

NUCLEAR REGULATORY COMMISSION

ORIGINAL

Title: Advisory Committee on Reactor Safeguards
501st Meeting

PROCESS USING ADAMS
TEMPLATE: ACRS/ACNW-005

Docket Number: (not applicable)

Location: Rockville, Maryland

Date: Thursday, April 10, 2003

Work Order No.: NRC-872

Pages 1-295

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

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

+ + + + +

501ST MEETING

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

+ + + + +

THURSDAY, APRIL 10, 2003

+ + + + +

ROCKVILLE, MARYLAND

+ + + + +

The Committee met at 8:30 a.m. at the
Nuclear Regulatory Commission, Two White Flint North,
Room T2B3, 11545 Rockville Pike, Mario V. Bonaca,
Chairman, presiding.

COMMITTEE MEMBERS:

MARIO V. BONACA	Chairman
GEORGE E. APOSTOLAKIS	Member
F. PETER FORD	Member
THOMAS S. KRESS	Member
GRAHAM M.. LEITCH	Member
DANA A. POWERS	Member
VICTOR H. RANSOM	Member
STEPHEN L. ROSEN	Member-at-Large
WILLIAM J. SHACK	Member

NEAL R. GROSS

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

COMMITTEE MEMBERS: (cont.)

JOHN D. SIEBER Member

GRAHAM B. WALLIS Member

ACRS STAFF PRESENT:

JOHN T. LARKINS Designated Federal Official;

Executive Director, ACRS/ACNW

SAM DURAISWAMY Technical Assistant, ACRS/ACNW

HOWARD J. LARSON Special Assistant, ACRS/ACNW

TIMOTHY KOBETZ Senior Staff Engineer, ACRS

RICHARD F. DUDLEY NRR/DRIP

GLENN KELLY NRR/DRIP

MICHAEL SNODDERLY

BOB FALLA NRR/DSSA/SPSB

FRANK GILLESPIE

MARY DROUIN RES/PRAB

GARETH PARRY NRR

MARK REINHART NRR/DSSA/PSAB

JACK HAYES NRR/DSSA/PSAB

MARK BLUMBERG NRR/DSSA/PSAB

STEVE LaVIE NRR/DSSA/PSAB

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

(202) 234-4433

www.nealrgross.com

1 ALSO PRESENT:

2 BIFF BRADLEY NEI

3 STEPHEN SCHULTZ NEI

4 JIM RILEY NEI

5 ALEX MARION NEI

6 JOHN DUFFY NEI

7 ROBERT CAMPBELL NEI

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

I-N-D-E-X

<u>Agenda Item</u>	<u>Page</u>
1) Opening Remarks by the ACRS Chairman	5
2) Draft Final Risk-Informed Revisions to	8
10 CFR 50.44	
3) Draft Final Regulatory Guide, DG-1122,	60
4) Control Room Habitability	199

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

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

(8:30 a.m.)

1) OPENING REMARKS BY THE ACRS CHAIRMAN

1.1) OPENING STATEMENT

CHAIRMAN BONACA: Good morning. The meeting will now come to order. This is the first day of the 501st meeting of the Advisory Committee on Reactor Safeguards.

During today's meeting, the committee will consider the following: draft final risk-informed revisions to 10 CFR 50.44 standards for combustible gas control system in light-water-cooled power reactors; draft final regulatory guide, DG-1122, determining technical adequacy of PRA results for risk-informed activities; control room habitability; items scheduled for meetings with the NRC commissioners; proposed ACRS reports.

This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Dr. John Larkins is the designated federal official for the initial portion of the meeting.

We have received written comments from Sid Bernsen, chairman of the ASME Committee on Nuclear Risk Management regarding DG-1122. You should have 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 copy of his letter in front of you.

2 We have received no requests for time to
3 make oral statements from members of the public
4 regarding today's sessions. A transcript of portions
5 of the meeting is being kept. It is requested that
6 the speakers use one of the microphones, identify
7 themselves, and speak with sufficient clarity and
8 volume so that they can be readily heard.

9 1.2) ITEMS OF CURRENT INTEREST

10 CHAIRMAN BONACA: I will begin with some
11 items of current interest. First of all, you have in
12 front of you a pretty sizeable package of items of
13 interest that are inside two recent staff and
14 requirements memoranda that are of interest there.
15 There are a number of speeches by the commissioners.
16 There is quite a bit of congressional correspondence.
17 And I think some of this is quite interesting, too.
18 Finally, there is some operating plant information.

19 On a separate item of interest, next week
20 we have the regulatory portion conference. For those
21 of you who are interested in participating in that,
22 please contact John Larkins. He will set up
23 registration.

24 Mr. Ramin Assa, who has been on the ACRS
25 staff for the past six months, has joined RES

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 effective April 7, 2003 as the programs and
2 communication liaison officer. On behalf of the
3 committee, I would like to thank him for his
4 contributions to the committee's review of several
5 matters, including the Peach Bottom licensing renewal
6 application and the PTS reevaluation project. There
7 you are.

8 (Applause.)

9 CHAIRMAN BONACA: Also, Mr. Tim Kobetz,
10 who has been with the ACRS staff for about a year,
11 will be joining NMSS as a project manager in the
12 Division of Waste Management. I would like to thank
13 him for his outstanding contributions to the ACRS
14 review of several licensing renewal applications,
15 regulatory guides, resolution of certain GSIs and fire
16 protection models.

17 Good luck to both Mr. Assa and Mr. Kobetz.

18 (Applause.)

19 MEMBER POWERS: Do we have rats abandoning
20 the ship here or something like that?

21 CHAIRMAN BONACA: Yes, but, fortunately,
22 we have a heavyweight joining us. And that is Mr.
23 Ralph Caruso. He has joined ACRS staff on April 7,
24 2003. In front of you, you will find his professional
25 experiences. You have a sheet of paper with

NEAL R. GROSS

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

1 information about that.

2 Welcome aboard.

3 (Applause.)

4 CHAIRMAN BONACA: With that, I think we
5 can now move to the regular agenda. We have in front
6 of us a presentation on draft final risk-informed
7 revisions to 10 CFR 50.44, "Standards for Combustible
8 Gas Control System in Light-Water-Cooled Power
9 Reactors." I believe Dr. Shack will take us through
10 this presentation.

11 2) DRAFT FINAL RISK-INFORMED REVISIONS TO
12 10 CFR 50.44, "STANDARDS FOR COMBUSTIBLE GAS CONTROL
13 SYSTEM IN LIGHT-WATER-COOLED POWER REACTORS"

14 2.1) REMARKS BY THE SUBCOMMITTEE CHAIRMAN

15 MEMBER SHACK: We've discussed 50.44 in
16 the past. The staff came up with a proposed option
17 for a risk-informed rule. They have now prepared a
18 draft final rule for this and addressed some public
19 comments that they have received on their initial
20 proposals for a risk-informed 50.44. The staff will
21 lead us through the discussion of that final rule and
22 the resolution of those public comments.

23 Mr. Dudley?

24 2.2) BRIEFING BY AND DISCUSSIONS WITH
25 REPRESENTATIVES OF THE NRC STAFF REGARDING THE

NEAL R. GROSS

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

DRAFT FINAL RISK-INFORMED REVISIONS TO 10 CFR 50.44

MR. DUDLEY: Okay. I'm Richard Dudley. I have recently been assigned as project manager for this rule. I have been doing this for about a month now. The previous project manager, Tony Markley, received a promotion. And he is off working in the events assessment area now.

With me today at the table is Glenn Kelly of the Probabilistic Safety Assessment Branch. He can discuss any questions or issues you might have with risk analysis.

Back in the audience, we have Jim Pulsipher and Dave Cullison of the Plant Systems Branch. We have Kevin Williams of the emergency preparedness group. And we have an attorney, Brooke Smith, from the Office of General Counsel. All of them worked on the team for this rule.

The objectives today, of course, are to discuss the draft final rule for 10 CFR 50.44 and the associated guidance documents. We will also discuss the staff evaluation of significant public comments. And we would like to receive ACRS feedback on current staff plans for proceeding with the final rule.

A little bit of background. Maybe it has been gone over before, but we first met with the ACRS

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 in December of 2001 to discuss the proposed
2 modifications. We received the letter from the ACRS
3 dated December 12, 2001, where the ACRS concluded that
4 the proposed rule would result in more efficient and
5 effective regulations to deal with combustible gases.

6 And the ACRS made a recommendation to us
7 that the proposed hydrogen source term for BWR Mark
8 III and PWR ice condenser containments should be
9 included not in the rule, not as a prescriptive
10 requirement in the rule, but in the regulatory guide,
11 perhaps as a performance-based requirement. I will
12 discuss the way we handle that later on when I talk
13 about the comments.

14 The rule went to the commission in
15 SECY-02-0080 in May of 2002. The commission issued an
16 SRM on June 27th and directed the staff to publish the
17 proposed rule. The rule was published on August 2,
18 2002, and the 75-day comment period expired on October
19 16, 2002. The staff has completed its analysis of
20 comments and has prepared the final rule and the
21 associated guidance.

22 We had comments from 15 commenters, 7
23 licensees, 2 industry groups, 2 vendors, 2 private
24 citizens, a citizens group, and comment/recommendation
25 from the ACRS.

1 The comments are grouped into four general
2 categories. The first group is general concerns that
3 people had, generally public citizens and public
4 interest groups, about the advisability of reducing
5 any requirements whatsoever related to nuclear safety.

6 The second category was questions and
7 clarifications that most licensees and vendors had
8 about the equipment, qualification, and survivability
9 requirements for the remaining combustible gas control
10 equipment.

11 The third concern was the concern of the
12 prescriptive requirement in the rule that the ACRS
13 had.

14 And the fourth concern and the one that
15 actually caused the most substantial changes from the
16 proposed rule to the final rule was the comment
17 regarding the applicability of the proposed rule to
18 future plants, particularly to non-light-water
19 reactors.

20 First I'd like to discuss the general
21 concerns about reducing requirements on nuclear
22 safety. Commenters expressed doubts that the NRC had
23 an adequate technical basis for concluding that public
24 safety was maintained. They referenced possibility of
25 voids or improper rebar in placement in concrete

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 containments and concerns about hydrogen generation
2 studies and the adequacy of the risk analyses we did.

3 Concerns were expressed that reductions
4 were only to provide financial benefits to licensees.
5 A comment was raised about the need to complete NRC
6 evaluations of generic safety issue 191 and GSI 189
7 before we reduced combustible gas requirements.

8 Concern was raised about allowing 90
9 minutes to initiate the hydrogen monitoring, instead
10 of the 30 minutes, as it currently is; concerns about
11 if you vented hydrogen from the reactor coolant
12 system. If you allowed that, that would increase the
13 possibility or could increase the possibility of
14 containment failure; a concern that passive
15 auto-catalytic recombiners, which are being required
16 now for PWRs in France but are not being required in
17 the United States; and also a concern about the need
18 for performance criteria for atmospheric mixing
19 systems.

20 MEMBER WALLIS: I think there was also a
21 concern about the defense-in-depth aspect of this,
22 that you were abandoning some aspect of --

23 MR. DUDLEY: Any time you would reduce the
24 requirement, you would be reducing defense-in-depth.

25 MEMBER WALLIS: Which is a thing that is

NEAL R. GROSS

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

1 rather intangible.

2 MR. DUDLEY: Yes, it is. It certainly is.
3 The way we evaluated these concerns or comments was to
4 look at them and see if any new technical information
5 or new technical data or bases or issues were raised
6 that we were not aware of when we prepared the
7 proposed rule.

8 As we went through these comments, we
9 found that generally they were assertions that things
10 weren't good enough, but there weren't any technical
11 bases provided that would specifically say why the
12 rule was not adequate in any particular area.

13 Many of these questions we looked at
14 already. For example, the commission in an SRM asked
15 us to look at the passive auto-catalytic recombiners,
16 and we did so. We did a value impact study in
17 SECY-02-0080 that showed that these recombiners for
18 large dry containments in the U.S. had little safety
19 or risk benefit for a very large expenditure of
20 resources. So we concluded that they were not
21 cost-beneficial.

22 MEMBER POWERS: One would presume, maybe
23 against contrary indicating evidence, that people in
24 France aren't totally irrational. Why have these
25 concluded these things are cost-beneficial?

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: This is Glenn Kelly from the
2 staff. It's our understanding that their decision was
3 not driven so much by the cost associated with the
4 recombiners as it was with their significant
5 consideration about the potential for off-site
6 deposition of various fission products. And they
7 chose to place their money towards providing
8 additional assurance that there would be no off-site
9 or a smaller probability of off-site consequences.

10 MEMBER KRESS: They don't use the same
11 \$2,000 per man-rem that we used in the cost-benefit.

12 MR. KELLY: I'm not exactly sure of what
13 value they used for doing that. It's my
14 understanding, in part, that when they make their
15 considerations, that it's not --

16 MEMBER KRESS: If they did a cost-benefit
17 study, that is likely to be where the difference would
18 be, don't you think? The costs, you know, would end
19 up being like I say. It would be land contamination
20 or higher population density, sites, and things like
21 that might make a big difference in France, you might
22 think.

23 MR. KELLY: It's possible that that made
24 the difference. It is not our understanding, though,
25 that the decision was made primarily based on a \$2,000

NEAL R. GROSS

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

1 per man-rem-type consideration.

2 MEMBER WALLIS: While we're on this slide,
3 I was impressed by the amount of effort you made in
4 the written record to answer these questions raised by
5 members of the public.

6 MR. DUDLEY: Thank you.

7 MEMBER APOSTOLAKIS: I am a little bit
8 disturbed here. Glenn, you keep saying it's your
9 understanding. I mean, you didn't talk to anybody in
10 France? Why did they do this? You didn't review any
11 documents? I mean, they seem to be going in the
12 opposite direction. Why is it your understanding?
13 Why didn't you say, "I know that they are doing this
14 because of this reason"?

15 MR. KELLY: I had the fortune of joining
16 this particular evaluation of 50.44 after most of the
17 technical work had already been performed. And we had
18 previously done an analysis on this where we had
19 provided already in a previous document the
20 significant write-up about the French technical
21 position and our position about the cost-benefit value
22 of the auto-catalytic recombiners. And because those
23 words had been chosen so carefully and that we had
24 used previously, we used those words again because
25 they had particular significance in consideration 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 a country that we share a lot of nuclear information
2 with.

3 MR. DUDLEY: That value impact study was
4 provided to the commission on May 13, 2002.

5 MEMBER KRESS: Regardless of what the
6 French position is, you have to be constrained by our
7 backfit rule. If it's not a compliance issue or it's
8 not an issue of substantial increase in protection,
9 then you have to go by the backfit rule. If you do a
10 cost-benefit and it doesn't pass, you have no
11 recourse.

12 Is there any other thing you could do? I
13 mean, if you said, "Well, it's not a compliance issue,
14 and it doesn't give substantial increase in safety.
15 It doesn't cost the price-to-cost-benefit," do you
16 have any other recourse at all?

17 MR. KELLY: You would have to indicate
18 somehow that there is a violation of the current rules
19 and that, therefore, regardless of the costs, that
20 they would have to do something to mitigate this.
21 It's not in the rules as such. So we don't have to --

22 MEMBER KRESS: I was wondering if there
23 was a way to invoke defense-in-depth in there. I
24 guess there must not be.

25 MR. KELLY: Well, we already have a lot of

NEAL R. GROSS

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

1 capabilities in defense-in-depth. And what turned out
2 as a result of when we did the cost-benefit analysis,
3 in looking at it, it turned out that it really had
4 very little benefit. PRA numbers in themselves don't
5 directly provide you with defense-in-depth arguments,
6 but in this case, there were so many different ways
7 that we had for providing defense-in-depth. But we
8 felt that this was adequate the way it was.

