and
23 that's why we are waiting for the Research support.
24 But, that's why we put in -

25 DOCTOR KRESS: Well, what would happen if

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 Research comes in and tells you that you've made a
2 mistake on the 17 percent, and that it really ought to
3 be a lot lower in order to bound these other
4 sequences? Do you have to go back and fix all the
5 ECCS?

6 MR. LANDRY: Well, we could go back and
7 make a change in the rule if we have to, but right
8 now, that's why we want these numbers far beyond TBS
9 range to be in the SOC and the Reg Guide, rather than
10 in the rule itself.

11 DOCTOR KRESS: The rule is just going to
12 say coolable geometry.

13 MR. LANDRY: Correct.

14 Now, if you recall yesterday when Jennifer
15 was making the presentation, she pointed out that one
16 of the things that we want reported on in the up to
17 TBS range now is not only a temperature change, but a
18 change in oxidation, because we recognize that
19 oxidation is not only a function of temperature, but
20 it is a function of time of temperature. And, in the
21 smaller breaks we'll have a longer time at a moderate
22 to moderately high temperature, rather than a short
23 period of time at a very high temperature, so that you
24 can have more extensive oxidation. And, we wanted to
25 preclude massive or large changes with oxidation.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 CHAIRMAN SHACK: At the risk of distracting
2 us further from the main point here, when you do the
3 best estimate analysis, do you compute that oxidation
4 of Baker-Just or can you use Cathcart-Pawel or some
5 other more accurate model?

6 MR. LANDRY: At this point in time you can
7 use another model, because the rule does not state
8 which oxidation model you have to use. It does in
9 Appendix K. Appendix K says thou shalt use Baker-
10 Just.

11 CHAIRMAN SHACK: Yes, Appendix K I know, it
12 was the best estimate.

13 MR. LANDRY: But, the best estimate does
14 not, and S-RELAP5.

15 CHAIRMAN SHACK: But, I guess in large
16 break you're peak temperature limited anyway, so it
17 may not be quite as exciting as it would be if you
18 went the small break best estimate.

19 MR. LANDRY: With the models we've seen so
20 far, yes, but as I started to say, the S-RELAP5 - ANP
21 model has both Baker-Just and Cathcart-Pawel built
22 into it.

23 The rule does not say we have to use
24 Baker-Just, so we looked at the model that was
25 proposed for S-RELAP5, we came back and said, okay,

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 we'll have to accept this because the regulation says
2 simply 2200 degrees, 17 percent oxidation, we don't
3 have a regulatory basis for saying if you use this
4 model you have to use this temperature and this
5 percentage oxidation, if you use this model you can
6 use this temperature and this percent oxidation, and
7 so on. The regulation does not give us that
8 flexibility today.

9 DOCTOR KRESS: I envision a little bit of
10 correlation between temperature, time, rate of
11 oxidation and ductility as a function of what kind of
12 clad you have, actually. So that, in essence, I think
13 the limit ought to be, if you have this much change in
14 loss of ductility, or some measure of loss of
15 ductility, and you no longer have a coolable geometry,
16 I think that's what you ought to define coolable
17 geometry as, and then they can calculate for all the
18 LOCA sequences how much loss of ductility you have due
19 to this correlation. And, the correlation will, of
20 course, have either a Baker-Just or whatever the best
21 estimate is of the oxidation models are. That seems
22 to me like a coherent way to do these.

23 DOCTOR WALLIS: What we've established is
24 that they are going to do something rational, it's not
25 just going to be vague.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 DOCTOR KRESS: Yes.

2 DOCTOR WALLIS: It will be defined in the
3 Reg Guide, and they are going to do their own numbers.

4 DOCTOR KRESS: They are going to say
5 coolable geometry -

6 DOCTOR WALLIS: Ductility, the appropriate
7 variable, that's what they'll focus on.

8 DOCTOR KRESS: That's right.

9 DOCTOR WALLIS: And then, when they come
10 back we can question them about whether it's a good
11 model or not.

12 DOCTOR KRESS: The Reg Guide ought to
13 specify something more than just the temperature and
14 oxidation.

15 DOCTOR WALLIS: If it does not specify
16 that, we'll tell them.

17 DOCTOR KRESS: Okay.

18 DOCTOR RANSOM: Is the fact that these
19 criteria apply only to the hottest rod just added
20 conservatism, presumably, there's only one rod.

21 DOCTOR KRESS: It may not be that
22 conservative if you get significant power uprates,
23 because you are starting to add that over the whole
24 area. But, as of now it's sometimes conservatism.

25 MR. LANDRY: The current methodologies, and

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

(202) 234-4433

www.nealrgross.com

1 Vic knows this even better than I do since he wrote
2 the Code, the common methodologies have a single hot
3 rod, hot channel calculation, and then an average rod
4 for the whole rest of the core. The calculated peak
5 cladding temperature and calculated maximum local
6 oxidation are for the hot rod only.

7 There is, however, a calculation for the
8 average rod, the peak cladding temperature on the
9 average rod and the oxidation on the average rod. So,
10 you can look at those two and say, what is the
11 difference?

12 All the calculations to date, yes, we are
13 only calculating the hottest rod in the core.

14 DOCTOR WALLIS: There's also a core-wide
15 oxidation criteria.

16 MR. LANDRY: Yes, and we do a core-wide
17 oxidation to calculate hydrogen generation.

18 DOCTOR WALLIS: But, that looks at all of
19 the rods, not just the hottest rod.

20 MR. LANDRY: Now, where there's a
21 difficulty is if you go to a calculation for which you
22 have reduced peaking, so that the entire core is at a
23 lower peaking factor, so that the hot rod is actually
24 the entire core. This was a problem back in the mid-
25 70s when a lot of steam generators were getting

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 heavily plugged and calculations were coming in from
2 some of the utilities that wanted to leap their PCT
3 limit by reducing the peaking factor on the hot rod to
4 the core average peaking factor. That says now that
5 the entire core is the hot rod.

6 DOCTOR WALLIS: Anyway, I think we can
7 probably move on, but these are details we are going
8 to examine pretty thoroughly when you come in with the
9 Reg Guide.

10 MR. ROSEN: Steve and Glenn, this may be
11 just a problem with the language in this bullet on
12 this slide, but it would seem to me that it ought to
13 say, would not result in loss of coolable geometry,
14 rather than what you have in there.

15 MR. KELLY: That's correct. That's correct.
16 It's not that we want to preclude them from having a
17 coolable geometry, that's not normally our intent.

18 MR. ROSEN: No, I would expect not, but I
19 would hate to see that language carried to the rule.

20 DOCTOR WALLIS: This looks like one of
21 those sentences that in the ACRS letter that we have
22 to work on.

23 MR. KELLY: Again, although it's not well
24 stated in the slide, the way we intend on assuring
25 that in the TBS region, and beyond TBS region, that we

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 are not setting ourselves up for operating such as if
2 we had a large LOCA that we were going to core melt
3 and maybe early release. What we are doing is, we are
4 saying that you should only operate in a configuration
5 where it's been demonstrated that if you were to have
6 a large LOCA that you would continue to have a
7 coolable geometry.

8 And, as it notes later on in the slide,
9 one way a licensee could do that is to limit its power
10 uprate or just to analyze those situations and show
11 that, in essence, it could handle a single failure, or
12 just to choose to operate to say that if it uses a
13 LPSI pump because it has to go out for a test and
14 maintenance or something like that, then they'll down
15 power during that period while it's being fixed.