9 MEMBER POWERS: If you had gone through
10 and done a completely similar analysis for the
11 containment itself, would you have come up with a
12 similar result?

13 MR. KELLY: I'd have to defer to someone
14 who has actually done that type of analysis.

15 MEMBER KRESS: Of course, it's required by
16 the regulations.

17 MEMBER POWERS: What I'm asking, Tom, is
18 that if you come through and you do a PRA kind of
19 analysis on any single component of the system, you
20 come up and say they're not very valuable.

21 MR. KELLY: If one were to look at certain
22 plants, let's take, for example, Grand Gulf, which has
23 a very low core damage frequency --

24 MEMBER POWERS: Well, Grand Gulf would not
25 be an appropriate one to look at, though, would it?

NEAL R. GROSS

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

1 It does have hydrogen igniters required for it.

2 MR. KELLY: I understand, and that is
3 because on a generic basis, we have determined that
4 that is a valuable --

5 MEMBER POWERS: I think a better example
6 would be to look at a large dry containment.

7 MR. KELLY: Okay. Well, you can take
8 South Texas or you can take another one of the plants
9 where you have a low estimate of the core damage
10 frequency. If you're going by assuming that the
11 safety goals constitute adequate protection and use
12 those numbers, then you would say in those cases, you
13 would not necessarily need a containment if you were
14 merely going by a numerical --

15 MEMBER POWERS: I think that is correct.
16 I think you would come up with that result. I bring
17 it up only to point out that there is a vulnerability
18 and a passion to that.

19 Now, I think you did the right thing here
20 on this particular issue, but one has to be very
21 careful about those results because of the
22 defense-in-depth argument.

23 My own feeling is defense-in-depth is
24 probably misplaced here. This once again gets into
25 the realm where PRA is probably the right tool to

NEAL R. GROSS

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

1 decide whether you need this or not.

2 MEMBER APOSTOLAKIS: Did the French do a
3 PRA for this issue or they said, "In the name of
4 defense-in-depth, we require the recombiners"?

5 MR. KELLY: I'm not aware of whether or
6 not they did. I don't know if Mike Snodderly, who is
7 now on the ACRS staff, is aware of that because Mike
8 was the technical reviewer at the time.

9 MR. SNODDERLY: George, I am aware of two
10 meetings with the French. The first took place here
11 in Rockville, where we exchanged our regulatory
12 analysis and position on the passive auto-catalytic
13 recombiners.

14 And then another meeting took place with
15 Gary Hollahan and his counterparts in France. The
16 conclusion was made that they do not perform a
17 cost-benefit study using the \$2,000 per person-rem.

18 In fact, the French said at this time,
19 they do not plan on using risk insights to reduce
20 requirements for relaxed regulatory features but only
21 to use them for possible enhancements, as was used in
22 this case.

23 MEMBER APOSTOLAKIS: So they didn't do a
24 risk assessment?

25 MR. SNODDERLY: They did a risk

NEAL R. GROSS

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

1 assessment, but it was more of a looking at the
2 phenomena, meaning conservative assumptions about
3 hydrogen combustion and its effects on containment and
4 the probability of failure; in other words, looking
5 more to a fragility type of analysis. And from that,
6 they made a determination that they wanted an
7 additional mitigative feature for hydrogen control and
8 required, then, the passive auto-catalytic
9 recombiners.

10 MEMBER APOSTOLAKIS: But the elements that
11 went into their analysis are also present in our
12 analysis. There are no major differences. It's just
13 the judgment at the end that was different.

14 MR. SNODDERLY: Yes. Well, first of all,
15 as I said, they did not use a \$2,000 per person-rem
16 ratio.

17 MEMBER APOSTOLAKIS: Yes, I understand
18 that.

19 MR. SNODDERLY: Their containment
20 fragility numbers were slightly lower than the
21 staff's. The staff used, I believe it was, the North
22 Anna and Surrey type of containment designs. They
23 also assumed some more conservative hydrogen loadings,
24 combustion loadings that the staff didn't use.

25 I would say that they are comparable

NEAL R. GROSS

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

1 results or they are very comparable in the sense that
2 you can see what they assumed for hydrogen combustions
3 and the loadings. You can see what the staff chose,
4 and you can see the fragility curves. Although those
5 results were slightly different, they came to
6 different conclusions.

7 MR. DUDLEY: Okay. If I can continue,
8 also I didn't add a bullet on this slide, but just to
9 balance these negative comments, there were quite a
10 few comments from numerous individuals, licensees, and
11 others, including the ACRS, that this was a good rule
12 and a step in the right direction towards efficient
13 and effective regulation.

14 The next category of comments was related
15 to equipment qualification and survivability. Mostly
16 licensees requested clarification of the applicability
17 of equipment qualification rules to monitoring systems
18 and whether any new survivability requirements were
19 going to be added by the proposed rule for combustible
20 gas control equipment.

21 The NRC agrees that we needed to make some
22 clarifications on the rule and the associated
23 guidance. And in the final materials, we will make it
24 clear that monitoring systems must perform in the
25 environment that is anticipated in the severe accident

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 management guidance, but they do not need to meet 10
2 CFR 50.49 equipment qualification requirements.

3 Also, we will make it clear that the final
4 rule will not bring about any changes to existing
5 licensee analyses and the environment conditions that
6 were used to establish the equipment qualification
7 50.49 compliance.

8 CHAIRMAN BONACA: Let's just expand on
9 that. I mean, I am trying to understand you wanted to
10 work in adverse environment. I believe that the 10
11 CFR 50.49, in fact, provided the requirements for
12 demonstration of survivability into an adverse
13 environment. What are they supposed to do now to
14 demonstrate that they will work in --

15 MR. DUDLEY: The rule itself contains
16 survivability requirements. The revised 50.44
17 provides reduced, but still requires that they survive
18 during the severe accident conditions. But they're
19 not as strict as 50.49 guidance, which is, I guess,
20 for design basis accidents.

21 Next is the issue raised by the ACRS on
22 putting the combustible gas source term for Mark III
23 and PWR ice condenser containments in a regulatory
24 guide and not incorporating it prescriptively in the
25 rule itself.

NEAL R. GROSS

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

1 The staff did not accept the ACRS'
2 recommendation. There were a couple of reasons for
3 that. If we required licensees to do an analysis to
4 determine plant-specific hydrogen source terms, that
5 would be a backfit. And we did not see any
6 significant safety or cost benefits to impose that
7 backfit.

8 In addition, the recent GSI 189 work that
9 has been done on hydrogen source term right now shows
10 about 65 percent metal water reaction for the source
11 term plus or minus 23 percent, which still indicates
12 to us that the current prescriptive value of 75 metal
13 water reaction for the hydrogen source term is still
14 reasonable for severe accident analysis.

15 MEMBER POWERS: I know of no severe
16 accident analysis. I have never seen a severe
17 accident analysis that does not go to 100 percent
18 metal water reaction. In my entire career of looking
19 at severe accidents, I have never seen them go less
20 than 100 percent. In fact, usually they go to well
21 over 100 percent because they include oxidations of
22 steels and metals coming into the system from other
23 sources.

24 MR. DUDLEY: I am not qualified to speak
25 for the GSI 189 work. I don't see anybody from 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 Office of Research. Bob, can you --

2 MR. PALLA: I am not with the Office of
3 Research, but I think what this number is based on is
4 the in-vessel phase. You may be speaking of the
5 ex-vessel.

6 MEMBER POWERS: For just the in-vessel
7 phase, it's a very reasonable number. In fact, it
8 might be a little conservative for the in-vessel phase
9 and quite an important number. But for the total
10 severe accident analysis, I have never seen one be
11 less than 100 percent. In-vessel phase is an
12 excellent --

13 MR. DUDLEY: But that's what that came
14 from.

15 MEMBER WALLIS: And that's what it's
16 applicable to? You've got two numbers. You just want
17 to complete your argument to show that using this
18 number for the in-vessel phase is appropriate to the
19 use to which you are putting it here.

20 MR. DUDLEY: 50.44 was always an
21 in-vessel. It was always limited to that amount. And
22 so that is why for this particular comparison, we used
23 the in-vessel number, yes.

24 MEMBER WALLIS: That's all I needed to
25 hear.

1 MR. DUDLEY: Thank you.

2 MEMBER KRESS: You mean that satisfied
3 you?

4 MEMBER WALLIS: Well, I mean, he says so,
5 and I know why. You didn't ask why?

6 MEMBER SHACK: In a risk-informed world,
7 you worry about the risk.

8 MEMBER KRESS: Thank you.

9 MR. DUDLEY: Bob, do you want to discuss
10 that or maybe you want to repeat the question.

11 MR. PALLA: I'm Bob Palla with the
12 Probabilities Risk Assessment Branch in NRR. Is the
13 question about why just constrain yourself to the
14 in-vessel phase?

15 MEMBER KRESS: Yes.

16 MR. PALLA: Well, I guess one way of
17 looking at it is that the rule, the original rule, was
18 following the Three Mile Island accident. The types
19 of accidents we tried to address there were degraded
20 core, TMI-type accidents.

21 So I guess the mindset of the original
22 rule is degraded core but not a full-blown core melt
23 accident. You know, these accidents are arrested
24 in-vessel.

25 An additional factor is that if one

NEAL R. GROSS

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

1 actually designs a system that can handle the 75
2 percent metal water, that same system will cope with
3 anything greater just as well. If the system is
4 operable, it will cope with 100 percent.

5 MEMBER KRESS: That is a much more
6 reasonable answer to me.

7 MEMBER POWERS: Also, seemingly dubious.

8 MEMBER KRESS: Yes, but the other answer
9 I might have been looking for was the probability
10 associated with going on to the full 100 percent or
11 the frequency may be such that you don't have to go
12 that far to meet whatever your risk criteria are.

13 MEMBER POWERS: It's no question that
14 NUREG-1150 made it clear to us that a lot of similar
15 accidents do get arrested before we progress.

16 MEMBER KRESS: That's right. So there is
17 an associated probability.

18 MEMBER WALLIS: But we haven't seen it.

19 MEMBER KRESS: The argument was made. We
20 haven't seen the backup to that.

21 MEMBER SHACK: But, I mean, if that's not
22 the basis, this is a risk-informed rule, which means
23 that you consider all sources of risk. I mean, you
24 had better at least believe that argument.

25 MR. PALLA: Yes. I guess what I am saying

NEAL R. GROSS

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

1 is that we did not develop arguments about in-vessel
2 recovery and probabilities and derive 75 percent based
3 on that. That's what I meant to say.

4 MEMBER KRESS: It gets back to the old
5 argument of the 75 percent is part of the design basis
6 accident concept. We're trying to reconcile design
7 basis versus risk-informed, and that's where we always
8 end up at this same impasse almost.

9 MEMBER WALLIS: You don't want to create
10 a precedent where 75 percent now becomes okay for
11 other kinds of severe accident analysis.

12 MEMBER SHACK: Well, it's not for future
13 reactors.

14 MR. DUDLEY: For future reactors, we are
15 going to require 100 percent.

16 MEMBER KRESS: It's just current reactors.

17 MEMBER POWERS: But, again, why 100
18 percent? I have never seen one limited at 100
19 percent.

20 MR. KELLY: We've also addressed that
21 aspect.

22 MR. DUDLEY: The next category --

23 MEMBER SHACK: Can you tell us how?

24 MR. KELLY: We have been working on
25 wording and looking. Dick is going to get into this

NEAL R. GROSS

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

1 later, I believe, if you can hold onto it.

2 MR. DUDLEY: Yes. This slide, actually,
3 we'll talk about it. The last category was a comment
4 that we received on the applicability of the proposed
5 rule. The rule was written to apply to all future
6 reactors. And the commenter noted that the
7 requirements that we had put forth in that rule were
8 really based on current light-water reactor
9 technology.

10 Now, the commenter's recommended fix was
11 that we apply the paragraph (c) only to future
12 light-water reactors and not issue rules for
13 non-light-water reactors. We decided not to do that.
14 Let me also let you know that this current position
15 was arrived at after we provided you the materials
16 that you have in your packets. So the material you
17 have says that we are going to limit the applicability
18 of the rule to future light-water reactors.

19 Subsequent to providing you the material,
20 we decided to change our position on that. So right
21 now we are adding a paragraph (d) to the rule that
22 specifies requirements for future non-light-water
23 reactors.

24 MEMBER POWERS: Do you have in your list
25 of definitions what a credible severe accident 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 MR. DUDLEY: We do not.

2 MEMBER POWERS: Could you tell me what a
3 credible severe accident is?

4 MR. DUDLEY: I can't tell you that.

5 MEMBER POWERS: Could you tell me what the
6 --

7 MR. DUDLEY: In the reactor design and a
8 lot of information, it is pretty clear that if we are
9 going to specify requirements for all sorts of future
10 non-light-water reactors, we don't necessarily know
11 the coolants. We don't necessarily know the clads.
12 It's pretty clear that we can't specify those rules
13 with a lot of detail. And this rule that --

14 MEMBER KRESS: It's the "credible" word
15 that I am worried about.

16 MR. DUDLEY: Do we have any --

17 MEMBER KRESS: I know you can't tell me
18 what the scenario is without a design, but it's
19 credible.

20 MR. DUDLEY: The meteorite striking the
21 spent fuel pool is incredible.

22 MEMBER KRESS: It has something to do with
23 the frequency.

24 MEMBER POWERS: We know what an incredible
25 accident is.

NEAL R. GROSS

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

1 MR. DUDLEY: Clearly, yes. I mean, there
2 is a spectrum of severe accidents. And you just can't
3 go out to everything. The distant that you go out in
4 severe accident space is credible.

5 I mean, that is the only definition I can
6 give you. I can't --

7 MEMBER KRESS: We have no limit on that
8 frequency. We don't know where that line is drawn.

9 MEMBER APOSTOLAKIS: Where is the word
10 "credible" here?

11 MEMBER KRESS: It's there in line --

12 MR. DUDLEY: You can't say "all severe
13 accidents" because that would just not -- you know,
14 you just can't.

15 MEMBER WALLIS: In a risk-based or
16 risk-informed world, you really consider everything
17 that is credible. You dismiss some things based on
18 probabilities, but you consider everything, don't you?
19 Isn't that the whole basis of it?

20 MR. DUDLEY: That is correct.

21 MEMBER POWERS: You would think you do,
22 but, in fact, the reality is that we truncate and we
23 exclude certain things. I agree I can identify things
24 that are incredible, but I am struggling to understand
25 what is credible.

NEAL R. GROSS

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

1 MEMBER POWERS: I'm just curious why
2 somebody used that word.

3 MEMBER KRESS: Yes.

4 MEMBER POWERS: I think you have explained
5 it, but you just didn't --

6 MR. DUDLEY: Maybe we didn't use it in the
7 term that you would define it.

8 MEMBER POWERS: You just want people to
9 think that they had to include the meteorite strike?

10 MR. DUDLEY: Absolutely.

11 MEMBER POWERS: That is all you were
12 trying to communicate there?

13 MR. DUDLEY: Pretty much, yes.

14 MEMBER POWERS: Is it going to get you in
15 trouble in ways that you don't anticipate?

16 MR. DUDLEY: The use of the word
17 "credible"?

18 MEMBER KRESS: I interpreted that
19 differently. I interpreted it to mean the frequency
20 of less than 10^{-6} is being excluded.

21 MR. GILLESPIE: Dr. Kress? Frank
22 Gillespie for NRR. I am not sure if I am going to
23 look at OGC because there was a Turkey Point hearing
24 many years ago where the word "credible" was, in fact,
25 brought up. And maybe it was one of our first

NEAL R. GROSS

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

1 risk-informed hearings at the time, but, as I recall,
2 something like 10^{-6} was related to the return
3 frequency of the word "credible" at that hearing.

4 So if I fall back on case law, which you
5 have to do because you are putting a word in
6 regulation, so you have to go back into how that word
7 has been previously interpreted in regulation, I
8 believe right now 10^{-6} return frequency would be what
9 we would likely associate with that word.

10 MEMBER POWERS: Then I can ask --

11 MR. GILLESPIE: That is how I remember it
12 anyway.

13 MEMBER POWERS: I reiterate Dr. Wallis'
14 question. 10^{-6} is assuredly a rare event, but if that
15 rare event is associated with a 3 billion curie
16 release, I might have pause on excluding that one.

17 MEMBER KRESS: Well, I think that 10^{-6} did
18 come about originally by considering a source term
19 which was representative of light-water reactors,
20 severe accident source terms.

21 MR. GILLESPIE: Of about a 1,000-megawatt
22 light-water reactor?

23 MEMBER KRESS: Yes, yes. So that is kind
24 of implied in the numbers.

25 MR. GILLESPIE: It's kind of a package

NEAL R. GROSS

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

1 because, actually, as I recall, it was the Turkey
2 Point-specific hearing. Although it was a seismic
3 hearing, I believe that that kind of got attached to
4 that word.

5 MEMBER POWERS: I think you are right now
6 what you mentioned the seismic that 10^{-6} came in, but
7 the source term world is a dynamic world. And I can
8 come up with scenarios that do have 10^{-6} return
9 frequencies not involving seismic events and have
10 formidable source terms.

11 Would not a better term be
12 "risk-significant severe accident sites"?

13 MEMBER KRESS: I would just love to see
14 terms like that in there.

15 MEMBER APOSTOLAKIS: You know, in the next
16 session, one major item of discussion will be what is
17 risk-significant. There is a disagreement between the
18 staff and --

19 MEMBER KRESS: Oh, yes. That is the next
20 question you ask, yes.

21 MEMBER APOSTOLAKIS: So it seems to me
22 that there should be some consistency between what the
23 staff puts in 1122 and what they put here because,
24 first of all, it's not only the word "credible."

25 It's also the word "scenario." The word

NEAL R. GROSS

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

1 "scenario" is not well-defined. I think that's what
2 you implied now, that you can put things together and
3 have one scenario. You can break them apart and have
4 15 different scenarios. So to put limits in terms of
5 scenarios, you are really not achieving much.

6 The proposal from the start was to
7 consider the sequence, whose aggregate frequency is 95
8 percent of the risk, which is much more meaningful.
9 And this is something that has been a problem ever
10 since Reg Farmer published his curves more than 35
11 years ago, where he talked about accidents. And then
12 people realized that to you talk about accidents, you
13 have to talk about the total frequency.

14 So maybe this should be coordinated with
15 1122 because that's a major issue.

16 MEMBER POWERS: It's an excellent point.

17 MEMBER KRESS: I think that is an
18 excellent point.

19 MEMBER POWERS: And you have put your
20 finger on where this particular wording will get you
21 in trouble is that I can always split my scenarios up
22 to guarantee that they fall below the 10^{-6} level.

23 MEMBER WALLIS: Well, to invoke something
24 I hate to invoke, Davis Besse, when I heard about what
25 happened at Davis-Besse, I said that is completely

NEAL R. GROSS

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

1 incredible. I just didn't believe it. I couldn't.
2 It was so incredible.

3 MEMBER APOSTOLAKIS: One of the reasons we
4 got into the risk business is to avoid using words
5 "credible," "incredible."

6 MEMBER WALLIS: Don't use those. Yes.

7 MEMBER APOSTOLAKIS: Right? And then the
8 next step is that you can't really talk about
9 individual scenarios because it is an ill-defined
10 concept.

11 MR. KELLY: Right. And we understand that
12 from the standpoint. And we're very sensitive to the
13 fact. Depending on how you do your risk assessment,
14 we don't want people to kind of cherry-pick and go and
15 remove things on a basis of they have defined such a
16 limited sequence that, "Okay. They can take that one
17 out. Now, I am going to find another limited
18 sequence, and I am going to take that one out." That
19 is not what we want.

20 MEMBER APOSTOLAKIS: The point is that you
21 have colleagues right now who are thinking about it.
22 And they're fighting a battle. So you might as well
23 take advantage of what their thoughts are and use the
24 appropriate language.

25 MR. DUDLEY: We're not cast in stone with

NEAL R. GROSS

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

1 any of these words. As you know, we have been working
2 on this just in the last three or four weeks.

3 MEMBER POWERS: That's just one that I
4 anticipate you getting in trouble with since it is
5 directed at reactors that we really haven't seen right
6 now. So we don't know what they're going to come in
7 with.

8 MR. DUDLEY: We appreciate your comments
9 and advice on this.

10 MEMBER ROSEN: I would observe that simply
11 taking out the word "credible" and the word
12 "scenarios" and making "accident" plural solves a
13 problem.

14 MEMBER WALLIS: I don't know that there
15 will be design basis accidents for these new designs
16 either.

17 MEMBER KRESS: Yes, I think that is a
18 problem, too.

19 MEMBER APOSTOLAKIS: That is another
20 problem, yes.

21 MR. KELLY: Well, that's why we have
22 indicated if you do both, if you talk about all severe
23 accidents, you run into a problem of at what point do
24 you draw the line. I mean, I could have an incredibly
25 robust containment, but if you allow me to drop the

NEAL R. GROSS

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

1 bottom of the vessel off instantaneously, it is going
2 to cause a lot of problems about anybody's
3 containment.

4 MEMBER ROSEN: Well, here's how I have in
5 the past solved that problem, simply by inviting those
6 who would wish to add a scenario which is 10^{-15} to the
7 list. So now it shows up on the list, and at the
8 bottom it has no impact on the summation.

9 It's there. One can look at it. But you
10 can see right away it has no impact on the total risk
11 because it's out in the ninth decimal place.

12 MEMBER APOSTOLAKIS: How about if you just
13 say, "Information demonstrating that the risk impacts
14 of combustible gases have been addressed"?

15 MEMBER KRESS: Or "acceptable."

16 MEMBER APOSTOLAKIS: "Have been
17 addressed." Well, it's implied.

18 MEMBER KRESS: Okay.

19 MR. KELLY: We've thought about that and
20 that wording. My concern is that if I merely say that
21 it has been addressed, that means that somebody wrote
22 something about it.

23 MEMBER APOSTOLAKIS: "Addressed to ensure
24 adequate protection." I mean, the whole thing. I
25 just stopped there because I didn't want to read the

NEAL R. GROSS

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

1 rest of it. So "The risk impacts of combustible
2 gases" and then you jump down to "have been addressed
3 to ensure adequate protection of public health and
4 safety from" --

5 MEMBER KRESS: But you need to put "risk"
6 in there.

7 MEMBER APOSTOLAKIS: Yes.

8 MEMBER KRESS: "Adequate protection" does
9 not cover it all.

10 MEMBER APOSTOLAKIS: "Risk impacts," yes.
11 No?

12 MEMBER POWERS: Well, I think we can work
13 with --

14 MEMBER KRESS: Yes, they can work with it.

15 MEMBER APOSTOLAKIS: Wordsmithing.

16 MR. DUDLEY: We are certainly open to
17 suggestions. And we will go back and look very hard
18 at this language. I think these suggestions are going
19 to be useful.

20 MR. KELLY: And where this came from, in
21 part, was we wanted to give consideration to the fact
22 that there might be unique designs, liquid metal, fast
23 breeder reactors, could be a salt reactor. I mean,
24 that's possible.

25 MEMBER POWERS: That's not possible.

NEAL R. GROSS

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

1 MR. KELLY: There might be plants that
2 chose to come in with perhaps considerably more
3 zirconium or they might be generating other types of
4 combustible gases than the ones that we're currently
5 considering in light-water reactors or I might have a
6 plant that in certain ways, as long as I have a very
7 low probability of failing the reactor itself or,
8 let's say, I have a very high probability of
9 mitigating that, but if I do, I also have a very high
10 probability of mitigating it.

11 But if I don't mitigate it, I have a very
12 high probability of failing the reactor, which, in
13 turn, would fail the containment. That might not give
14 us the kind of results that we would be happy with.
15 So we try to give ourselves some flexibility here in
16 our wording.

17 MEMBER WALLIS: I have a technical
18 question for you. Maybe it's appropriate at this
19 time. The rule says, I think, all containments must
20 have a capability for ensuring a mixed atmosphere.

21 MR. KELLY: Yes.

22 MEMBER WALLIS: And if you read the reg
23 guide, obviously it's going to be how you achieve
24 that. It turns out that this can be achieved either
25 with fans or by natural circulation or a combination

NEAL R. GROSS

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

1 of all of those things and that then the licensee must
2 provide an analysis of the effectiveness of this
3 mixing.

4 I just wonder how good that analysis can
5 be with the present state of the art, how good an
6 analysis is the licensee capable of making to ensure
7 that the atmosphere is mixed and how well mixed does
8 it have to be and all of that sort of thing.

9 I think there are a lot of technical
10 questions about this issue of mixed atmosphere.

11 MR. KELLY: That's a good question. We
12 were just talking about that the other day, about
13 exactly what does that mean to have a mixed
14 atmosphere.

15 In particular, in this case, the
16 definition at the beginning of the rule talks about,
17 in essence, it's mixed. So if I were to have
18 detonation, the detonation would be not severe enough
19 to fail the containment.

20 I am not a containment expert. So I would
21 have to go to somebody like Mike to get some comments
22 about this.

23 MR. SNODDERLY: Graham, this is Mike
24 Snodderly.

25 I think the precedent was set in the IPE

NEAL R. GROSS

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

1 walkdowns that were done. For a system such as fans,
2 the analysis would be as fairly well-understood. It's
3 very well-understood.

4 For natural circulation, the goal was to
5 assure that there were not closed passages where
6 stratification would take place. Experts in PRA and
7 in hydrogen did walkdowns of several containments to
8 assure that --

9 MEMBER WALLIS: Have experts in flood
10 mechanics as well as in PRA?

11 MR. SNODDERLY: Yes. Yes, Graham. And
12 they did walkdowns to assure that there were not a lot
13 of areas where stratification could take place, that
14 there were vents.

15 MEMBER WALLIS: They walked around and
16 said, "We don't think it will happen here."

17 MR. SNODDERLY: They were looking for --

18 MEMBER WALLIS: That's a typical analysis.

19 MR. SNODDERLY: You asked what was the
20 level of detail or what is expected. I think it was
21 to assure that in future designs or to meet this rule,
22 that such a walkdown to support the PRA had been
23 performed.

24 MEMBER WALLIS: Yes, I know they did that.
25 They used to just look around and say, "Is it likely

NEAL R. GROSS

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

1 to accumulate some combustible mixture here?" It
2 would be more reassuring if we had a technical basis
3 for analyzing these situations.

4 MEMBER POWERS: What I can tell you is
5 that we have a variety of lump node codes in this
6 world for analyzing containment response under
7 accident conditions. And a variety of experiments had
8 been done to look specifically at this question of how
9 well do these codes calculate mixing.

10 Under forced circulation conditions, lump
11 node codes do just fine. They identify those
12 closed-in spaces Mike spoke of as the places where you
13 get hydrogen concentration sufficient to support
14 detonations on occasion.

15 When they have looked at natural
16 circulation conditions, they have found that if you
17 can hypothesize well what the natural circulation
18 pattern is, they can nodalize the codes well enough to
19 reproduce that.

20 If you have to predict a priori what they
21 are, there is not good intuition on what it looks
22 like, the code is not very good at that. They have
23 had the God-given good sense not to even include the
24 momentum equation so they don't run afoul of that
25 problem.

NEAL R. GROSS

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

1 MEMBER WALLIS: Which one of these? The
2 MAPP code, was that?

3 MEMBER POWERS: MAPP is certainly one.

4 MEMBER WALLIS: It came before us a couple
5 of years ago with some strange models for mixing and
6 never came back.

7 MEMBER POWERS: This is not a static
8 field. In the last international standard problem
9 dealing with this issue that I attended, there were 46
10 submissions of analyses of a containment circulation
11 kind of modeling, representing, I believe, 15
12 different computer codes. And MAPP was one of those.

13 The interesting result that came back was
14 that the fairly coarse nodalization that these codes
15 used was adequate for this particular test, which
16 involved a situation where one could imagine --

17 MEMBER WALLIS: There is a real comparison
18 with data, then?

19 MEMBER POWERS: Oh, yes. This is a
20 data-code configuration. The interesting thing that
21 you get is with the same code applied to the problem
22 by different users, you get a disparity of results
23 that can be dramatic.

24 MEMBER WALLIS: So then we have to ask,
25 when the NRC sees one of these analyses submitted

NEAL R. GROSS

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

1 using one of these codes, how do you assess whether or
2 not it is acceptable? Do you have your own code for
3 these situations?

4 MEMBER POWERS: They have two of them, as
5 a matter of fact.

6 MEMBER KRESS: Contain and MELCOR.

7 MEMBER WALLIS: They use MELCOR? Do you
8 have confidence in the predictions of your own code as
9 sort of a comparison with whatever is submitted?

10 MR. KELLY: I'm not the expert on that.
11 Mike or Bob, do you have any thoughts about it?

12 MEMBER POWERS: Well, I'll be glad to
13 respond to the question. Well, I know something on
14 this subject, at least a little bit. Let's be honest.
15 I know a hell of a lot on this subject.

16 MEMBER WALLIS: What are your
17 qualifications, Dr. Powers?

18 MEMBER POWERS: Limited, limited, very
19 limited. I think it is safe to say that this is an
20 area of continuing research, ongoing research. The
21 mere fact that we are conducting international
22 standard problems, we're comparing code predictions to
23 experimental data right now is indicative. It's an
24 evolving situation that as the codes are challenged by
25 different experimental configurations, they get

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 continuously refined and developed and whatnot. They
2 are reflective of our current state of the industry.

3 MEMBER KRESS: This looks like a good
4 place where a CFD code might be useful.

5 MEMBER POWERS: Our experience is that is
6 beyond the current state of the art, that for
7 particular configurations -- and one of those
8 configurations of great interest is the ice condenser
9 beds. Here we are talking about more advanced
10 reactors. Ice condenser beds is an area that poses a
11 challenge to lump node codes.

12 You can for those kind of specialized
13 environments do a CFD kind of calculation, but,
14 remember, CFD calculations still struggle heroically
15 when you have a phased condensing.

16 MEMBER KRESS: Oh, yes. Oh, yes.

17 MEMBER POWERS: So it represents a real
18 challenge to CFD codes as well. In fact, in
19 connection --

20 MEMBER KRESS: If one ignored condensing,
21 wouldn't you get a conservative result?

22 MEMBER POWERS: No, I don't think so
23 because why you get detonable concentrations is
24 because you carry a hydrogen-steam mixture up into an
25 environment. And you can condense out the steam. And

NEAL R. GROSS

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

1 then, all of a sudden, you are in a detonable
2 configuration.

3 What we have seen in comparisons is that
4 there are real challenges modeling the turbulence with
5 the CFD codes. In fact, if one asks only questions
6 about gross quantities, like temperature, pressure,
7 condensation rates, and things like that, and not
8 microscopic questions, lymph node codes actually do
9 better than the CFD codes.

10 MEMBER WALLIS: Well, I think with that in
11 mind, there could be situations where you might want
12 to install a fan or something. I don't know.