16 There are a lot of different options that
17 they have, but we believe that this requirement of the
18 rule will force utilities to make sure that they are
19 operating in a safe condition.

20 Again, we also talked about here
21 containment performance, and we have added a late
22 containment performance metric, and the question is
23 why are we doing that. Well, if you go back and you
24 look at the proposals in the proposed rule for the
25 changes in the GDC, you'll see in the area beyond the

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 TBS that licensees are not going to have to consider
2 single failures, and this will allow them to make
3 certain changes to the containment in the systems that
4 they wouldn't have been able to make before.

5 We also note -

6 DOCTOR KRESS: Such as reducing the spray
7 flow rate?

8 MR. KELLY: That's a potential thing that
9 they could do, or the containment heat removal
10 processes. And, those changes wouldn't change CDF or
11 LERF, but they would affect the late releases.

12 So, you know, in the past -

13 MR. RUBIN: It would not necessarily affect
14 LERF, they would not affect CDF.

15 MR. KELLY: Right.

16 In the past, what we are doing today,
17 normally we handle looking at these late containment
18 failure issues as part of our Reg Guide 1.174 we use
19 our defense-in-depth argument. We believe that in
20 this case, where we are specifically modifying the
21 regulations to allow the potential for these changes
22 that we should be a little bit more robust in our
23 guidance about what's acceptable, and, therefore,
24 we're going to be looking at what is an appropriate
25 containment performance metric. We don't know what

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 that is today, but we're going to have that in time
2 for the final rule.

3 MR. ROSEN: In time for the final rule, or
4 in time for what you publish?

5 MR. KELLY: Well, we are going - we will be
6 publishing it fairly quickly. We're planning on going
7 to the Commission in December, to the EDO and to the
8 Commission in December. We talked about that
9 yesterday.

10 MR. RUBIN: Excuse me, Glenn, if I could
11 comment. No, it wasn't for the final rule, we hope to
12 have some certainly guides in the Reg Guide in the
13 middle of next year, but we have a great deal of
14 technical work, we've got the Research involvement to
15 look at the options and proper way to try to deal with
16 the late containment failure.

17 MR. ROSEN: So, what you are telling us now
18 is there is going to be a guideline for late release,
19 and that - but you are not telling us what it is.

20 MR. KELLY: At this point we have a
21 placeholder there.

22 MR. ROSEN: We have to judge, okay, it's
23 okay to go out and have a comment with just that much
24 in it.

25 MR. RUBIN: The point we are making here is

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 that it's a useful or needed decision metric to help
2 evaluate potential plant changes. We haven't yet
3 developed the quantitative value, but, of course, it
4 really doesn't include quantitative values for
5 anything, and we are just pointing out here that this
6 is needed for the decision process.

7 MR. ROSEN: No, that's okay, I understand
8 that, when you do come up with that it will be in the
9 Reg Guide and we'll get a chance at the Reg Guide.

10 DOCTOR KRESS: Are you in discussions with
11 or aware of what the people working on the technology
12 mutual framework is considering when its setting
13 metric?

14 MR. DINSMORE: The technology neutral
15 framework, I think, is looking at a conditional
16 containment failure probability of .1, and so, you
17 know, all of that is being kind of - we are kind of
18 starting to figure out how to deal with this.

19 DOCTOR APOSTOLAKIS: I think they've
20 changed their argument, they are really looking at the
21 releases.

22 MR. DINSMORE: Is that what they are going
23 to do?

24 DOCTOR APOSTOLAKIS: Because it's not
25 clear, you know, the core damage versus containment.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 They are going with frequency - consequence versus
2 frequency curves, like the Farmer curve, you know,
3 that's the latest we have seen.

4 DOCTOR KRESS: But, at one time they had a
5 concept for an LRF, it had to do with conditional
6 containment failure, and as best I remember it was
7 accommodated by the value for core damage frequency.
8 If you met the core damage frequency, you
9 automatically met this scenario.

10 MR. RUBIN: Let me just comment here that,
11 I mean, those are excellent observations, we did look
12 at conditional containment curve probabilities for the
13 damaged reactors eight or nine years ago. There are
14 some difficulties in using that as a metric.

15 Here, I don't think we want to tell you
16 that we've zeroed in on any metric, what we've done is
17 identified this as what we think is a likely decision
18 metric to go out with the draft rule. We'd like to
19 get comment from the stakeholders. At the same time,
20 we do some technical development to see if there's a
21 feasible, justifiable approach to use for this metric.

22 DOCTOR KRESS: I believe you're going to
23 have similar problems as you had with LERF, the
24 consistently accepted value will depend on the site,
25 because what you are worried about is the land

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 contamination- you are worried about land
2 contamination and total number of this latent cancer,
3 that thing, and that's going to depend on the site,
4 and it's going to be more sensitive than the LERF was.

5 You know, the LERF - a value of LERF over
6 all the sites to be consistent with the safety goal
7 QHO varied only by a factor of four or five. So, you
8 could come up with one value and say it's good enough.
9 You aren't going to have that freedom with the LRF,
10 you are going out for 50 miles or so, and land
11 contamination and total latent cancer, so the
12 variation site to site will be a real problem in
13 trying to come up with a value. I just wanted to
14 caution you on that.

15 MR. RUBIN: Thank you, that's very helpful.
16 There are a lot of challenges in developing this
17 metric, especially with relationship of anything we
18 can tie to elements of the safety goal or not.
19 Perhaps, a site bounding criteria will have to be
20 identified because of the issues you raised. We have
21 a lot of work ahead of us in this area.

22 DOCTOR KRESS: It will be interesting to
23 follow.

24 MR. KELLY: Okay.

25 We are going to move on to the numerical

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 risk criteria. The rule requires that the total risk
2 of all changes must be estimated and be sufficiently
3 small. I think I'd probably put the estimated there
4 in quotes, because we do know that - we do allow for
5 some use of non-PRA methods, but we are expecting that
6 there should be strong justification for why those are
7 adequate. We are going to talk a little bit more
8 about that in a later slide.

9 One of the things that we have put in is
10 that if proposed changes are not modeled in the PRA
11 then they either should be modeled or should
12 demonstrate that it basically doesn't make any
13 difference.

14 MR. ROSEN: That happens all the time.

15 MR. KELLY: Right.

16 MR. ROSEN: Many features that aren't
17 modeled, simply because if you do model them you can
18 show that they never enter into any of the sequences,
19 so it's a waste of time to model.

20 MR. KELLY: Right.

21 MR. ROSEN: It's just an exercise.

22 MR. KELLY: Right.

23 MR. ROSEN: So, is that the kind of
24 demonstration you'll be seeking? I mean -

25 MR. KELLY: I believe we would certainly

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 accept something like that as a demonstration, but I'm
2 not saying that that's the only way it can be
3 demonstrated.

4 MR. ROSEN: That's a qualitative
5 demonstration, having modeled all these things we can
6 show you that they never show up in the sequence
7 anyway.

8 MR. KELLY: Or, it may be I could just sit
9 down and talk about why my water coolant has no effect
10 on core damage.

11 MR. ROSEN: We have no way to put it in
12 sequence.

13 MR. KELLY: Right.

14 DOCTOR WALLIS: Safety grading doesn't
15 affect the non-PRA? You don't have to consider it?

16 MR. KELLY: The numerical criteria that are
17 currently in the SOC that we're talking about in our
18 examples come really right out of Reg Guide 1.174, and
19 as Mark was talking about earlier, the guidance for
20 LRF will be developed and we'll, in fact, have that
21 ready in time for the Reg Guide.