13 MEMBER POWERS: When it comes to the ice
14 condenser, you will see that debate in spades.

15 MEMBER WALLIS: That is right.

16 MEMBER POWERS: Well, I speak to a variety
17 of them, the FEMIS, AMED, CAVR, HFD. I mean, this is
18 not a neglected area. And it's one that people have
19 struggled with in many, many different ways, in many,
20 many different approaches. And slowly the community
21 evolves toward a consensus type of approach.

22 We have, for instance, in connection with
23 the MAPP codes seen a tremendous evolution in the MAPP
24 code from MAPP 4.0 to the current 5.3 or whatever it
25 is and its approach to it; similarly, an evolution in

NEAL R. GROSS

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

1 the codes that we have in this country, the codes that
2 are used in Europe, and the codes that the Japanese
3 are developing.

4 MEMBER WALLIS: I think that my concern
5 was not whether Dr. Powers could analyze this but
6 whether or not a typical licensee could do a good job
7 and whether the NRC was capable of evaluating that
8 job. Maybe this is something you should take note of.

9 MR. SNODDERLY: Graham, this is Mike
10 Snodderly again.

11 I think the intent of the reg guide was to
12 document that this issue had been considered as part
13 of the IPE process but was not formally required to be
14 documented and the resolution was based on the
15 walkdowns that we previously discussed.

16 So the idea here was to somehow bring
17 those walkdowns in that basis for addressing
18 stratification in large dry containments or any
19 containment that didn't have -- if they chose not to
20 credit the fans in toto would be brought into the
21 regulatory framework.

22 So that was the intent there and that was
23 the level of detail that's expected, but it's to bring
24 that in to the regulatory framework as being instead
25 of remaining solely as part of the IPE process.

NEAL R. GROSS

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

1 MEMBER KRESS: How does that deal with the
2 top of the containment at issue? I mean, that seems
3 to be a place where stratification is lacking. You
4 know, you can't assure there are open passages there.

5 MR. SNODDERLY: But I think there they
6 were crediting the spray systems. And what they were
7 concerned about in the walkdown areas was to verify
8 that there was not stratification in the rooms in the
9 lower parts of the containments.

10 MEMBER POWERS: And the sprays typically
11 don't go out to the dock.

12 MEMBER APOSTOLAKIS: Do you really need to
13 say in "common defense and security" there? I mean,
14 it sounds too pompous.

15 MR. DUDLEY: Just words from the Atomic
16 Energy Act.

17 MEMBER APOSTOLAKIS: But we don't use
18 those in routine. "Public health and safety," period.
19 This is not an issue that affects the defense of the
20 United States.

21 MR. DUDLEY: We'll discuss that with our
22 general counsel.

23 MEMBER POWERS: Do you object to quoting
24 from the Atomic Energy Act, George?

25 MEMBER APOSTOLAKIS: We never do that. We

NEAL R. GROSS

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

1 never do.

2 MEMBER POWERS: Don't worry. We'll
3 straighten him out after the meeting here. Heresy.

4 MEMBER APOSTOLAKIS: Now, to what extent
5 are you relying in your assessments on the voluntary
6 industry initiatives? I mean, it says here, "The
7 commission continues to use severe accident guidelines
8 as an important part of the severe accident closure
9 process."

10 I mean, in your risk assessments, did you
11 have any elements there that said, "But the industry
12 is doing this voluntarily so it will affect the
13 progression of the accident this way"?

14 To what extent are you relying on the
15 voluntary initiative of the industry to reach your
16 conclusion?

17 MR. KELLY: To what extent are we taking
18 credit for saying --

19 MEMBER APOSTOLAKIS: Exactly. Yes, that's
20 another way of putting it. Maybe you can put your
21 marker on that.

22 MR. KELLY: Mike, I will have to ask you
23 about that because you did those analyses.

24 MR. SNODDERLY: For containment venting in
25 the long term, beyond 24 hours, the possibility.

NEAL R. GROSS

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

1 MEMBER APOSTOLAKIS: That's the only, not
2 the short-term? Okay.

3 MR. SNODDERLY: Not prior to 24.

4 MEMBER APOSTOLAKIS: How much credit? I
5 mean, was that essential?

6 MR. SNODDERLY: Just that it's an
7 acknowledged tool that should be available to
8 decisionmakers in the technical support centers.

9 MEMBER APOSTOLAKIS: What happens if it is
10 not available?

11 MR. SNODDERLY: Then eventually
12 containment failure could possibly occur in the very
13 long term, beyond 24 hours. So the decision would
14 have to be made, do you want to control the release
15 with a venting system or do you decide to have an
16 uncontrolled release late, charge for late containment
17 failure?

18 But that's the only place that I am aware
19 of where voluntary actions were explicitly credited.
20 And if you look at all of the major severe accident
21 management guidelines for the owners' groups, it is
22 included, the capability to vent the containment. But
23 it is there as an option. It is not an exact step
24 that one would take.

25 MEMBER APOSTOLAKIS: See, that is what I

NEAL R. GROSS

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

1 am trying to understand. Did you use any
2 probabilities that they will vent the containment
3 there? Where did they come from?

4 MR. SNODDERLY: Scenarios were postulated
5 where you can postulate containment late due to lack
6 of decay heat removal and eventual pressurization or
7 the possibility of radiolysis that could be to such a
8 degree that would require possible venting or the
9 possible of a hydrogen burn very late due to
10 radiolysis.

11 MEMBER APOSTOLAKIS: What is the
12 probability that they will actually vent it? It's
13 voluntary. Is it one, that if there is a need, they
14 will do it? The probability of not doing it is simply
15 because somebody made a mistake someplace?

16 MR. SNODDERLY: No. It's linked to the
17 likelihood of overpressurization due to hydrogen that
18 would suppress radiolysis, but the quantification that
19 I saw typically would have likelihoods of either .9 or
20 .1, .9 that you would not need to vent containment.
21 But there is the idea there that there is a small
22 likelihood that you may need to vent containment late.
23 And you should have that capability. And it's covered
24 in the severe accident management --

25 MEMBER KRESS: But there's some criteria

NEAL R. GROSS

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

1 in there, George, as to when you would vent. And if
2 you meet those criteria, then the probability is
3 pretty high. It's a pretty low probability you will
4 meet those criteria.

5 So the conditional probability of that is
6 pretty high. You will probalby never have --

7 MEMBER APOSTOLAKIS: I guess the question
8 in my mind is there must be a spectrum of some metric
9 where you decide that something is acceptable, it is
10 done on a voluntary basis, and other things are not --

11 MEMBER KRESS: Yes. You're getting into
12 the old question of this doesn't impact LERF and we
13 don't have anything else in risk base which we ought
14 to have. We really need some criteria on --

15 MEMBER APOSTOLAKIS: Why is this
16 acceptable if I cannot take it to the extreme and say,
17 "The only regulation we are going to have is to tell
18 the industry to run the plant safely"? That's my only
19 regulation.

20 MEMBER KRESS: Yes.

21 MEMBER APOSTOLAKIS: And then they will
22 have all sorts of voluntary programs to achieve that?
23 Where do you draw the line, which I believe comes
24 close to what Mr. Williams told us about the English.
25 They just issue generic statements, and then the

NEAL R. GROSS

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

1 industry takes care of it. Right?

2 That is this additional thing that put on
3 safety culture. And Commissioner McGaffigan said,
4 "But we can't do that here."

5 MEMBER POWERS: I don't know that the
6 English would agree with your characterization that
7 there were 38 safety requirements.

8 MEMBER APOSTOLAKIS: Well, they are not as
9 prescriptive as we are. That's what I understood from
10 his presentation.

11 MEMBER POWERS: They might agree with
12 that. I don't think they would agree with the
13 statement of some generic things, and the industry
14 just takes care of it.

15 MEMBER APOSTOLAKIS: Okay. Where do you
16 draw the line when you say, "This is acceptable"?
17 When it comes to the severe accident management
18 guidelines, it can be a voluntary program, it's fine.

19 But when it comes to around the plant
20 safety, no. We have to impose regulations, some of
21 them there. There is something that says, "No, no,
22 no, no, no. We have to have 50 points," such and such
23 and such and such. That is probably not related to
24 this, but I am just curious.

25 Mike, you wanted to say something?

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. SNODDERLY: Yes. I think let's put it
2 in perspective by looking at the containment event
3 trees just very quickly. You would have to say,
4 number one, that you do not have your
5 hydrogen-mitigated system; for example, the igniters.

6 Then you would have to say that you do not
7 have a decay heat removal system. And you had not
8 been able to get that back for over 24 hours. Then
9 you have to say that you have sufficient
10 stratification that you create a detonable mixture.
11 And then for certain designs, you also needed
12 radiolysis to take place to give you enough oxygen to
13 create a detonable mixture.

14 So now the rule has given you requirements
15 that make this a very, very low-probability event
16 because you have all of these mitigative features to
17 prevent it. But if you don't, for defense-in-depth,
18 there may be a possibility that all of those things
19 don't work out the way you thought.

20 And so for defense-in-depth, you have your
21 severe accident management guidelines that say, at
22 your very last resort, you may want to have the option
23 to vent the containment to preserve it. It's the only
24 place for that very low likelihood sequence that you
25 would have created a volunteer action.

NEAL R. GROSS

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

1 So I would argue that it really has met
2 our regulatory framework in the sense that for very
3 low-likelihood defense-in-depth, you address that
4 through something like the severe accident management
5 guidelines, the voluntary initiative that has been
6 well-documented and has received significant peer
7 review as part of the --

8 MEMBER APOSTOLAKIS: No. That makes
9 sense. I mean, it's just an extra defense-in-depth
10 layer.

11 MEMBER KRESS: That's one reason the staff
12 continues to require in this rule the hydrogen
13 monitoring measurement systems. It's for that reason.

14 MEMBER APOSTOLAKIS: Okay. Fine.

15 MEMBER WALLIS: But you still haven't
16 answered your question of what is the criterion for
17 when you impose a rule and when you leave it up to
18 industry.

19 MEMBER APOSTOLAKIS: I think Mike answered
20 it.

21 MEMBER WALLIS: He is saying when it
22 becomes very unlikely but still credible.

23 MR. SNODDERLY: You're right, Graham. I
24 did forget to mention in the regulatory analysis that
25 was done for this rule and it's determined using the

NEAL R. GROSS

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

1 staff's regulatory analysis guidelines in the backfit
2 rule to determine that the vents in the hydrogen
3 recombiners were no longer cost-beneficial.

4 CHAIRMAN BONACA: Okay.

5 MR. DUDLEY: So if we make this addition,
6 when we make this addition to the rule of paragraph
7 (d), we will have to make some corresponding changes
8 to the regulatory guide and the standard review plan
9 and other things to make sure that those are all
10 compatible.

11 That's the end of the presentation that we
12 had planned for you this morning. Any more questions
13 that you have we would be glad to try to answer.

14 MEMBER KRESS: Is industry happy with this
15 rule pretty much, do you think?

16 MR. DUDLEY: Yes.

17 MEMBER WALLIS: You didn't your
18 overwhelming cost-benefit analysis.

19 MEMBER APOSTOLAKIS: You presumed that we
20 knew all the technical details, and you just talked
21 about what other people said.

22 MEMBER POWERS: He knew that you had
23 carefully scrutinized the documentation and had you
24 had any questions, you would have raised them.

25 MEMBER APOSTOLAKIS: Voluntary commitment

NEAL R. GROSS

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

1 on my part.

2 MEMBER WALLIS: Maybe you should say
3 something about the criterion for judgment, which
4 seemed to be a cost-benefit analysis.

5 MR. SNODDERLY: Graham, the committee
6 looked at the regulatory analysis during its last
7 letter-writing session on this issue. Jim Myers from
8 ISL was saying Khatib Rabar performed the reg
9 analysis. And they were here present.

10 MEMBER WALLIS: At least there should be
11 some references since this is the final meeting on
12 this. I think it would be useful to say in two
13 sentences what the result of that was.

14 MEMBER KRESS: I recall a letter last
15 time. We thought the cost-benefit analysis was very
16 --

17 MEMBER WALLIS: It's overwhelming, really.

18 MEMBER KRESS: It was very well-done.

19 MR. DUDLEY: I'm sorry that I am not
20 prepared to discuss that at this moment.

21 MEMBER SHACK: If there are no additional
22 questions, then, Mr. Chairman, it is back to you.

23 CHAIRMAN BONACA: Thank you.

24 We have completed this presentation ahead
25 of time.

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 foregoing matter went off
2 the record at 9:37 a.m. and went back on
3 the record at 10:02 a.m.)

4 CHAIRMAN BONACA: The meeting has come to
5 order again. The next item on our agenda is the draft
6 final regulatory guide, DG-1122, "Determining the
7 Technical Adequacy of PRA Results for Risk-Informed
8 Activities."

9 I believe we have two presentations in
10 front of us today. Professor Apostolakis is going to
11 walk us through this issue and presentation.

12 MEMBER APOSTOLAKIS: Okay. Thank you, Mr.
13 Chairman.

14 3) DRAFT FINAL REGULATORY GUIDE, DG-1122,
15 "DETERMINING THE TECHNICAL ADEQUACY OF PRA RESULTS
16 FOR RISK-INFORMED ACTIVITIES"

17 3.1) REMARKS BY THE SUBCOMMITTEE CHAIRMAN

18 MEMBER APOSTOLAKIS: We wrote a letter
19 last July regarding the revision 1 to regulatory guide
20 1.174, where we raised again the issue of quality of
21 PRAs. We were told by the staff that they were in the
22 process of developing a regulatory guide to address
23 this issue.

24 What we have in front of us is the draft
25 final regulatory guide that does this, DG-1122, which

NEAL R. GROSS

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

1 has already undergone extensive public comments. I am
2 sure the staff will talk about them.

3 My understanding is that most of them have
4 been resolved except perhaps two or three. So today
5 we will focus on the points of disagreement. This
6 regulatory guide endorses the ASME standard and the
7 NEI guidelines, with some exceptions. And these are
8 the points of disagreement.

9 So I will turn the floor over to Ms.
10 Drouin to lead us through the discussion.

11 MS. DROUIN: Thank you.

12 3.2) BRIEFING BY AND DISCUSSIONS WITH
13 REPRESENTATIVES OF THE NRC STAFF REGARDING THE DRAFT
14 FINAL VERSION OF DG-1122, INCLUDING RESOLUTION OF
15 PUBLIC COMMENTS

16 MS. DROUIN: My name is Mary Drouin with
17 the Office of Research. With me today also is Gareth
18 Parry from NRR.

19 Just quickly, what we are going to try and
20 go through today, of course, why we are here. We are
21 not going to spend a whole lot of time on the
22 background and history, but we did think that there
23 are some key points that we need to just remind
24 ourselves and what generated DG-1122 to revisit the
25 commission position.

1 Then we are going to walk through at a
2 very rather quick pace actually what is in DG-1122 and
3 the SRP.

4 MEMBER APOSTOLAKIS: Excuse me, Mary. I
5 forgot to do something.

6 MS. DROUIN: I'm sorry.

7 MEMBER APOSTOLAKIS: We received a letter
8 dated April 8 and address to Dr. Bonaca, the Chairman
9 of the ACRS, from Dr. Sidney Bernsen, who was the
10 chairman of the ASME committee that drafted the
11 standard.

12 Basically he says that there are two
13 differences between the staff and the committee. One
14 is a definition of significant sequences. And the
15 other is describing the level of detail for the peer
16 review.

17 I believe the members have copies of this
18 letter. I don't know whether Mary is aware of the
19 letter.

20 MS. DROUIN: Yes.

21 MEMBER APOSTOLAKIS: Oh, you are? Okay.
22 So we are all aware of it.

23 MS. DROUIN: I was cc'd, yes.

24 MEMBER APOSTOLAKIS: Very good.

25 MS. DROUIN: And, as George noted a few

NEAL R. GROSS

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

1 minutes ago, where we really want to spend the
2 majority of the presentation and discussion is on the
3 resolution of the public comments. We have received
4 comments from several organizations. Most of the
5 comments we have come to resolution. We are going to
6 get more into that in the presentation.