22 CHAIRMAN SHACK: Just at the risk of
23 bringing up the bundling argument again, suppose I
24 take a power uprate, do I do two calculations, one
25 where I have the new 50.46 and one where I have the

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 old one, and only the portion of the delta CDF that I
2 can get because of the new rule goes to count against
3 the 50.46 quota?

4 MR. DINSMORE: Is the power uprate due to
5 your relaxed 50.46 requirements?

6 CHAIRMAN SHACK: Well, I can uprate it
7 partially without the 50.46 by using a best estimate
8 model, and then I can get a little bit more power
9 uprate by using the new 50.46.

10 MR. RUBIN: That's - let me respond to
11 that. That is a great question. I wish we'd thought
12 of it.

13 But, right now we are seeing a lot of
14 power uprates based on the current regulatory
15 authority, and I guess we were assuming that everyone
16 would be doing their power uprates as they are now
17 under the current regulatory flexibility, and that
18 we'd be seeing uprates that were just defined as
19 50.46a uprates. And then, we'd look at the impact of
20 those against the criteria.

21 So, I think the answer to your question,
22 scratching my head, is yes. We really should strip
23 them out, it gets awfully complex. Hopefully, they'll
24 just come in with uprates related to 50.46a, rather
25 than trying to get the ones that we could get from

1 before, that would be our preference, but I guess we
2 have to think about that in the rule.

3 Thank you.

4 MR. KELLY: The numerical criteria
5 applicable for all modes of operation, again, doesn't
6 necessarily mean that they all have to be quantified,
7 but they certainly all have to be addressed. And,
8 that's an expectation here, just as it was in Reg
9 Guide 1.174. It's actually not an expectation, it's
10 requirement in the proposed rule that they be
11 considered.

12 Also, that as in Reg Guide 1.174 that the
13 licensee should look at the proposed risk-informed
14 plant changes would dramatically alter any risk-
15 informed decisions that they had made previously.

16 DOCTOR APOSTOLAKIS: Wait a minute, let me
17 understand that. This might create significant burden
18 on the licensees, right, and the staff? They'd have
19 to go back and look at what was requested, what was
20 approved, and re-evaluate it, and I'm wondering in
21 calculating delta CDF and delta LERF within 50.46,
22 they would have to take the plant as it is with the
23 changes that have been approved. Wouldn't that be
24 sufficient information for you to make a decision?
25 Why are you asking them to go back and revisit past

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 decisions?

2 MR. KELLY: Well, one of the reasons - the
3 major reason why we have it here is that it is in Reg
4 Guide 1.174, and that we - because it's our
5 expectation under this rule change that licensees will
6 be able to make much more safety significant changes
7 than ordinarily they do make, that they might have, as
8 was talked about a little bit yesterday, the tentacles
9 from this may spread into many, many different areas.

10 MR. RUBIN: Let me add something here, if
11 I could, Doctor Apostolakis.

12 Hopefully, this is not a big significant
13 deal. The philosophy here is that it's risk-informed
14 regulation, risk-informed changes that have been
15 implemented over the years. Some of them may have
16 come out acceptably because of a performance
17 assumption or a system availability that now goes away
18 because of the change from 50.46a, and we just want to
19 ensure that if anything like that exists -

20 DOCTOR KRESS: Wouldn't that be reflected
21 in the delta CDF?

22 DOCTOR APOSTOLAKIS: Yes, that's what I'm
23 wondering about, I mean, they will have to do a delta
24 CDF calculation for the 50.46, so if you have received
25 permission to have something out wouldn't that be

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 reflected in the new calculation?

2 MR. RUBIN: It would be reflected to some
3 degree, but it wouldn't fully reflect that the delta
4 impact of the change that was approved some years ago
5 still meets the acceptance criteria. I don't think -
6 we don't want to be overly burdensome.

7 MR. KELLY: I can give an example. Let's
8 say I had a plant that had a 72 hour AOT for its
9 diesel, and they got a seven day or 14 day extension,
10 and we said - and that that estimated increase in core
11 damage frequency was 9×10^{-6} , and we said, yeah, you
12 are just under the thing, it seems okay.

13 But now, with other changes that I may
14 make under 50.46a, if I were to go back and look at
15 that change, maybe now it's 1.8×10^{-5} , which would be
16 the increase associated with that going from three
17 days to 14 days. So then we would say, maybe that
18 wasn't such a good AOT increase.

19 MR. RUBIN: I think we might even, I -

20 DOCTOR APOSTOLAKIS: Excuse me, on this
21 topic, but the fact now that your diesels are allowed
22 to be out for seven days, would affect the calculation
23 of delta CDF for the proposed change.

24 MR. KELLY: No. It would affect your -
25 because now that I've already made that change, okay,

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 that has affected, past tense, my baseline risk. So
2 now, we are talking about on top of that we are now
3 adding another - you know, all we are checking for
4 when we do our 50.46a, when we are looking at the
5 numerical criteria, we are looking at how much from
6 our baseline today we are increasing core damage
7 frequency.

8 DOCTOR APOSTOLAKIS: Yes, today, and today
9 you have already approved the expansion of the AOT.

10 MR. DINSMORE: I think this isn't as
11 dramatic as it looks, because the ASME standard, for
12 example, when they do a PRA update, and I guess as
13 they incorporate these changes into the update on the
14 PRA, when they do a PRA update they are supposed to go
15 back and check on all the previous risk-informed
16 applications and estimates.

17 DOCTOR APOSTOLAKIS: Yes, so they have done
18 this once, they now have a PRA that is up to date.
19 Six months later they decide, you guys published this
20 rule, they decide to request a different change.

21 The baseline now is the one I have now,
22 where the diesel AOT is seven days, right?

23 MR. DINSMORE: Right.

24 DOCTOR APOSTOLAKIS: And, that fact will
25 affect the new delta CDF calculation.

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

(202) 234-4433

www.nealrgross.com

1 MR. DINSMORE: Right, and once -

2 DOCTOR APOSTOLAKIS: And, what I'm saying
3 is, maybe that's enough. Why are you asking them to
4 go back and re-evaluate the original petition that led
5 to the seven days?

6 MR. DINSMORE: And, what I was trying to
7 say is that they kind of have to do it - they are
8 supposed to do it anyway, the ASME standard would say,
9 all right, you are using your current PRA, you do your
10 calculations, you come in to 50.46, the current PRA
11 includes the 14 hour, 14 day, whatever, you do your
12 calculations, you come in to us, we say, okay, you can
13 make the change. You make the change, you put that
14 change in your PRA, so, therefore, you've updated the
15 PRA. Then you are - anyway you are supposed to go
16 back and check the validity of all the other previous
17 risk-informed applications.

18 DOCTOR APOSTOLAKIS: Really?

19 MR. DINSMORE: Yes.

20 DOCTOR APOSTOLAKIS: I don't recall that.
21 It's in the ASME standard?

22 MR. DINSMORE: It's in the standard, yes,
23 but it's kind of in there as a should, and this just
24 kind of reassures us.

25 MR. ROSEN: My question about this bullet

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

(202) 234-4433

www.nealrgross.com

1 is, is this the same thing you were talking about this
2 morning, I mean earlier today, about cumulative
3 tracking cumulative changes?