7 I will disagree with Sid Bernsen. There
8 are three areas where we have not come to a
9 resolution, not two. We are going to spend some time
10 on those three areas and then what our proposed
11 schedule is.

12 We are here, of course, to brief the ACRS
13 on DG-1122 and the SRP. We have gone out for public
14 review and comment to provide the staff's resolution
15 to these comments and how we would like to move
16 forward. Ultimately we would like to obtain ACRS
17 approval to allow us to issue this draft guide as a
18 regulatory guide for trial for use.

19 MEMBER ROSEN: I'm not sure that we
20 approve your doing that. I mean, we would comment on
21 your course of action, but I am not sure "approval" is
22 the right word, is it?

23 MS. DROUIN: My understanding is that we
24 need a letter from the ACRS agreeing that this should
25 be entered as a regulatory guide. That is one of 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 checkmarks that we need. And that is the primary
2 purpose of why we are here. We are requesting a
3 letter, and we need a letter.

4 MEMBER ROSEN: Well, we'll write a letter
5 to Dr. Travers or the commission, one or the other,
6 and say we think it probably should be issued but
7 certainly not approved in the regulatory guide.

8 MEMBER APOSTOLAKIS: If we say that it
9 should be published, we approve it, right?

10 MEMBER ROSEN: It's a fine point.

11 MS. DROUIN: I have a little package, and
12 it has in there a little checkmark that I get ACRS
13 concurrence.

14 MEMBER POWERS: I will point out that --

15 MS. DROUIN: We can change that word to
16 "concurrence" to be "concurrence/approval."

17 CHAIRMAN BONACA: That's fine. You will
18 get a report from us.

19 MEMBER POWERS: We're not above bribery
20 here.

21 MEMBER KRESS: That's right.

22 MS. DROUIN: As I said, I am not going to
23 spend a lot of time on these but just to go back in
24 history where we had the PRA policy statement
25 encouraging our use. We had GAO criticizing us for a

NEAL R. GROSS

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

1 lack of PRA standards. We had Dis-13 that said get on
2 with professional societies and creating professional
3 standards, specifically a PRA standard.

4 The next things are just a series of staff
5 papers and SRMs that all deal with the PRA standards.
6 And it all deals with this one issue of PRA quality.
7 You hear this over and over again, a major issue
8 concerned with the commission as we look at
9 risk-informed activities.

10 MEMBER WALLIS: I have trouble with that
11 expression because, in actual fact, you are addressing
12 technical adequacy. All of these documents seem to
13 address what the PRA tries to cover, the extent of the
14 coverage of PRA. That says nothing to me about its
15 quality.

16 There is a difference to me between what
17 it tries to do and how well it does it. Yours seem to
18 be addressing what it tries to do; whereas, I would
19 like a measure of is it good or is it excellent or
20 what is the quality of it. I think there is a
21 different thing than the extent of the coverage of
22 things.

23 MEMBER APOSTOLAKIS: Yes. This is a
24 question that I was going to ask as well. Let me make
25 it a bit more specific. Is the standard, the ASME

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 standard, and the staff's position the peer reviewers
2 will decide this issue of whether the actual models
3 are good?

4 Because on page 93 of the standard, it
5 says -- we are going to have to do a lot of this back
6 and forth. Sorry. Like under "Quantification," page
7 93, it says that "Level 1 quantification results are
8 being reviewed" and then "The portion of Level 1
9 quantification process selected for review typically
10 includes a symmetry sensitivity study, the recovery
11 analysis," and so on.

12 So are we relying on the peer reviewers to
13 actually say the models are good enough? Because then
14 the peer review, of course, becomes even more
15 important than what it is now.

16 MS. DROUIN: The peer review is certainly
17 a very essential and critical aspect of it. I would
18 not say that you are relying strictly on the peer
19 review. If you were relying strictly on the peer
20 review, then you would not need chapter 4 because you
21 could just say, "Okay. I have got these peer
22 reviewers, and I am going to rely on their opinion."

23 Chapter 4 sets the standards against which
24 you are relying on the peer review to ascertain that
25 those standards were 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 MEMBER APOSTOLAKIS: Well, in some
2 instances, I think you are right, like when it comes
3 to common cause failures, it says, "use," you know,
4 either the alpha factor or basic factor, basic
5 parameter model.

6 But in other instances, it just says,
7 "Calculate realistic parameter estimates." It doesn't
8 say, you know, "Using Basean updates." Unless this
9 means the same thing to all of us, it is not clear
10 they are going to do it correctly.

11 So in some instances, you are right. The
12 model is specified. In other instances, it just says,
13 "Do this." I guess the question is, then we will rely
14 on the judgment of the --

15 MS. DROUIN: Now you are relying on the
16 judgment of the peer review. And this is where the
17 peer review becomes very critical. And this is when
18 we get into the areas of disagreement, some of that is
19 because from our perspective, you are putting a lot of
20 reliance on this peer review.

21 MEMBER APOSTOLAKIS: Okay. But it is a
22 correct understanding that peer reviewers will do
23 this?

24 MS. DROUIN: Yes.

25 MEMBER APOSTOLAKIS: Just a clarification.

NEAL R. GROSS

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

1 MEMBER ROSEN: A priori one shouldn't
2 blanch at the idea that you are putting a lot of
3 reliance on the peer review, do you?

4 MS. DROUIN: We certainly are not putting
5 the reliance to the point where we are going to
6 abdicate our responsibility. So what I mean is that
7 the NRC would still not do a review. They would still
8 do a review.

9 MEMBER ROSEN: Of course.

10 MS. DROUIN: But you would still rely a
11 lot of the peer review to help us focus our review.

12 MEMBER ROSEN: What I come into this
13 discussion with is a degree of comfort with the
14 quality of the peer review at this time from the
15 evidence that I have seen and personally experienced.

16 And I am asking the question about whether
17 you think that is well-placed or should I not? To me,
18 a peer review has been robust, at least in the
19 instances that I have heard of and experienced.

20 MS. DROUIN: I am not understanding your
21 question.

22 MEMBER ROSEN: The implication of your
23 remarks to me at least could be interpreted to be that
24 you can't rely on the peer review. And that is just
25 the opposite.

NEAL R. GROSS

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

1 MS. DROUIN: That is not what I said.

2 MEMBER ROSEN: Okay.

3 MS. DROUIN: I said you rely on the peer
4 review to help our review but not to abdicate our
5 review.

6 MR. PARRY: And I think this relates to
7 some extent to one of the issues, the third issue of
8 disagreement between us and ASME, which is that what
9 we would like is for the peer reviewers to make value
10 judgments about the assumptions and approximations
11 that are a part of the PRA because that is valuable to
12 us as reviewers because I think that is an essential
13 part of peer review. Otherwise it becomes an audit.
14 And I think we will come to that.

15 MS. DROUIN: We're going to come to that.

16 MEMBER APOSTOLAKIS: One last question on
17 this subject. In a recent issue of *Inside NRC*, it
18 says that the commission in two staff requirements
19 memoranda said that, "A Level 2 internal and external
20 initiating event or PRA which has been subjected to a
21 peer review process and submitted to and endorsed by
22 the NRC would be required." Is that any different?
23 This "endorsed by the NRC," does that change anything?

24 MS. DROUIN: I don't think so. I am going
25 to get to our next slide, which was getting to those

NEAL R. GROSS

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

1 two SRMs that you are just referring to. The whole
2 point of the previous slides on the background and
3 history was to bring out this issue that the
4 commission -- with every SRM when you go to the
5 briefings, anything that has dealt with risk-informed
6 activities, the commission keeps bringing up their
7 concern of the issue with PRA quality.

8 We just were issued two SRMs, one on
9 50.69, one on 50.46. What I showed on the two slides
10 -- now, I paraphrased their words, but on 50.69, the
11 rule to be issued in parallel with the PRA standard
12 and associated guidance; i.e., DG-1122, in the
13 statements of consideration to ask whether or not we
14 should require comprehensive high-quality PRA. Some
15 of the words you just said pertain to the second one,
16 the statements of consideration, for 50.69.

17 MEMBER APOSTOLAKIS: I guess the word that
18 I was asking about is this "endorsed." In other
19 words, if I look at 1122 and the PRA has gone through
20 the peer review process meeting the standard and so
21 on, then when you receive it, you are endorsing it or
22 you have to do more to endorse, you have to do your
23 own review?

24 MS. DROUIN: When we receive the PRA?

25 MEMBER APOSTOLAKIS: Yes, after it has

NEAL R. GROSS

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

1 gone through the peer review process, the industry
2 peer review process. Does this word "endorsed" by the
3 NRC add anything or is it just another way of stating
4 it?

5 MS. DROUIN: Again, probably to understand
6 some of those statements, you have to go and look at
7 the actual vote sheets. It is not, again, abdicating
8 us to not do any review. The NRC would still do
9 review of the PRAs.

10 CHAIRMAN BONACA: That's why you were
11 saying that to you the importance of the type of
12 review that you would like to see from the peer
13 review, something that supports your judgment.

14 MR. PARRY: And I think, remember, the
15 main purpose of this standard is to help us focus our
16 review only in those areas that we really should be
17 reviewing, which are probably the things where we
18 don't meet where the PRA is known perhaps not to meet
19 the standard.

20 So I am not actually clear what that
21 statement means, and I don't think that we have -- I
22 think we are probably still in the process of
23 interpreting it is my guess. Tim Reed is here. He is
24 involved with the option 2. And he would perhaps know
25 a little bit more about that.

NEAL R. GROSS

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

1 MEMBER ROSEN: But it clearly doesn't mean
2 a wholesale submission of PRAs from everybody in the
3 industry, does it?

4 MR. PARRY: I would hope not.

5 MEMBER ROSEN: I think you would find a
6 lot of work in that --

7 MR. PARRY: A tremendous amount of it.

8 MEMBER POWERS: Could I come back to Mr.
9 Rosen's question about the robustness of the peer
10 review? Peer review, of course, is a hallowed
11 institution of the scientific and engineering
12 community. And it has been the subject of some
13 academic study.

14 Have you looked at the conclusions of
15 academic studies in the general area of peer review to
16 see if they give you any insight into the reliability
17 of peer reviews for your purposes?

18 MS. DROUIN: No in a quick answer. In a
19 more long-winded answer, as someone who has
20 participated in peer reviews, I think they are very
21 valuable. And I think they can accomplish the intent
22 to which we are looking for from them.

23 MEMBER POWERS: I think that is a general
24 perception of the scientific and engineering
25 community. It is not the conclusion that comes out of

NEAL R. GROSS

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

1 some of the more notable studies of the peer review
2 process. Words like "quixotic" appear in those. Peer
3 review is an interesting institution on whether it is
4 indeed a robust examination.

5 Now, it may well be, like democracy, the
6 worst possible way of doing things except for
7 everything else. It has not been found to be a
8 panacea.

9 MS. DROUIN: I don't think that it is a
10 panacea in that regard. And I think that if you are
11 looking for the peer review to tell you where all of
12 your awards are, that is not something to use the peer
13 review for. A good peer review I think can tell you
14 whether what you have is solid or whether it is going
15 to fall apart.

16 MEMBER APOSTOLAKIS: I think it most
17 likely will tell you whether it's consistent with the
18 current state of the practice.

19 MS. DROUIN: Yes.

20 MEMBER APOSTOLAKIS: Unless you
21 specifically ask the reviewers and select them in such
22 a way that they are competent to do that, they will
23 not give you statements like "We need to go beyond the
24 state of the art in this particular issue because
25 there are these uncertainties and so on" that would

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 just tell you yes. We use this model. That is what
2 everybody else is using. And you used it correctly.

3 MS. DROUIN: Yes.

4 MEMBER ROSEN: Isn't the former too much?
5 It certainly wasn't an expectation of the peer review
6 process?

7 MEMBER APOSTOLAKIS: No, but what we are
8 doing here is trying to understand the limits of peer
9 review.

10 CHAIRMAN BONACA: Because we are trying to
11 understand what the other role is, how much you depend
12 on it and what kind of information you get in to make
13 a judgment about the adequacy of your --

14 MEMBER APOSTOLAKIS: Exactly. There is a
15 difference because the NRC staff has to worry about
16 the public health and safety, not whether the analysis
17 was done according to the existing models.

18 The peer reviewers look at, you know, this
19 PRA, does it conform? Do you have a more difficult --
20 for example, I can see a peer review group not saying
21 anything about model uncertainty because nobody does
22 it.

23 But when you come in, you have to worry
24 about it because your criteria are different. You
25 worry about public health and safety. And if model

NEAL R. GROSS

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

1 uncertainty can change the conclusions, then you have
2 to worry about it.

3 MS. DROUIN: That's right.

4 MEMBER APOSTOLAKIS: So there is this
5 distinction, I think.

6 MS. DROUIN: So there are things, you
7 know, during the course of the development, I think,
8 of the standard, particularly when you look at some of
9 the list in there for the peer review, that were put
10 in there from that perspective.

11 MEMBER APOSTOLAKIS: Yes, yes. I think we
12 will come back to the peer review later because you
13 were addressing the issue.

14 MS. DROUIN: Yes.

15 MEMBER WALLIS: Again, you've got this
16 word "high-quality" PRA, but we don't have any
17 criteria for high quality. I think most of your
18 remarks are about acceptability or technical adequacy
19 to me is a C. High quality may be an A. There is a
20 difference.

21 MS. DROUIN: When we were writing DG-1122,
22 we tried not to use the words "PRA quality" anywhere
23 in there. I think we did that. I am now quoting you
24 from the SRM.

25 MEMBER WALLIS: Yes.

1 MS. DROUIN: These were the commission's
2 words in the SRM.

3 CHAIRMAN BONACA: You are talking about
4 adequacy to support the conclusions.

5 MS. DROUIN: Yes.

6 MR. PARRY: Right. And, in fact, I think
7 you will notice the position that -- I think that we
8 state this position in SECY-00-162 -- what we talk
9 about for quality, we talk about the quality of the
10 PRA sufficient to support an application.

11 MEMBER WALLIS: I think you would accept
12 a C level PRA because --

13 MR. PARRY: Right.

14 MEMBER WALLIS: You are not selecting for
15 all PRAs to be A grade.

16 MR. PARRY: And I think the benefits you
17 get from it are commensurate with the grade, if you
18 like.

19 MEMBER APOSTOLAKIS: Are these comments,
20 especially from Commissioner McGaffigan, changing now
21 anything you are doing? I think your draft guide, you
22 try to stay within the spirit of 1.174 that given a
23 particular decision, you want to make sure that the
24 PRA is done adequately and so on. And other parts of
25 the PRA may not be done very well.

NEAL R. GROSS

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

1 But now the commissioner comes in and
2 says, "The fee for participating in the risk-informed
3 activities is to have a Level 2 all modes high-quality
4 PRA," which means now what, that you have to have a
5 Category 3 PRA and that your effort here to
6 accommodate people maybe is not consistent with the
7 commissioner's view?

8 MS. DROUIN: In terms of Commissioner
9 McGaffighan's statements, that does not change in
10 terms of what we do in this draft guide, in this
11 regulatory guide, because that is the implementation.

12 When I look at Appendix A endorsing the
13 standard for a Level 1 full-power internal event, is
14 there sufficient enough information or requirements in
15 that standard such that if you fold it, it would yield
16 you a quality PRA?

17 MEMBER APOSTOLAKIS: But if he requires
18 high-quality, it seems to me you are going to Category
19 3.

20 MR. PARRY: I think his paradigm appears
21 at first sight to be a little different from the one
22 that we have been developing in reg guide 1.174 and in
23 this document.