4 MR. DINSMORE: No, it's not the same.

5 MR. KELLY: No, it's -

6 DOCTOR APOSTOLAKIS: It's related.

7 MR. KELLY: It has to be related.

8 DOCTOR APOSTOLAKIS: Its' related, because
9 if the original expansion to the AOT is affected by
10 the 50.46 change, then you have the question of
11 whether to include that original change in your
12 bundling process. Would you consider it despite the
13 50.46 now, or is it a separate?

14 MR. KELLY: It's separate. I mean, what
15 this - you know, I've gone along and I made some risk-
16 informed decisions, and they were based on the plant
17 being in a certain kind of configuration and other
18 things. I'm going to change those configurations now.
19 Have I changed the plant so much that the risk-
20 informed decisions that I made before no longer make
21 sense? I say, you know, if I go ahead and make these
22 changes now it kind of negates the arguments that I
23 made before on some risk-informed decisions.

24 If it doesn't negate them, then they are
25 okay. If it does, then the licensee should look - we

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 even had a case recently where - didn't somebody come
2 in when they found that they had -

3 MR. DINSMORE: Yes, somebody came in and
4 said that the criteria - the new PRA violated the
5 criteria if they used that to redo an analysis they
6 did on an earlier application. So, they are tracking
7 it, they can do it.

8 In this case, it turned out that it
9 violated the criteria because when they updated the
10 PRA they made a big mistake in the way they were doing
11 the -

12 DOCTOR APOSTOLAKIS: Yes, but that was a
13 mistake, and they wanted to tell -

14 MR. RUBIN: No, they reported it before
15 they identified the mistake. They reported it as a
16 potential violation of the acceptance criteria of a
17 previous risk-informed application because of a PRA
18 model update.

19 MR. DINSMORE: So, it is possible, and the
20 answer is, yeah, it would be the cumulative impact of
21 all the previous changes under each of them.

22 It starts to get a little complicated.

23 MR. RUBIN: We need the deltas more in the
24 Reg Guide, of course, and I'm not competent or clear
25 that requantification of all them is required, but,

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 perhaps, some high-level look to make sure that a
2 fundamental assumption that was a basis of the
3 acceptability of a previous change hasn't been
4 invalidated.

5 DOCTOR APOSTOLAKIS: It probably makes more
6 sense. Are we requiring this of all the rule changes,
7 I mean, 50.44, if they do something there they would
8 have to go back -

9 MR. KELLY: 50.44, although the first risk-
10 informed change was really made, minor changes that
11 affected risk, similarly with 50.69, this is the first
12 risk-informed application that I think is making full
13 use of -

14 MR. RUBIN: Yeah, 50.44 is a risk-informed
15 deterministic rule, in fact, using the incites of PRA
16 the rule, non-voluntary, the rule is revised to allow
17 removal of certain pieces of equipment. No risk
18 calculations are required by the licensee. The
19 generic basis for the changes was sufficient.

20 DOCTOR APOSTOLAKIS: Yeah, but I mean, they
21 made the changes, and they have already gotten five
22 approvals of risk-informed changes. Should they go
23 back and re-evaluate those because of the change?

24 MR. RUBIN: Yeah, well, the changes - the
25 things, the recombiners and things they pull out of

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 the plant, yeah, will get reflected in the PRA model,
2 but, in fact, they won't, because they have no benefit
3 in severe accident space in the first place is why
4 they were allowed to be removed in 50.44.

5 So, the answer to your question is yes,
6 but it has no effect.

7 MR. ROSEN: I'm sitting here thinking about
8 a real problem, and maybe you could just comment on
9 it.

10 Let's just say a plant gets two or three
11 of these 50.46 changes behind them, and then goes
12 ahead and does fire risk requantification, kind of a
13 global change. How would that play?

14 MR. DINSMORE: You mean they would do a
15 fire PRA and use that instead of this?

16 MR. ROSEN: Yes, they had a PRA, but, you
17 know, it was state of the art when it was done, but
18 they go ahead and do this fire risk requantification,
19 completely relook at all of the issues, try to deal
20 with all the issues.

21 MR. DINSMORE: Hopefully, when they did the
22 screening analysis against the fires, I'm not quite
23 sure I understand the question.

24 MR. ROSEN: Well, I'm just trying to see
25 with that kind of a big perpetually global change to

1 the PRA.

2 MR. KELLY: We're going to talk about this
3 a little bit later. Steve is going to get into that
4 when we talk about the cumulative and how you deal
5 with PRA updates. We'll be talking about how you deal
6 with PRA updates.

7 MR. ROSEN: That would be a substantial
8 update, and could have broad scale impacts on the risk
9 sequences.

10 MR. KELLY: And, I think the bottom line
11 is, if you do a PRA update you are expected to go back
12 and to confirm that you continue to meet the
13 acceptance criteria on 50.46a.

14 MR. DINSMORE: And, hopefully, the
15 screening criteria which they used to say that fire
16 didn't impact the decisions which we were allowing, or
17 the changes which we were allowing them, should have
18 been sufficient such that when they actually do the
19 fire PRA and incorporated it systematically, that the
20 past changes should have been okay, and if they are
21 not then we maybe should look at the way they are
22 doing it.

23 MR. ROSEN: I think that's an expectation
24 that, without having done the fire risk
25 requantification that people will only have an

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 intuition about not have any real detailed knowledge.

2 MR. DINSMORE: Well, there would be some
3 systematic way of saying, well, if it's involved in
4 fire sequences, check and see if it's involved in fire
5 sequences, if it's screened out, and if it has - if
6 it's not involved then you should check and see if it
7 had an influence on those that were screened out. So,
8 it's a little more than an intuition, it might not be
9 perfect, there might be cases where it would change,
10 but that would be the intent of the way that the
11 process would work.

12 MR. ROSEN: So, you see no bar to going
13 ahead with 50.46 ahead of fire risk requantification.
14 I mean, they can't -

15 MR. DINSMORE: It will limit the changes
16 that they could make.

17 MR. KELLY: To some extent.

18 MR. DINSMORE: May limit the changes.

19 MR. ROSEN: Because at the end of the day
20 you'll say, yeah, but you haven't done risk
21 requantification on fire, and we don't know, there's
22 a lot of stuff that goes through the same areas here.

23 MR. KELLY: I think licensees make these
24 decisions all the time, where they say, you know, I'm
25 a little bit ahead of the curve, so to speak, in a

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 certain area, now I can either be very aggressive and
2 take the very maximum advantage I take of this, or I
3 can say, you know, I'm going to only take those things
4 which I'm really very sure of that will be okay, and
5 even if I have to requantify this later.

6 MR. ROSEN: It's going to be a limitation.

7 MR. KELLY: Yes.

8 Steve is going to go ahead now and talk
9 about the risk assessment requirements.

10 MR. DINSMORE: Yeah, okay, I'm going to
11 discuss the PRAs that they are going to be using to
12 calculate these things.

13 These things are very familiar. In
14 general, we were discussing the other day, and we
15 discovered we've been doing these risk-informed
16 applications for about seven years, and these things
17 that they are supposed to address, these have been
18 very useful. We've actually been able to use them to
19 identify insufficient modeling, and we've been able to
20 work together with the licensees, and based on this
21 list of stuff we've actually - we've had pretty good
22 success. So, we are going to keep using these pretty
23 much the way they are.

24 The PRA technical adequacy, this is going
25 to be kind of a continuation of the way that we're

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 doing business. 50.46 application is not going to be
2 a standard application, like an ISI or IST, it's,
3 essentially, going to be, well, the licensees are
4 going to go through their analyses and evaluations and
5 try to figure out what they can change, and whatever
6 they can change they'll come in and request that
7 change.

8 So, it's a very open-ended type of
9 arrangement. So, for each one that comes in, of
10 course, we are going to review the PRA, take into
11 account whatever standards exist, and if the standard
12 doesn't exist then we'll have to review that PRA
13 pieces in more detail.

14 We've changed this slightly to say that
15 the PRA must be able to calculate the CDF, the LERF
16 and the late release frequency. Actually, pretty much
17 everybody can calculate late release frequencies now,
18 it's no great burden. Plus, in the nu reg, which
19 tells you how to calculate a simplified LERF that
20 actually is in there how to calculate late release
21 frequency, although NEI has been trying to get that
22 taken out for years, but didn't succeed, so it's still
23 in there.

24 And again, if there's approved standards
25 out, and they meet those standards, it will have a big

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 impact on the degree of the amount of review that we
2 have to do.

3 We are going to follow this phased
4 approach to quality. The phased approach mostly tells
5 you how to review a submittal coming in, based on what
6 it wants to do and what standards and so on are
7 available.

8 We have taken a little criteria from the
9 phased approach and put it into the rule, which might
10 be a little new, which is we say that the PRA must
11 consider all initiating events and operating modes
12 that would affect the regulatory decision in a
13 substantial manner, should be in the PRA.

14 Now, there are two ways to do that. One
15 is that if you don't have a fire PRA, and then you are
16 not really supposed to change stuff that might affect
17 the fire PRA. We haven't quite figured out what
18 substantial manner is, but we'll work on that in the
19 Reg Guide. I think we'll go ahead and further define
20 this.

21 And, other than that, the process would be
22 pretty much the same as what we are doing today.

23 MR. ROSEN: That's kind of what I was
24 getting at. If you can't affect - if you haven't done
25 a fire PRA, and you can't change anything that might

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 be affected by the results of such a fire PRA, that's
2 pretty much everything. You just don't know a priori.

3 MR. RUBIN: We face that now, Doctor Rosen.
4 It's been a challenge for applications that have come
5 in where there might be some impact on fire. We've
6 been able to deal with it sometimes using what incites
7 came from the FIVE analysis, some bounding
8 calculations, but there are definite limitations due
9 to lack of scope of modeling, and that has always been
10 a clear restriction limitation in the use of these
11 techniques at the beginning of a full-scope, high-
12 quality analysis.

13 MR. ROSEN: Then I come back to where we
14 were before. It's going to limit what you can do,
15 because you are going to have questions that you can't
16 answer and that the licensee can't answer. And then
17 you can say, well, I guess we are not going to come to
18 a conclusion on this.

19 MR. DINSMORE: Well, it might not limit it
20 completely, because we do have these guidelines on
21 what we accept for risk assessment methods, other than
22 what's actually in the PRA.

23 A lot of people in industry are pretty
24 smart, and they'll come in and they'll give us
25 arguments about why this won't make hardly any

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 difference whatsoever, and that point is going to be
2 not a significant contributor, and we're allowing them
3 that option.

4 MR. ROSEN: There will be cases where that
5 will be pretty apparent on both sides of the table,
6 but then there will be the ones where it's not so
7 apparent, and you'll just have to exercise discretion.

8 MR. DINSMORE: Right, we'll work through
9 those like we kind of do now to some extent, although
10 not as - again, this is going to be a much broader
11 scope of applications that we have to deal with.
12 That's going to be the main change that's going to
13 come down.

14 I guess we'll go back to 41. Uncertainty
15 analysis, we are going to have to deal with
16 uncertainty analysis within the framework that
17 uncertainty analysis is generically dealt with and we
18 can't come up with any new specific guidelines that we
19 can use.

20 Essentially, they just must demonstrate
21 that the risk assessment adequately addresses the
22 uncertainty, so that there's confidence that the
23 numbers that they do provide clearly reflect the
24 effect on risk. I know that Research is developing
25 guidelines how to deal with uncertainty, and I think

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 they are coming to talk to you in December, I believe.

2 MR. ROSEN: About model uncertainty.

3 MR. ROSEN: It's only on model uncertainty.

4 DOCTOR APOSTOLAKIS: Model uncertainty
5 quantification.

6 MR. ROSEN: Not broader than that?

7 DOCTOR APOSTOLAKIS: Uncertainty which is
8 broader.

9 MR. ROSEN: Okay. Well, I was listening -
10 going to listen to part on what we are going to do
11 about model uncertainty.

12 DOCTOR APOSTOLAKIS: Well, that's the key
13 issue.

14 MR. ROSEN: Including those things we don't
15 know about.

16 DOCTOR APOSTOLAKIS: Yeah, they have to
17 tell us everything they know about things they don't
18 know about, right?

19 MR. DINSMORE: We have great faith in Ms.
20 Droun.

21 DOCTOR APOSTOLAKIS: We have great faith in
22 what?

23 MR. DINSMORE: Ms. Droun.

24 DOCTOR APOSTOLAKIS: Oh.

25 MR. DINSMORE: Then we'll go to

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 implementation and monitoring is always a big piece of
2 risk-informed activities. Licensees must demonstrate
3 that the acceptance criteria in the rule continue to
4 be met, given other changes to the plant, its
5 operation, PRA model data updates.

6 This means that every time they update the
7 model they are going to have to redo all the
8 calculations for this risk-informed activity, and as
9 I indicated earlier most of the other ones have the
10 same requirement in it.

11 If it can't be demonstrated the acceptance
12 criteria continue to be met, a licensee must propose
13 steps to remedy the situation. I think we've kind of
14 - I'm not sure it's a consensus yet, but we've kind of
15 decided that if, for example, you bump up over to the
16 10^{-5} limit because you've been doing other things at
17 the plant, you don't have to take out what you did,
18 you might be able to address it by doing something
19 else. In other words, you could - there's some
20 flexibility in how you could get that back below those
21 guidelines.

22 Again, that's not real clear, because I
23 think the Commission used reversibility once, but what
24 means isn't clear.

25 MR. ROSEN: I suppose they meant

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 reversibility if you can't do what is suggested, make
2 some other change that's countervailing.

3 MR. DINSMORE: That's kind of the
4 interpretation that we've been working on, working
5 with.

6 And then, the last slide, the peer view
7 process on the PRA is a one-shot deal, and the ASME
8 guideline again does say that if you do substantial
9 changes to your model you'd have people come in and
10 review those substantial changes. But, it's still not
11 clear over the long term how we are going to at least
12 monitor the quality of the PRAs.

13 And, we've decided that the updated PRA
14 must retain sufficient technical adequacy to
15 demonstrate that the acceptance criteria continue to
16 be met.

17 And, after our discussion we've kind of
18 just looked towards I think it's the 50.46 - the 50
19 degree thing, we'd have to report it. And, we
20 thought, and we looked back at why they were asking
21 for that, and if you look in the regulations it says
22 they are asking for that exactly for this reason, to
23 retain confidence that the models that they are using
24 are able to demonstrate that this criteria is being
25 met.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 So, we kind of just took that as a
2 precedent which had been working quite well, and
3 thought that we would apply it to the PRA side of the
4 equation here. And, we just said, well, if they are
5 going to have big changes in the CDF and LERF it would
6 be nice to know. For example, if they had these big
7 changes they could notify us and they'd say, oh, well
8 it's already been peer reviewed and that would mean
9 one thing, if they had big changes and just notified
10 us that would mean another.