24 MEMBER APOSTOLAKIS: But you have not
25 received a formal communication from the commission 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 do that?

2 MS. DROUIN: One, I think that what is
3 meant by high-quality, the staff still has to
4 ascertain what is meant by that. Personally I
5 disagree with you.

6 I don't think what is meant by
7 Commissioner McGaffigan -- this is my personal view --
8 I want to make that clear -- that I am expressing
9 here. I do not think he means a Category 3. I think
10 what he means is a full-scope Level 1/Level 2 all
11 contributors taken into account.

12 It is not just full power. It's low-power
13 shutdown. It's external events. It's internal fire.
14 I think when he talks about high-quality, he's meaning
15 all of this. It's not that you come over and you have
16 this Level 1/Level 2 LERF and then you just sort of do
17 this side stuff and deal with your other contributors.

18 MEMBER APOSTOLAKIS: Well, that's part of
19 it. You can't really --

20 MS. DROUIN: This is something that the
21 staff is going to have to work out, what is meant by
22 those words.

23 MEMBER APOSTOLAKIS: You can't call a
24 Category 1 PRA high-quality, though.

25 MS. DROUIN: No, but I would call Category

NEAL R. GROSS

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

1 2 high-quality. I would call Category 1 high-quality
2 if you do it right.

3 MR. PARRY: Category 1 is high-quality.

4 MEMBER ROSEN: Sure, you can do Category
5 1 high-quality, but if that's all you need for the
6 application you are asking for some sort of change
7 based on. It always comes back to the question, is it
8 good enough for the purposes intended? That's
9 different for everything.

10 MEMBER APOSTOLAKIS: That's different from
11 high-quality.

12 MEMBER ROSEN: That's different than what
13 you might interpret, sufficient remarks --

14 MEMBER APOSTOLAKIS: Good enough for this
15 application, but it's not the high-quality.

16 Are we going to come back to this category
17 business? I have a question on the categories.

18 MS. DROUIN: No, we were not.

19 MEMBER APOSTOLAKIS: Okay. Let me raise
20 my question. The way I understand the categories, as
21 you move from 1 to 3, you become more realistic and
22 more plant-specific.

23 MR. PARRY: And more detailed.

24 MS. DROUIN: And more detailed.

25 MEMBER APOSTOLAKIS: Right. But one

NEAL R. GROSS

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

1 essential ingredient is this plant specificity, isn't
2 it?

3 MS. DROUIN: Well, if you go to the
4 standard and you go to Table --

5 MEMBER APOSTOLAKIS: Yes. It's the first
6 one, isn't it?

7 MS. DROUIN: On page 3 of the standard.

8 MEMBER APOSTOLAKIS: Yes, page 3.

9 MS. DROUIN: I was one of the persons on
10 the small group who helped put together this table.

11 What we felt is that if you are trying to
12 define these categories of PRA, we felt there were
13 three things that defined it. That was: The level of
14 detail that you went into, how much plant-specific
15 information you took into account, and how much
16 realism you brought to your analyses.

17 So as you go from left to right, your
18 left-hand one, which is your Category 1, your model is
19 much at a higher level of detail. And you might be at
20 the tray level. You're dealing with a more generic
21 type of information. You're dealing with more
22 conservative type analyses; whereas, when you move
23 over to your far right, your Category 3, then you have
24 gone to a much finer level of resolution detail.
25 You're being very plant-specific, and you're being

NEAL R. GROSS

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

1 realistic in your analyses.

2 MR. PARRY: It also has to be said that,
3 even for Category 1, the models have to represent the
4 systems as built and as operated.

5 MS. DROUIN: Oh, yes.

6 MEMBER APOSTOLAKIS: But you do state in
7 the guide that the PRA model must represent the
8 as-built and as-operated bond?

9 MS. DROUIN: Right.

10 MEMBER APOSTOLAKIS: And the event
11 probabilities represent the actual operating history
12 and experience of the plant and applicable generic
13 experience is applicable? Right? You do say that,
14 which it seems to me eliminates Category 1.

15 MS. DROUIN: No, no, because Category 1,
16 you might keep your model, for example, at your fault
17 tree level. You might keep it at the train level,
18 system level. It starts to represent it. You're just
19 not building it down to the component or subcomponent
20 level.

21 You might keep your event trees at a
22 higher level. They're still going to represent how
23 that accident would progress, but it may not be down
24 at this very detailed, fine cut where you have got 100
25 events in your event tree.

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 MEMBER APOSTOLAKIS: No, but the --

2 MS. DROUIN: So it's the level of detail.

3 MEMBER APOSTOLAKIS: But you cannot use
4 generic data when you ask them to represent the actual
5 operating history and experience of the plant.

6 MR. PARRY: Where are you looking, George?

7 MEMBER APOSTOLAKIS: Well, I'm trying to
8 find it myself.

9 MR. PARRY: Okay.

10 MS. DROUIN: Well, in your Category 1, you
11 aren't going to be able to do a Category 1 that is 100
12 percent generic data.

13 MEMBER APOSTOLAKIS: But if you ask them
14 to have event probabilities that represent the actual
15 operating history and experience and that the PRA
16 model must represent the as-built and as-operated
17 plant, it seems to me you have made it plant-specific.

18 MS. DROUIN: Where are you reading from?

19 MEMBER APOSTOLAKIS: I can't find it. I
20 don't know why I can't find it.

21 MS. DROUIN: Then I would tend to say that
22 is a mistake on ASME's part in characterizing it
23 because that is not the intent. I don't want to speak
24 for ASME because this is an ASME standard, not an NRC
25 standard. I am just trying to share to you what I

NEAL R. GROSS

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

1 think --

2 MR. PARRY: They're talking about the
3 guide.

4 MS. DROUIN: Our guides? In our guide?

5 MR. PARRY: Yes, your guide.

6 MS. DROUIN: Then that would be our
7 problem.

8 MR. PARRY: Yes, that would be our
9 problem. That is what they are talking about.

10 MS. DROUIN: I didn't think we had a
11 discussion on categories anywhere.

12 MEMBER APOSTOLAKIS: Okay. Page 19 of the
13 draft guide.

14 MS. DROUIN: Okay.

15 MEMBER APOSTOLAKIS: Demonstration of
16 technical adequacy of the PRA. In the middle
17 paragraph, A, "The PRA model or those parts of the
18 model required to support the application represent
19 the as-built and as-operated plant." Okay? So that
20 is the first part. "Current design and operating
21 practices."

22 MR. PARRY: C is the point you are looking
23 at. That just says "probabilities and frequencies
24 consistent with the definitions of the events and the
25 model." It will cover all categories.

NEAL R. GROSS

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

1 MEMBER APOSTOLAKIS: There is another
2 place where you actually say they should be using the
3 actual experience. I mean, it's there. I just can't
4 find it now.

5 If one is to make a decision regarding a
6 particular plant, one has to have plant-specific
7 information. Now, the correct way of putting it in my
8 mind is that you may argue in some instances that the
9 generic information does, in fact, represent the
10 plant-specific information as well.

11 MR. PARRY: Or represents it adequately
12 for the application --

13 MEMBER APOSTOLAKIS: So based on what I
14 see in the guide, it seems to me you are eliminating
15 capability Category 1 and, really, you're talking
16 about capability 3 with some allowance for capability
17 2 in some places.

18 MR. PARRY: I hope not. And if you can
19 find those and point them out to us, I think we need
20 --

21 MEMBER APOSTOLAKIS: I just gave you one,
22 right, the as-built and as-operated?

23 MR. PARRY: No. That's okey.

24 MEMBER KRESS: That's not plant-specific.

25 MR. PARRY: Yes, but that is the structure

NEAL R. GROSS

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

1 of the logic models, the systems, the ones that you
2 have. And the operator actions are the ones --

3 MEMBER APOSTOLAKIS: And I agree with
4 that. It's the second one, the event probabilities,
5 that is more --

6 MR. PARRY: That would be my worry.

7 MEMBER APOSTOLAKIS: Let's go on, and
8 maybe I'll find it.

9 MS. DROUIN: You will see the statement
10 right at the very beginning of the regulatory guide.
11 I believe it shows up in the second paragraph, you
12 know, "The purpose of the draft guide is to describe
13 an acceptable approach for determining that the
14 quality" -- unfortunately, this is one of the few
15 places where we did use the word; we didn't feel we
16 could get away from it here -- "of the PRA in toto or
17 for those parts that are used to support an
18 application are sufficient to provide confidence in
19 the results since they can use regulatory
20 decisionmaking," et cetera.

21 MEMBER APOSTOLAKIS: Which brings up
22 another question. I think we have discussed it in the
23 past, too, but let's make clear where we stand.

24 I can see when you're dealing, say, with
25 the allowed outage time of a particular piece of

NEAL R. GROSS

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

1 equipment not worrying about whether the fire analysis
2 or something else has been done or the human
3 reliability analysis has been done rigorously.

4 But if you go to regulatory guide 1.174,
5 there is a requirement that you consider also the
6 total CDF and the total LERF. So if one does the
7 limited analysis using Category 1, what category
8 should you be using for the total CDF and total LERF,
9 also Category 1?

10 MR. PARRY: I think that in reg guide
11 1.174, the only time that absolute values of CDF and
12 LERF are used, I think if you read it carefully, what
13 it says is that if you have any indication that you're
14 in excess of 10^{-4} , then you should be more careful
15 with granting the application. I don't think --

16 MEMBER APOSTOLAKIS: How would you know
17 that if you don't do a rigorous analysis?

18 MR. PARRY: I think if you don't do a
19 rigorous analysis, if you do a Category 1, I suspect
20 what you are going to end up with is, in fact, a
21 higher CDF than you would do if you did a Category 2.

22 MEMBER APOSTOLAKIS: But isn't it an
23 assumption on our part that, indeed, you will get a
24 conservative CDF if you do Category 1?

25 MR. PARRY: In the sense that when you are

NEAL R. GROSS

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

1 moving from Category 1 to 2 and that most of the
2 supporting level requirements here I think for
3 Category 1 tend to suggest that you should be using
4 conservative analyses, then perhaps it is an
5 assumption. But I think it is not a bad assumption.
6 But it perhaps needs to be checked out.

7 MS. DROUIN: It certainly is an
8 assumption, but I think as you go through and you look
9 at the supporting requirements that are in the
10 standard, I don't think it would be very difficult to
11 show that it would yield a more conservative number.

12 MEMBER APOSTOLAKIS: Right, but if I look
13 at pages 14 and 15 of the standard, where they give an
14 example, -- and I think that is a good idea to give an
15 example -- section 3.2.2, "Determination of Capability
16 Categories," if you read the example, you get the
17 impression that the values of CDF and LERF are sort of
18 absolute.

19 So, for example, on page 14, they say they
20 are looking at the surface water pump allowed outage
21 time. Okay? And they say, "If the plant has a
22 baseline CDF and LERF of such and such and it is
23 expected that the changes in CDF can be shown to be
24 small, then the parts of the PRA that are impacted by
25 changes in SW pump availability due to maintenance 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 determined to require PRA capability Category 2."

2 I am determining the capability category
3 after I have a CDF and LERF. And I am confused now.
4 If I have determined CDF and LERF using Category 1, I
5 get a conservative result, which would probably be
6 insensitive to a lot of the things I do because it is
7 conservative.

8 Then I am not going to reach the
9 conclusion that I should go to Category 2. I will
10 stay to Category 1 because, no matter what I do, it
11 will be insignificant with respect to the final
12 result.

13 And then it goes on on the next page and
14 says, "Continuing the above example, with a baseline
15 core damage frequency of 10^{-4} " and so on, then again,
16 they determine the capability category. And it seems
17 to me the way these values are used, it implies that
18 they are an external input.

19 And I am determining now the capability
20 category for the application using that external
21 input, where, in fact, in practice, what you are
22 saying is, "No, it's not external. You have decided
23 on the capability category, and you get the baseline
24 CDF and LERF.

25 But then how can I use that as a criterion

NEAL R. GROSS

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

1 whether I need to go to a higher category?

2 MR. PARRY: My interpretation of this is
3 that, really, the way you would want to make sure that
4 -- if you felt you had a conservative estimate of CDF,
5 where you are really going to focus is on the
6 evaluation of delta-CDF. Those things you need to do
7 pretty well.

8 MEMBER APOSTOLAKIS: But if the original
9 CDF is very conservative, how can I trust the
10 delta-CDF? See, the CDF is not done independently of
11 the baseline CDF.

12 MR. PARRY: No, it's done by the baseline
13 CDF minus the modified CDF.

14 MEMBER APOSTOLAKIS: Right, but if I have
15 already --

16 MR. PARRY: It is those elements that you
17 are changing.

18 MEMBER APOSTOLAKIS: But if I have made
19 already conservative assumptions because I decided to
20 start with Category 1, then the delta-CDF I am going
21 to have may be zero because I have been so
22 conservative already that by changing the AOD by two
23 weeks, my model is insensitive to that.

24 MR. PARRY: Then I think what this says is
25 you look at those elements that go into the

NEAL R. GROSS

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

1 calculation of that change and make sure that those
2 now are Category 2. So it's almost like separating
3 out part of the PRA.

4 MEMBER APOSTOLAKIS: But when it says, "If
5 the plant has a baseline CDF," the plant doesn't have
6 anything. You produce that. And the way it is
7 presented here, it says, "Is that something that you
8 Vic here gives me?" No. I do.

9 It's not external. I have made the
10 decision to go with Category 1. And I produce a CDF.
11 So the statement "If the plant has" is not meaningful.

12 MR. PARRY: Okay.

13 MS. DROUIN: But I think you can't say it
14 quite that way.

15 MEMBER APOSTOLAKIS: Well, that's what it
16 says.

17 MS. DROUIN: You don't have a CDF that's
18 a Category 1 or a Category 2 or a Category 3.

19 MEMBER APOSTOLAKIS: That is my question.
20 Do I?

21 MS. DROUIN: No, you don't.

22 MEMBER APOSTOLAKIS: So what do I have?

23 MS. DROUIN: It's a mixture of things. I
24 mean, I would doubt that you would find a single PRA
25 out there of the PRAs that are out there that when you

NEAL R. GROSS

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

1 go down and you look at -- say you just take your
2 vertical slides of Category 1 and you look at all the
3 supporting requirements.

4 You aren't going to find one. You are
5 going to see some places where it is Category 1, some
6 places it's Category 2. And I think you would even
7 find some places where it is Category 3.

8 MEMBER APOSTOLAKIS: No, but I think if --

9 MS. DROUIN: So it's the whole mixture.

10 MEMBER APOSTOLAKIS: But if a PRA is
11 really Category 3, the parts they did using Category
12 1, there was a reason for that. They showed that if
13 you do this conservative, it doesn't contribute much.
14 You can't say it's Category 1. They just did a
15 bounding analysis. But the baseline is Category 3.
16 A lot of PRAs do that. That is how you screen
17 sequences, right?

18 So I just don't see how the baseline CDF
19 and LERF are produced. And it is used here as a
20 criterion for deciding whether I need to do Category
21 2 for this particular application or something else.

22 It says, "Due to maintenance, a determined
23 to require PRA capability Category 2; whereas, the
24 remaining parts of the PRA needed to determine CDF or
25 determined to require only PRA capability Category 1."

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 what did the baseline CDF have in it,
2 Category 1 or 2?

3 MR. PARRY: I think Mary is right that
4 most PRAs will have some elements of the Category 1
5 and probably the majority that are 2. So all this
6 says is what you are going to focus on is you are
7 going to try and do a Category 2-type job on those
8 things that you need to calculate the delta.