11 The 20 percent number I think is open for
12 discussion. I'm actually not sure where it came from,
13 but it was decided upon, and this was for the baseline
14 numbers.

15 And then we also, even though that they
16 are required to monitor the increase due to this
17 application, and if it bumps over 10^{-5} than they have
18 to do something, this is a somewhat lower boundary on
19 if it changes by a certain amount they should notify
20 us again. And again, this is to provide confidence
21 that the adequacy of the PRA has provided confidence
22 that the accepted criteria are met.

23 These numbers as well, we've used them
24 from - we pulled them from the - these are very small
25 changes. We couldn't, of course, make it the same

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 10⁻⁵ which is the limit, because they have to do
2 something else, and that's where these came from.

3 And, if you'll notice LRF is in neither of
4 these guidelines, late relate frequency, because we
5 don't have any numbers for them yet, and so we didn't
6 have any starting point.

7 CHAIRMAN SHACK: You could have made it 20
8 percent of the allowable change.

9 MR. KELLY: I would just note that on this
10 last bullet that these increases or these changes are
11 all associated with merely the updated PRA. It has
12 nothing to do with any of the - it's just what the
13 modeling change is, or other changes that might have
14 happened in the plant, how they are going to affect
15 the numbers that we've already calculated.

16 MR. RUBIN: And, I will add to that that
17 this is purely a reporting requirement, the staff will
18 not necessarily take any action here, it just gives us
19 the knowledge and the ability if we want to look at
20 something.

21 MR. ROSEN: Is that a report immediately or
22 an annual report?

23 MR. KELLY: I think a proposed 60 days.

24 MR. RUBIN: And, PRA update process is a
25 maximum of a two cycle period.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 MR. DINSMORE: And, that concludes this
2 presentation.

3 DOCTOR APOSTOLAKIS: A thought occurred to
4 me that's not directly related to what they are doing,
5 but maybe we might could take a note of. You know, we
6 always review rules, draft rules, and regulatory
7 guides, and then after they are published and
8 implemented I don't think the Committee is aware of
9 how they are implemented and what the experience is.
10 And, from the discussions yesterday and today, I think
11 it would be useful for us to have maybe an hour and a
12 half, two hours presentation, an information meeting
13 only, from people who do make decisions, have been
14 making decisions for the last several years, using
15 risk information.

16 Like Steve a few minutes ago just said,
17 you know, we've been doing this for seven years, it's
18 been working very well, the Committee is not aware of
19 what is going on. So, maybe you guys can come here
20 with several cases, some where you are really happy
21 with what you saw, others where you denied the
22 petition, the request, and just enlighten as to what
23 are the issues of PRAs, how things are happening,
24 because I might say we are in the dark here.

25 MR. ROSEN: George, Mark Rubin and I had a

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 conversation in the hall before this meeting about
2 that very point, and there were people who, before we
3 embarked on this thing, felt that making these kinds
4 of changes would result in very abrupt performance
5 degradations in the plant in various areas, ISI, IST,
6 all these applications would have negative and almost
7 immediate consequences.

8 And, I would - I don't think that's been
9 true, been borne out.

10 DOCTOR APOSTOLAKIS: It has not been true.

11 MR. ROSEN: And, I think it would be useful
12 to have some sort of time line and some sort of
13 accounting.

14 DOCTOR APOSTOLAKIS: What is the experience
15 of the regulatory staff in implementing 1.174? How do
16 they apply, for example, I don't think we are really
17 fully aware of how the stuff applies, these
18 qualitative boxes, defense-in-depth, margins, and I'm
19 really curious to see a case, for example, where the
20 delta CDF were okay and everything, and the staff said
21 denied because of defense-in-depth consideration. I'm
22 going to send a note to the Planning and Procedures
23 Subcommittee so you guys can consider it.

24 MR. SNODDERLY: I think we did that,
25 George, last - well, 2003, when we did the Fleming

1 report, because the Fleming report looked at four
2 examples of where the staff had used - done risk-
3 informed decision-making, and he did an assessment of
4 that.

5 DOCTOR APOSTOLAKIS: But, that was
6 Fleming's point of view. I want to hear these guys.

7 MR. RUBIN: Yeah, we sent him a number of
8 SEs, some that were favorable, and a couple of
9 rejections for the Committee to review.

10 DOCTOR APOSTOLAKIS: When did that happen?

11 MR. RUBIN: It was about a year and a half
12 ago.

13 MR. ROSEN: But, that's safety evaluations,
14 I was more focused on performance in the plant. Have
15 there been events that one could attribute to risk-
16 informed changes that wouldn't have occurred.

17 DOCTOR APOSTOLAKIS: That's a separate
18 issue.

19 MR. ROSEN: Yeah.

20 DOCTOR APOSTOLAKIS: No, I'd like to see
21 the licensee's request and the staff's evaluation, and
22 maybe tell the staff to make a presentation. Do we
23 have those SEs that they sent, I remember there was a
24 report but not any attachments from the staff.

25 CHAIRMAN SHACK: Maybe Carl saw the SEs, we

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 didn't.

2 DOCTOR APOSTOLAKIS: I didn't see them.

3 MR. SNODDERLY: I gave the SEs to all of
4 us, or to those people - I showed the staff.

5 DOCTOR APOSTOLAKIS: I got the six cases
6 from Gary Holahan, but that was five, six years ago.
7 Those were extremely enlightening, now if we can do
8 the same thing now, but include the licensee's
9 application, to see what they actually - I don't think
10 it's a big deal.

11 MR. RUBIN: No, and it's not unreasonable
12 for, you know, once every year or two years that we
13 have some examples.

14 MR. ROSEN: And, my point, the idea that
15 you would tell me about events that have occurred, and
16 maybe as Bill suggests, a null set, but just the point
17 that, say, 56 out of 60 potential people who could
18 have done this have performed a risk-informed ISI, for
19 example, would be very useful to know. I mean, I know
20 those numbers are getting high, but I don't know how
21 high.

22 MR. KELLY: And, no large levels.

23 MR. ROSEN: And, there hasn't been one that
24 I've been told about.

25 MR. DINSMORE: It's about 75 plants.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 MR. ROSEN: Seventy-five units have now
2 done risk-informed ISI?

3 DOCTOR APOSTOLAKIS: And, I think all of
4 them are planning to continue it.

5 MR. DINSMORE: All but two.

6 DOCTOR APOSTOLAKIS: Okay.

7 MR. ROSEN: Well, that's just a thought.

8 DOCTOR APOSTOLAKIS: Vesner has a nice
9 thing. Is that okay, if we could have such an
10 information meeting?

11 MR. RUBIN: Sure, hopefully, after we get
12 the rule out, maybe the Reg Guide.

13 MR. ROSEN: Well, you can do this while you
14 are resting, it's easy.

15 MR. RUBIN: It was a timing issue, George,
16 but we'll certainly accommodate your request.

17 DOCTOR APOSTOLAKIS: You could do it in
18 your sleep. You could come here and -

19 CHAIRMAN SHACK: They may have to do it in
20 their sleep.

21 MR. RUBIN: We would be pleased to
22 accommodate the Committee in this area.

23 DOCTOR APOSTOLAKIS: Oh.

24 MR. ROSEN: You've been to charm school,
25 too.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 MR. SIEBER: When does your term expire?
2 You can do it right after that.

3 CHAIRMAN SHACK: When will we have the
4 presentation of the main Committee?

5 MR. SNODDERLY: Yeah, that's what Brian
6 wanted us to provide the staff feedback on.

7 CHAIRMAN SHACK: How much time do we have?

8 MR. SNODDERLY: Right now we are scheduled
9 to go from 8:35 until 10:30, so it's two hours.

10 DOCTOR APOSTOLAKIS: An hour and a half.

11 MR. SNODDERLY: Two hours, 8:30 to 10:30,
12 so two hours.

13 DOCTOR APOSTOLAKIS: I think this last
14 stuff must be reviewed because it's important. Not
15 all of it, but a lot of it.

16 DOCTOR KRESS: Particularly the question of
17 bundling.

18 DOCTOR APOSTOLAKIS: The question of what?

19 DOCTOR KRESS: We could lose the whole hour
20 and a half, Tom, but that's going to be one of the
21 items that's going to be discussed, I think rightly,
22 before we write a letter.

23 DOCTOR APOSTOLAKIS: And, something from
24 Jennifer, another chance of losing the whole hour and
25 a half.

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

(202) 234-4433

www.nealrgross.com

1 CHAIRMAN SHACK: I was going to suggest
2 Brian's overview myself.

3 DOCTOR APOSTOLAKIS: That was good, that
4 was good.

5 CHAIRMAN SHACK: But, that takes up a
6 goodly chunk in itself, you know. I think we can have
7 Brian's overview and one other topic, so you have to
8 pick either Jennifer or PRA. I'd probably go for the
9 PRA.

10 DOCTOR APOSTOLAKIS: PRA.

11 MR. RUBIN: I'd go for Jennifer.

12 CHAIRMAN SHACK: How about Jennifer doing
13 the PRA?

14 DOCTOR APOSTOLAKIS: No, but I think what
15 Mr. Fischer presented, it was only four slides, but
16 there is information there that's useful.

17 CHAIRMAN SHACK: There's information that's
18 useful in many places, but we only have an hour and a
19 half, George.

20 DOCTOR APOSTOLAKIS: Well, all she has to
21 do is show it and say here are the GDCs that are
22 effective. It's not a big deal.

23 DOCTOR BONACA: Two hours.

24 DOCTOR APOSTOLAKIS: Yeah, Brian's
25 presentation, I think, is - now one of the things

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 where you can - one of the things where you can save
2 time - or also add something about the safety
3 benefits.

4 MR. ROSEN: Safety benefits.

5 DOCTOR APOSTOLAKIS: The safety benefits,
6 yeah.

7 CHAIRMAN SHACK: Well, he's got slide 4
8 with the second bullet.

9 DOCTOR APOSTOLAKIS: Slide what?

10 CHAIRMAN SHACK: Slide 4 of his
11 presentation, second bullet.

12 MR. ROSEN: He expects to reduce plain
13 risk. That's not enough, there's a whole submittal
14 from NEI that one could at least -

15 DOCTOR APOSTOLAKIS: One of the things they
16 don't need to do is tell us what they intend the risk-
17 informing regulations is, if you are maintaining
18 defense-in-depth, if you are trying to improve safety,
19 we will know this stuff. You don't have to give us a
20 general - I know that that's common to start that way.

21 MR. KELLY: is there anything out of our
22 submittal or discussion that we had today that you
23 particularly would like to cut out?

24 DOCTOR APOSTOLAKIS: That I'd like to cut
25 out. Yeah, your slide two.

1 DOCTOR KRESS: Three and four.

2 DOCTOR APOSTOLAKIS: Three and four.

3 CHAIRMAN SHACK: No, no, no, four you want

4 in, four is exactly what you want in there.

5 DOCTOR APOSTOLAKIS: Four is important,

6 yeah.

7 DOCTOR KRESS: Yes.

8 DOCTOR APOSTOLAKIS: Six.

9 MR. RUBIN: Six is out?

10 DOCTOR APOSTOLAKIS: Yes.

11 MR. ROSEN: You definitely want to have

12 eight, but have it right.

13 DOCTOR KRESS: The way it is.

14 DOCTOR APOSTOLAKIS: Twelve?

15 CHAIRMAN SHACK: In or out, George?

16 DOCTOR APOSTOLAKIS: Out. And, that's it

17 in my mind, because everything else, you know, is

18 really one way or another important.

19 CHAIRMAN SHACK: Yes, most of us are here,

20 most of us have heard of all of this.

21 DOCTOR BONACA: Allow two and a half hours

22 for this presentation, and qualified is going to be

23 two and a half hours.

24 CHAIRMAN SHACK: You're the chairman, you

25 are going to be in charge, you can whip them right

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 through, Mario.

2 DOCTOR BONACA: No, I can't whip them, I
3 mean, you are in charge, you are supposed to be the
4 one that you say two hours, you stay within two hours.

5 MR. ROSEN: You could get those done in an
6 hour and a half and give the chairman back a half an
7 hour.

8 DOCTOR APOSTOLAKIS: Mr. Dudley's
9 presentation, I think, has to be there. It's right
10 after Brian's.

11 Now, selecting the transitional break size
12 probably does not belong to this, because we are going
13 to have a separate meeting on that, aren't we?

14 MR. SNODDERLY: Yes, November 16th.

15 DOCTOR APOSTOLAKIS: So, that's out.

16 MR. SNODDERLY: And, maybe the analysis we
17 leave out, too.

18 DOCTOR APOSTOLAKIS: The analysis.

19 MR. SNODDERLY: Because the idea would be
20 that we understand the criteria that they are going to
21 use, but it's going to be - the guidance will be
22 provided in the Reg Guide, which we are going to
23 review.

24 DOCTOR APOSTOLAKIS: I think there are two
25 or three, or maybe four, issues that really require

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 some bundling of this issue.

2 MR. SNODDERLY: See, I think that's more
3 important, because that deals more with rule language
4 which you are talking about putting out, as opposed to
5 things that are going to be in the Reg Guide.

6 DOCTOR SHERON: One possibility is that,
7 you know, since I think you've asked a lot of the
8 questions of myself and also Dick, I think I could get
9 my slides in ten minutes. Dick, I just asked Dick,
10 you know, without a lot of questions he thinks he
11 could run through his in ten minutes. If there's two
12 hours allotted, and you typically give 50/50, so you
13 could have 20 minutes, you know, 15 or 20 minutes for
14 Jennifer to run through the thermal-hydraulic analysis
15 part, and then another 20 minutes for Mark or so to go
16 through the - or, you know, whoever to go through the
17 PRA, if you want. And, you are right, you could, if
18 you are happy with the break and saving that for
19 another subcommittee with Research that would be fine.

20 And then the only thing is the conforming
21 changes. I think if you wanted, Dick, we could
22 probably just merge that into Dick's and have him
23 cover it.

24 DOCTOR APOSTOLAKIS: Jennifer didn't have
25 very many slides, and as I remember she went through

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 them fairly quickly.

2 MR. ROSEN: You know, on the conforming
3 changes you don't really need to do more than say
4 we'll make conforming changes, right?

5 DOCTOR SHERON: Right, and I said Dick
6 could probably just mention those in his presentation,
7 and that would cover that.