9 For what you need to calculate the
10 balance, as long as you have reached one, then that is
11 adequate. But in all likelihood, there will be more
12 in Category 1. They will probably be Category 2.

13 MEMBER APOSTOLAKIS: So I start with a CDF
14 Category 1?

15 MR. PARRY: No, It's not a Category 1
16 CDF. It's a calculated CDF from the model.

17 MS. DROUIN: It's a CDF, but you can't
18 call it --

19 MEMBER APOSTOLAKIS: Can I do it using
20 Category 1 approaches?

21 MS. DROUIN: What we keep saying is that
22 --

23 MEMBER POWERS: I think that is the
24 essential point, that regardless of what category it
25 is, if whatever you have done is very conservative,

NEAL R. GROSS

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

1 you end up with this zero delta-CDF because you are
2 insensitive. That is the question.

3 MEMBER APOSTOLAKIS: That's my point.

4 MEMBER POWERS: And I think it is an
5 excellent insight.

6 MR. PARRY: But I didn't necessarily think
7 you do reach a --

8 MEMBER POWERS: We seem to get an awful
9 lot of things coming to us that said we just did this,
10 and it didn't make any difference.

11 MR. PARRY: The only way you could get a
12 zero, I think, is if the elements that you were
13 changing were not even in the model.

14 MEMBER POWERS: I don't think we mean zero
15 in absolutely zero. I think we mean they are always
16 very small.

17 MR. PARRY: Well, they might be small, but
18 they might genuinely be small.

19 MEMBER POWERS: They might be a product of
20 the conservatism.

21 MR. PARRY: Just by looking at them.

22 MEMBER APOSTOLAKIS: They might not.

23 MR. PARRY: But the only way you have to
24 be concerned is where the conservatisms that you have
25 put into the model have made it impossible for you to

NEAL R. GROSS

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

1 calculate the delta. That is where I would be
2 concerned. And if there are the elements in the model
3 that you can represent the change with, then you can
4 calculate a delta.

5 I mean, the result of the model is a sum
6 of cuff sets. So you take a large sum and a small bit
7 that you're changing. When you take the difference,
8 that large bit cancels out.

9 CHAIRMAN BONACA: Would a reviewer at the
10 NRC be able to see how this kind of dullness of the
11 model is making some effects? I think it would.

12 MR. PARRY: And I think that that is one
13 of the requirements in reg guide 1.174, that you do
14 sensitivity studies to see whether there are changes
15 out --

16 CHAIRMAN BONACA: To see how the
17 assumption is made in the inputs in the data that you
18 have been using plus --

19 MEMBER APOSTOLAKIS: But isn't this again
20 part of the spirit, consistent with that approach that
21 we want to accommodate licensees who don't have good
22 PRAs and so on? I find this kind of guidance here to
23 be inconsistent with the statement from the commission
24 of high-quality PRA.

25 MEMBER KRESS: Let me add a little

NEAL R. GROSS

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

1 question to this. Suppose I wanted to use the PRA to
2 determine some importance measures.

3 MEMBER APOSTOLAKIS: No. That doesn't
4 apply.

5 MEMBER KRESS: Well, you know, eventually
6 when we are risk-informed, we might get there. If I'm
7 using a very conservative PRA, I get a conservative
8 CDF, say, a large CDF, what that tends to do is make
9 the importance measure with respect to that CDF
10 smaller, which goes against having this fixed value of
11 an importance measure, saying that's when it's
12 risk-significant. I worry about things like that when
13 we use conservative PRAs. I am worried about the
14 further use of PRAs using this quality guide.

15 MR. PARRY: But if you look at -- I'm
16 trying to think. I think it is Appendix A in reg
17 guide 1.174, that issue is discussed that you can
18 obscure importance measures by having conservative
19 elements and also having non-conservative elements.

20 So we recognize that. And I think you
21 will find that in, for example, 50.69, it is the whole
22 PRA that needs to be of an adequate quality because of
23 the fact that you are using --

24 MEMBER KRESS: You would have to use the
25 Category 3.

NEAL R. GROSS

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

1 MR. PARRY: Two I think is what people
2 seem to be holding out.

3 MS. DROUIN: I think at this point, what
4 we need to do is go back and re-look at this, re-look
5 at it a little bit more carefully, and just determine
6 if we need to add any clarification in DG-1122.

7 MEMBER APOSTOLAKIS: Yes, I think the
8 issue of whether the baseline CDF and LERF can be
9 Category 1 is really a serious one because, I mean, I
10 haven't thought of all of the implications, but to do
11 the baseline CDF on Category 1 and then the
12 situation-specific analysis Category 2 or 3, that just
13 doesn't make sense to me.

14 By the way, I found the sentence that we
15 are looking for, page 7.

16 MEMBER ROSEN: Seven of which?

17 MEMBER APOSTOLAKIS: Of the guide.

18 MEMBER ROSEN: Of the guide.

19 MEMBER APOSTOLAKIS: No, no. Of the
20 DG-1122.

21 MEMBER ROSEN: Page 7?

22 MEMBER APOSTOLAKIS: Yes, "Parameter
23 Estimation." Okay? "Parameter Estimation Analysis."
24 The last sentence, "and represents the actual
25 operating history and experience of the plant and

NEAL R. GROSS

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

1 applicable generic experience as applicable."
2 "Applicable generic experience as applicable." That's
3 nice.

4 It seems to me that the guide -- and I
5 agree with that -- asks for a plant-specific PRA which
6 is of reasonable quality. And my question is, why
7 don't we just say that up front? I think if I do what
8 you are asking them to do, I will end up with at least
9 Category 2.

10 You are eliminating Category 1 implicitly.
11 And the question is, why don't you want to do it
12 explicitly?

13 MS. DROUIN: Let me come back and answer
14 this because we are going to now get into this part of
15 the guide.

16 MEMBER APOSTOLAKIS: Okay. Fine. I mean,
17 you are asking them to be plant-specific, the models.
18 You are asking them to include actual operating
19 experience. I mean, that is what PRAs do. I mean, if
20 you look at South Texas, you look at Seabrook, all of
21 these --

22 MS. DROUIN: I think you are misreading.
23 I think you are misreading this. I am going to get
24 back to this point.

25 MEMBER APOSTOLAKIS: Okay. Now, where are

NEAL R. GROSS

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

1 we?

2 MS. DROUIN: We talked about what we are
3 not trying to do with this reg guide. One, we are not
4 trying to address how the PRA results are used in the
5 decisionmaking process. That is not part of the scope
6 of this document.

7 The guidance on how PRA results are used
8 is in the application-specific guide. So you would
9 go, for example, for tech specs. I think it is 1177,
10 ISI 178. Go to 174. So how you actually use the PRA
11 results in your application, you go to that
12 application-specific regulatory guide.

13 This is strictly dealing with the issue of
14 determining the technical acceptability of the PRA for
15 the application. It has a very specific focus.

16 MEMBER WALLIS: I guess it is possible to
17 do that. I am not quite sure. It seems to me that
18 what is acceptable technically can hardly be divorced
19 from what you are going to do with it.

20 MR. PARRY: That is what we are saying,
21 isn't it?

22 MEMBER WALLIS: But it does not address
23 how they use it. Since they use it for
24 decisionmaking, I don't know how you can divorce
25 technical acceptability from the use.

NEAL R. GROSS

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

1 MR. PARRY: No, but what --

2 MEMBER WALLIS: It is a nice thing to say,
3 but I am not sure how you can do it.

4 MR. PARRY: All this is saying is that
5 where we talk about technical acceptability, it is in
6 relation to those elements of the PRA that are used in
7 the decisionmaking process.

8 This guide does not address how you
9 identify those elements. That is dealt with elsewhere
10 because this guide is meant to support a lot of other
11 regulatory guides.

12 MS. DROUIN: So based on that scope, how
13 do you --

14 MEMBER WALLIS: It seems very strange to
15 me. The whole idea of engineering is the technical
16 acceptability of the engineering analysis is based on
17 what it is used for, isn't it, always? You can't
18 divorce the two.

19 MS. DROUIN: How somebody is going to, for
20 example, use the fact that station blackout has this
21 CDF and these contributors and how they are going to
22 use that in some decisionmaking process, we are not
23 addressing.

24 But given that they are going to use that
25 information, we are trying to say that that

NEAL R. GROSS

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

1 information is technically acceptable. I mean, it was
2 performed --

3 CHAIRMAN BONACA: So what you're going to
4 do, you are going to show that this is adequate
5 support, any one of those activities that then are
6 described so far as the evaluation portion in
7 different guides?

8 MS. DROUIN: Right.

9 MR. PARRY: I think another way of looking
10 at it is that this guide will give our position on the
11 ASME standard, which if you applied all of the --

12 MS. DROUIN: And PRA standards.

13 MR. PARRY: And other PRA standards.

14 MS. DROUIN: If you apply all of the
15 supporting level requirements, then you would have a
16 PRA that does what a PRA does. It calculates CDF. It
17 calculates LERF. It identifies all the contributors.

18 I think all we are saying by this
19 statement is that we are not telling people how to
20 make decisions here. All we are doing is commenting
21 on the quality of the elements of the PRA.

22 MEMBER WALLIS: But it seems to me your
23 PRA has to be adequate for the most difficult decision
24 that uses the most sophisticated PRA.

25 MR. PARRY: But that I think is the way

NEAL R. GROSS

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

1 the ASME standard is written. It is written to
2 incorporate all of the elements that you would need to
3 do exactly what I just said.

4 MEMBER APOSTOLAKIS: The regulatory
5 guides, though, do not specify categories.

6 MR. PARRY: No, they don't.

7 MEMBER APOSTOLAKIS: Should they? Who
8 makes that determination? Let's say I want to --
9 again, the AODs. I would go to the regulatory guide
10 that says, "tech spec changes." Right? That is a
11 regulatory guide.

12 MR. PARRY: Right.

13 MEMBER APOSTOLAKIS: Now, it doesn't tell
14 me there what kind of capability category I need.

15 MR. PARRY: Right, right.

16 MEMBER APOSTOLAKIS: So the individual
17 reviewer will have to make that determination or is it
18 going to evolve from long practice?

19 MR. PARRY: No, I don't understand.

20 MEMBER APOSTOLAKIS: I pick up the
21 regulatory guide that deals with tech spec.

22 MR. PARRY: That's right.

23 MEMBER APOSTOLAKIS: And I want to change
24 my AODs. I look at the guide. It makes no reference
25 to categories. There is a lady and gentleman here

NEAL R. GROSS

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

1 writing regulatory guide 1122, DG-1122, saying, "Look,
2 we are not getting involved in what category, what
3 quality of PRA you need. We are just going to
4 describe various attributes of the various categories
5 because the regulatory guides that deal with specific
6 regulatory decisions deal with that," but they don't.
7 So there is a gap there.

8 If I want to extend the AOD, somehow I
9 have to make a judgment because if I look at the
10 guide, it doesn't tell me what category to use. And
11 I go to DG-1122. It talks about categories. Somehow
12 I have to decide that Category 1 is good enough.

13 MS. DROUIN: But again, you're never
14 deciding it at that high level that your PRA is
15 Category 1. You are deciding it on a requirement by
16 --

17 MEMBER APOSTOLAKIS: At a local level.

18 MS. DROUIN: Yes.

19 MEMBER APOSTOLAKIS: Okay. But there is
20 no guidance how to do that, even at the local level.

21 CHAIRMAN BONACA: Okay. As you looked at
22 this quality and this implementation -- and the ASME
23 people have done, too -- they have made a judgment
24 that if you meet these requirements, you can support
25 all regulatory applications we know of right now.

NEAL R. GROSS

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

1 MEMBER APOSTOLAKIS: No.

2 CHAIRMAN BONACA: Now, that is how it has
3 to be because we are talking about adequacy of
4 standards to support regulatory applications.

5 MEMBER APOSTOLAKIS: But they are not
6 telling you which applications.

7 CHAIRMAN BONACA: They are not telling
8 which applications.

9 MEMBER APOSTOLAKIS: Because it is a
10 graded approach.

11 CHAIRMAN BONACA: And there may be a gap.
12 I'm saying that --

13 MEMBER APOSTOLAKIS: There is a graded
14 approach.

15 CHAIRMAN BONACA: -- I can live without
16 putting a burden right now on the standard and the reg
17 guide, recognizing that there may be some additional
18 steps to be done for specific applications. Actually,
19 there is.

20 MEMBER APOSTOLAKIS: In fact, an earlier
21 draft of the ASME standard tried to do that. And the
22 staff and we objected.

23 MS. DROUIN: Excuse me?

24 MEMBER APOSTOLAKIS: A very early draft of
25 the standard tried to put up front and give examples

NEAL R. GROSS

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

1 of applications where --

2 CHAIRMAN BONACA: But that wasn't done --

3 MEMBER APOSTOLAKIS: We all objected.

4 CHAIRMAN BONACA: But there was no
5 technical basis for it.

6 MEMBER APOSTOLAKIS: We didn't want to
7 specify.

8 MEMBER ROSEN: I think there's a burden of
9 proof issue here. And that is that the applicant who
10 wants to get some sort of regulatory approval to make
11 a change has the burden of proof to say, "For this
12 change that I want, my PRA is acceptable. And it's of
13 the correct category because."

14 Most of the because is in the delta-CDF
15 argument, as Gareth would argue. It is not something
16 that is in either of the guides, either the one side
17 of the sandwich or the other. I mean, it's not --

18 MEMBER APOSTOLAKIS: It's not. It's not.

19 MEMBER ROSEN: It's not as you suggest.

20 MEMBER APOSTOLAKIS: It's a statement of
21 fact.

22 MEMBER ROSEN: But the outcome of that
23 discussion between the applicant, the licensee, and
24 the staff is going to be presumably some sort of
25 change or some sort of denial of a request for 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.

2 The burden of proof, it seems to me, is on
3 the licensee to say that his PRA can support this
4 change he has requested. And I don't know how you
5 would write it ahead of time. I'm not sure you would
6 even want to try.

7 MR. PARRY: And I think chapter 3 of the
8 ASME guide, in fact, tells the applicant to do that.

9 MEMBER APOSTOLAKIS: All of these things
10 would go away if everybody had the level of a Category
11 3 PRA.

12 MS. DROUIN: I don't know that they had a
13 Level 3.

14 MEMBER APOSTOLAKIS: Category, category.

15 MS. DROUIN: If you certainly had a single
16 category. I mean, going into multiple categories
17 added a whole level of complexity that we are now
18 having to deal with. I am not going to argue that.

19 MEMBER APOSTOLAKIS: And that's what
20 Commissioner McGaffigan is referring to by saying
21 "Band-Aids" and "Band-Aids."

22 MEMBER ROSEN: Well, that's not fair.

23 MEMBER APOSTOLAKIS: That's what he says.

24 MEMBER ROSEN: Maybe he did, but I don't
25 think it's fair. I think that people have developed

NEAL R. GROSS

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

1 this tool. And some places want to use it broadly,
2 and they have to have a better one. And some places
3 want to use it in a minimal sense. And the wisdom of
4 the ASME and the staff in thinking about what the ASME
5 has done has said, "Yes, that's okay."

6 MEMBER APOSTOLAKIS: So can you give me an
7 example, to close this, of an application where
8 Category 1 would be sufficient?

9 MS. DROUIN: I guess I would come back and
10 say that is not really a fair question because I don't
11 know of anyone who has a Category 1 PRA. You keep
12 saying, but no one has done a PRA that has just been
13 done to those requirements at that level. Such a
14 beast does not exist.

15 MEMBER APOSTOLAKIS: So it's a mixture?

16 MS. DROUIN: It's a mixture.

17 MEMBER APOSTOLAKIS: For everybody?

18 MS. DROUIN: For everybody, absolutely.

19 CHAIRMAN BONACA: But this bullet there,
20 3 and 4 particularly, they state that these are the --
21 "sufficient technical quality," which means every
22 regulatory application can be supported by this PRA
23 now.