8 CHAIRMAN SHACK: Okay, I mean, let's try
9 that, and I'll just crack the whip hard enough to get
10 us through, you know, we'll just cut off the
11 discussion as need be to make it happen.

12 DOCTOR SHERON: Okay, so then, Dick and I
13 will take about 20 minutes, about 20 minutes for
14 thermal-hydraulics, and 20 minutes for PRA. Sounds
15 good.

16 MR. ROSEN: Are we done?

17 CHAIRMAN SHACK: Unless anybody else has
18 anymore comments or questions, I think we are ready to
19 adjourn.

20 MR. SNODDERLY: Unless anyone wants to
21 amend the comments that they made at the end of
22 yesterday evening, but otherwise we'll go with those
23 comments not hearing any others.

24 CHAIRMAN SHACK: The meeting is adjourned
25 then.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 (Whereupon, the above-entitled matter was
2 concluded at 11:09 a.m.)
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

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

(202) 234-4433

www.nealrgross.com

CERTIFICATE

This is to certify that the attached proceedings
before the United States Nuclear Regulatory Commission
in the matter of:

Name of Proceeding: ACRS/REG. POLICIES &
PRACTICES SUBCOMMITTEE

Docket Number: N/A

Location: ROCKVILLE, MD

were held as herein appears, and that this is the
original transcript thereof for the file of the United
States Nuclear Regulatory Commission taken by me and,
thereafter reduced to typewriting by me or under the
direction of the court reporting company, and that the
transcript is a true and accurate record of the
foregoing proceedings.



REBECCA DAVIS
Official Reporter
Neal R. Gross & Co., Inc.

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

(202) 234-4433

www.nealrgross.com

Risk-Informed Evaluation of the Acceptability of Proposed Plant Modifications

Glenn Kelly/Stephen Dinsmore
Probabilistic Safety Assessment Branch,
DSSA, NRR
October 29, 2004

1

Risk-Informed Regulation

- Promote safety by focusing regulations and regulatory enforcement on safety significant issues
- Frequency of DEGB LOCA is very small
- Resources are better directed toward other more likely events
- Risk assessment methods allow integrated evaluation of the risk impact of changes that might be made as a result of re-directing resources from DEGB LOCA to other more likely events

2

Steps To Making Plant Modifications

- Define the proposed change and identify the change process
- Perform an engineering analysis
- Define or expand implementation and monitoring programs
- Submit proposed changes as required

3

Define The Proposed Change

- Define what will be affected in plant's design or licensing basis including licensing conditions and commitments
- Identify all SSCs, procedures, and activities to be changed or affected
- The totality of changes made under 50.46a are evaluated as a single change for purposes of tracking changes to risk
- Rule permits two plant change processes
 - Changes with prior staff review and approval
 - Inconsequential changes without prior staff review and approval for each change

4

Two Change Processes

- (1) "Normal" risk-informed Licensing Action Request review process available for any proposed changes
 - (2) Licensee may apply for approval to make inconsequential future changes without staff prior review and approval
 - Initial application required to demonstrate capability of evaluation processes and tools used to determine that acceptance criteria of rule remain satisfied
 - May limit initial staff review by limiting scope of future changes
 - Cumulative change in risk from all unreviewed changes must remain inconsequential
- Licensee's evaluation process is the same for all changes

5

Plant Changes Must Meet The Following Risk-Informed Principles

- Proposed change meets current regulations
- Sufficient Defense-in-Depth
- Sufficient safety margins
- At most, small increases in risk
- Impact of change must be monitored with performance measuring strategies

6

Defense-in-depth Coolable Geometry

- Requirements have been relaxed in the Region beyond TBS.
- Relaxed analyses no longer require assumption of limiting SSC unavailability.
- At the same time, risk-significant SSCs (e.g., LPSI, CCW, ESW. etc.) may be removed from service for long periods for test and maintenance
- Assurance of protection for the core is via requirement that core retain coolable geometry for all analyzed breaks up to DEGB.

7

Defense-in-depth Coolable Geometry (Cont.)

- To maintain defense-in-depth, the plant cannot enter or operate in a configuration unless it has been shown that a LOCA larger than the TBS with the plant in that configuration would result in a coolable geometry
- This may place some limits on power uprates or operation configurations, because the analyses would need to account for major SSCs out of service for maintenance.

8

Defense-in-Depth Containment Performance

- Changes to containment and containment systems will be allowed by the rule
- Some changes to containment and containment systems will not affect CDF or LERF estimates but could still change the likelihood of a large release
- Late containment failure and late release qualitatively evaluated as part of defense-in-depth in risk-Informed licensing actions
- Late release frequency (LRF) was added to the CDF and LERF guidelines to provide a structured evaluation process and consistent acceptance criteria

9

Numerical Risk Criteria

- Rule requires that the total risk increase of all changes be estimated and be sufficiently small
 - It is expected that the effect of the changes proposed can be measured quantitatively and in a realistic manner
 - Estimates using risk assessments other than PRA are permitted (qualitative, bounding, screening, etc)
 - If proposed changes are not modeled, then they should be modeled, or it should be demonstrated that the change has no, or only a very small negative effect on CDF, LERF, and LRF.
- Numerical criteria for CDF and LERF based on principles and expectations of R.G. 1.174
- Guidance for LRF will be developed as part of the planned RG

10

Numerical Risk Criteria (Cont)

- Criteria are applicable for full power, low power, and shutdown operation for both internal and external events
- Licensees are to determine effect that proposed plant changes would have on important risk-informed decisions made previously

11

Risk Assessment Requirements

- Risk Assessments are to address the following:
 - Initiating events - internal and external
 - Modes - full power, low power, and shutdown
 - Represent the current as-operated, as-built plant
 - Be of sufficient technical adequacy

12

PRA Technical Adequacy

- PRA will be assessed by NRC taking into account standards and peer review results (see trial use R.G. 1.200)
- PRA must be able to calculate mean CDF, LERF, and LRF
- Meeting NRC approved standards should reduce the NRC resources needed to review
- Phased approach to quality of PRA's endorsed by the Commission

13

PRA Technical Adequacy (Cont)

- A licensee must demonstrate that its risk assessment adequately addresses uncertainty so that there is confidence that the predicted changes in CDF, LERF, or LRF adequately reflect the plant and the effect of the proposed changes on risk
- Required uncertainty evaluation should be consistent with staff guidelines under development

14

Risk Assessment Technical Adequacy

- Plants using risk assessment methods other than PRA's would need to:
 - Justify methods produce realistically conservative numerical results and appropriate safety insights, or
 - Justify method is capable of accurately determining expected changes in CDF, LERF, and LRF or
 - Justify the absence of PRA modeling for this initiator would make no significant difference in numerical results and insights.

15

Implementation and Monitoring

- Licensees must demonstrate that the acceptance criteria in the rule continue to be met given other changes to the plant, its operation, or PRA model/data updates
- If can not be demonstrated that the acceptance criteria continue to be met, a licensee must propose steps to remedy the situation

16

Implementation and Monitoring (Cont.)

- The updated PRA must retain sufficient technical adequacy to demonstrate that the acceptance criteria are met
- To provide confidence in the technical adequacy of the updated PRA, the licensee must report
 - If the baseline CDF increases by 20% or more after an update
 - If the baseline LERF increases by 20% or more after an update
 - If the change in CDF from 50.46a implementation increases by more than $1\text{E-}6/\text{year}$
 - If the change in LERF from 50.46a implementation increases by more than $1\text{E-}7/\text{year}$

17