24 I see the point that George is making.
25 That is, some applications may need a level of quality

NEAL R. GROSS

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

1 which is higher or lower than some other. And so are
2 you seeing a standard here that it is closer to mostly
3 the PRA or --

4 MS. DROUIN: But when we say "level of
5 quality," those words bother me because whether you're
6 Category 1, you're Category 2, or you're Category 3,
7 you have quality in all of them. Whatever the
8 requirements are, you have to do it right.

9 CHAIRMAN BONACA: Well, let me use the
10 word, then, "sufficient technical adequacy."

11 MS. DROUIN: No because that is adequacy
12 also. It's depending on if you are in Category 1, do
13 you need that level of detail? Do you need that level
14 of plant-specific information? Do you need that level
15 of realism? I mean, that is what we are talking about
16 between the different categories. So it's not a
17 difference between technical adequacy or quality.

18 CHAIRMAN BONACA: The problem I am having
19 is that you start, the NRC starts, with an
20 application, right? Say it's an application for reg
21 guide 1.174. It comes in as a model and with a
22 problem that is being resolved.

23 So the problem that actually is being
24 addressed is the first thing that the NRC is
25 confronted with. And then you are saying, "Okay.

NEAL R. GROSS

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

1 This is the problem I am trying to resolve. And this
2 is the evaluation I am using. Now, what kind of PRA
3 do I have behind that to support it?"

4 You make a judgment on the PRA based on
5 the problem that you have to solve. There is a
6 correlation between the two. And you are making a
7 statement of sufficient technical adequacy.

8 Now, that doesn't mean that you have set
9 this model of sufficient technical adequacy to address
10 any other problem. You are only focusing on the
11 adequacy for that problem. Is that correct?

12 MR. PARRY: I have a slightly different --

13 CHAIRMAN BONACA: Unless people are going
14 to docket a PRA that is good for any regulatory
15 application.

16 MEMBER ROSEN: I would say yes to that
17 right away. Go ahead, Gareth.

18 MR. PARRY: I have a slightly different
19 take on this, and I am not sure that everybody would
20 agree with it. I think that you could use a Category
21 1 PRA to even do Option 2 in 50.69.

22 MS. DROUIN: I would agree with that.

23 MR. PARRY: What it means, though, is that
24 you would have more components in your high safety
25 significance category than you would if you had a

NEAL R. GROSS

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

1 Category 2 PRA.

2 So I think because a Category 1 PRA is a
3 PRA model that has all the right PRA elements, it
4 hangs together as a model, it deals with dependencies,
5 it has the right operator actions in there, it has
6 some conservative --

7 MEMBER KRESS: It gives you a conservative
8 CDF.

9 MR. PARRY: That's right.

10 MEMBER KRESS: That's in the denominator
11 for the importance factors for option 2.

12 MR. PARRY: It's true, but also if you
13 look at the guidance for doing option 2, you have to
14 perform certain sensitivity studies to see whether by
15 changing parameters --

16 MEMBER KRESS: Yes, but those sensitivity
17 studies are divorced from the actual CDF.

18 MR. PARRY: Well, not necessarily. I
19 mean, if one of the things that you had done was to
20 put very conservative common cause failure values in
21 your model, then take them out. See what new results
22 you get. And construct your set of high and low
23 safety significance SSEs on that basis together with
24 other things that you could put in.

25 MEMBER KRESS: In that sense, you are

NEAL R. GROSS

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

1 right. You're right. You're right.

2 MR. PARRY: You have to jump through more
3 hoops.

4 MEMBER KRESS: Yes.

5 MR. PARRY: But you can still come to a
6 solution. You will get an answer. It's just that I
7 think that the answer that you will get will not be as
8 beneficial if you have got a Category 1 as if you had
9 a Category 2. I think that is the flavor that we have
10 to get with these categories. It's somewhat --

11 MEMBER KRESS: Let me give you a scenario
12 and see what you think of this. I'm a plant. I'm a
13 licensee. And I have a PRA. It's been through the
14 peer review process. And they deemed this PRA to be
15 Category 2 just without any application at all, just
16 Category 2.

17 Now they have submitted it to you to see
18 if you agree and along with some requested application
19 of it. Now, the application, they will use it in
20 their application.

21 They will calculate a CDF and a LERF. And
22 they will also calculate. They will look at that CDF
23 and LERF and say, "Oh, in 1.174 space, this allows me
24 a delta of so much. And I know by my category that I
25 don't have to go to Category 3 because I am

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 conservative on both these CDFs and LERFs. So I can
2 use them, and I can allow this delta CDF."

3 So then I use the same thing, but I go in
4 and specify where my application is going to affect
5 the PRA and calculate a delta, which is probably more
6 precise than the CDF, and I come up with a delta
7 calculation that fits my 1.174 guideline, I am okay.
8 And I am going to submit all of this to you, along
9 with some potential uncertainties in all of these.

10 Now, the question I have is, where does
11 uncertainty fit into that? Is that left over to the
12 decisionmaking process? Is that part of your saying,
13 "We ought to tell them how to make the decision" or --

14 MR. PARRY: Yes, that's included. That
15 would be included in the reg guide 1.174 application,
16 where it tells you to consider all of the
17 uncertainties.

18 That is not to say that the standard in
19 DG-1122 is silent in that sense. It's not. It
20 mentions it. But I think where they're used because
21 I think, again, what reg guide 1.174 says is to focus
22 on those uncertainties that you know can change the
23 position.

24 MEMBER KRESS: But when they ask for
25 uncertainties in the guide, I will have to refresh my

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 memory. Does it ask for uncertainties on the delta
2 also?

3 MR. PARRY: It doesn't.

4 MEMBER KRESS: That could be much smaller
5 than the uncertainties on the actual CDF.

6 MS. DROUIN: I mean, the guide does not
7 ask for certainties on the delta because the guide is
8 not producing a delta.

9 MEMBER KRESS: I see.

10 MS. DROUIN: It is producing a CDF.

11 MEMBER KRESS: But does it say you have to
12 have uncertainties on the delta?

13 MR. PARRY: It doesn't mention delta
14 anywhere.

15 MEMBER KRESS: Okay.

16 MS. DROUIN: The guide does not tell you
17 how to calculate a delta. So, therefore, it doesn't
18 ask for uncertainties. It does ask for you to do
19 uncertainties on your CDF. I mean, there is quite a
20 bit in here on certainty analysis.

21 MEMBER KRESS: But you leave it up to the
22 decisionmaker on that?

23 MS. DROUIN: Yes.

24 CHAIRMAN BONACA: We need to have some
25 progress on this presentation, I guess.

NEAL R. GROSS

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

1 MEMBER APOSTOLAKIS: Why are you guys
2 silent on bounding analysis? You say on page 4 that
3 "Guidance and such alternative methods are not
4 provided in this guide" at the very top of page 4 of
5 DG.

6 MR. PARRY: Because this guide is
7 specifically designed to address the ASME standard and
8 NEI-00-02.

9 MEMBER APOSTOLAKIS: How is a bounding
10 analysis different from a Category 1? Isn't Category
11 1 supposed to be conservative; therefore, bound?

12 MR. PARRY: No.

13 MS. DROUIN: Category 1 is still a PRA.

14 MR. PARRY: Yes, yes.

15 MEMBER APOSTOLAKIS: And bounding analysis
16 is not? What is it?

17 MR. PARRY: I don't think it is. It is
18 not an analytical PRA.

19 MEMBER APOSTOLAKIS: What kind of bounding
20 analysis are we talking about? Are we talking about,
21 for example, the five methodology from EPRI? Is that
22 the bounding analysis?

23 MS. DROUIN: To me, that would be a
24 bounding analysis. That is not your PRA. This is
25 where you don't have a PRA and you are doing some

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 other type of analysis to bound the problem.

2 MR. PARRY: And the type of analyses that
3 were done for many of the external hazards, for
4 example.

5 MEMBER APOSTOLAKIS: So what is the all of
6 bounding analysis? I mean, it says, "Guidance is not
7 provided. We acknowledge that some of them sometimes
8 are used."

9 MR. PARRY: Where are you looking?

10 MEMBER APOSTOLAKIS: Page 4.

11 MEMBER ROSEN: The bottom of 3 and the top
12 of 4.

13 MS. DROUIN: You have got to start with
14 the bottom of 3 and then go on to 4.

15 MR. PARRY: I think that is just trying to
16 say what this guide is doing and not doing.

17 MEMBER APOSTOLAKIS: Is there another
18 place where we can find some guidance?

19 MR. PARRY: No, probably not. Probably
20 not.

21 MEMBER APOSTOLAKIS: I think the committee
22 objected to the bounding analysis being included in
23 the ANS external event guide. We didn't see that it
24 was proper to put them there.

25 MR. PARRY: What did you mean by the

NEAL R. GROSS

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

1 "bounding analyses"?

2 MEMBER APOSTOLAKIS: I don't know. BIDE
3 is a bounding analysis. The seismic margins approach
4 is a bounding analysis.

5 MR. PARRY: Well, that's not a PRA,
6 though.

7 MEMBER APOSTOLAKIS: It appears in a PRA
8 standard.

9 MR. PARRY: Yes, I know.

10 MEMBER APOSTOLAKIS: Now, is there a place
11 in the internal event analysis where so-called
12 bounding analyses are used or is it only external
13 events?

14 MS. DROUIN: I don't know that anyone in
15 the sense of how we use the term "bounding analysis"
16 will use it for a Level 1 PRA because everyone has a
17 Level 1 PRA.

18 MEMBER APOSTOLAKIS: So what is the
19 difference between a bounding analysis and a
20 conservative --

21 MR. PARRY: Maybe we can reasonably put
22 this in there. This reg guide eventually will have
23 additional appendices to address all of the other PRA
24 analysis, like external hazards, low-power shutdown.
25 I guess that's it.

NEAL R. GROSS

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

1 What this is saying is that what we are
2 looking at here is specifically PRA elements and not
3 the bounding types of analysis that we could do for,
4 say, high winds and --

5 MEMBER APOSTOLAKIS: So in the internal
6 event part, you don't see any --

7 MR. PARRY: I don't see any myself, no.

8 MS. DROUIN: No.

9 MR. PARRY: I can't think of any.

10 MEMBER KRESS: Now, the CDF is supposed to
11 include all of those things, internal and external,
12 and low-power shutdown. I can see if you had a Level
13 1 that didn't have those in it, then it wouldn't meet
14 your Category 2?

15 MS. DROUIN: If, for example, in their
16 Level 1 PRA, for some reason, they didn't include
17 LOCAs, that was not part of the analysis, this guide
18 does not give the technical attributes for an
19 acceptable analysis, if you want to call it a bounding
20 analysis, that you could do in replacement of going
21 back and doing your LOCA analysis, as you would do it
22 in your PRA.

23 MEMBER KRESS: I could imagine someone not
24 having a fire in their PRA or not having low-power
25 shutdown risk in their PRA and coming up with some

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 sort of bounding effect on the CDF for those things
2 and saying, "Now, our calculated CDF by our PRA we
3 have is this much. And we are going to multiply it by
4 a factor to include these bounding analyses." Would
5 that be an acceptable bounding analysis?

6 MR. PARRY: I don't know if it's
7 acceptable or not, but this is not addressed in here.

8 MEMBER KRESS: I know, but George is
9 asking where would a potential bounding analysis
10 likely be.

11 MR. PARRY: I think that would have to be
12 addressed in the application-specific reg guide and
13 review, I think. It's not addressed here.

14 MEMBER KRESS: I guess the question is how
15 would the staff deal with that if it had no guidance
16 on how to deal with bounding analyses.

17 MEMBER APOSTOLAKIS: I mean, shouldn't
18 there be some guidance as to what a bounding analysis
19 is.

20 MS. DROUIN: I'm sure there should be.
21 It's just not part of the scope of this document is
22 all we are saying. I mean, we are giving the basic
23 requirements, common guidance for the basic
24 requirements, of the PRA.

25 To get back to your question, would there

NEAL R. GROSS

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

1 be such a case on Level 1, I quickly started thinking
2 about the PRAs we saw in the IPEs. I can say, yes, I
3 saw quite a few.

4 If you go back to the insights report,
5 there were quite a few initiating events that were
6 your support initiators that were not modeled that
7 should have been modeled that are contributors and
8 should have been included in that.

9 Now, what this says is that if you want to
10 include them, we are going to give you guidance on how
11 to do them in your customary -- I am trying to use the
12 right word here in creating your initiating event
13 model, your event tree model, et cetera.

14 If you don't want to do it that way and
15 you want to do it through this other some bounding
16 way, you are going to have to go to another document
17 -- whether or not it exists is a good question -- for
18 what would be acceptable.

19 MR. PARRY: See, we are commenting on the
20 ASME standard in NEI-00-02.

21 MEMBER APOSTOLAKIS: No. You are doing
22 more than that.

23 MR. PARRY: And they don't address --

24 MEMBER APOSTOLAKIS: But you are doing
25 more than that, aren't you?

NEAL R. GROSS

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

1 MEMBER POWERS: George, are we
2 interrogating the speakers about not including that
3 which we beat on the seismic standard for including?

4 MEMBER APOSTOLAKIS: No. The question is,
5 shouldn't there be some guidance as to what is --

6 MEMBER POWERS: It just strikes me as this
7 is maybe a diversion from the main thrust.

8 CHAIRMAN BONACA: I would like to just say
9 I have a concern about the timing available here
10 because we have a full presentation yet. And then the
11 second presentation is some issues for resolution.

12 I am just wondering if we should have a
13 subcommittee meeting on this if we want because there
14 may be significant issues on DG-1122 deserving more
15 time.

16 MEMBER APOSTOLAKIS: If the committee
17 finds that they will not have sufficient information
18 to issue a letter, maybe we should do it.

19 CHAIRMAN BONACA: I understand.

20 MEMBER APOSTOLAKIS: Because on page 5,
21 for example, it says that "The risk calculation, CDF
22 and LERF, should account for all plant operating
23 states and initiating events, either quantitatively or
24 qualitatively." Now, what does it mean to
25 characterize risk qualitatively? It's about 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 middle of the page.

2 MS. DROUIN: Right. That sentence, that
3 little paragraph was inserted because, again, what we
4 wanted to say is that when you get to an application,
5 you do have to consider all of your contributors to
6 risk. You don't necessarily have to do it through a
7 formal quantitative PRA analysis approach.

8 MEMBER APOSTOLAKIS: How can it be
9 qualitative? Do you mean you are bounding it? You're
10 deciding it's not significant? That's quantitative.
11 A judgment like we were saying earlier this morning,
12 credible versus incredible, a judgment that this does
13 not contribute significantly is based on my estimate
14 that it has a 10^{-6} frequency. It's never qualitative,
15 even though you don't do anything about it afterwards
16 because you dismiss it. But qualitative --

17 MS. DROUIN: Then that's just a poor
18 choice of words on our part because all that paragraph
19 is trying to say is that we were just trying to
20 acknowledge that while you have to address all of your
21 risk contributors, you don't necessarily have to do it
22 through this.

23 MEMBER APOSTOLAKIS: Through a formal PRA.

24 MS. DROUIN: Through a formal PRA
25 approach.

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 MEMBER APOSTOLAKIS: Fine.

2 MEMBER KRESS: Well, let me ask you
3 another question.

4 MS. DROUIN: That is all that paragraph is
5 trying to acknowledge.

6 MEMBER APOSTOLAKIS: So why don't we take
7 out the words "either quantitatively or qualitatively"
8 because the whole thing is structured that way, I
9 mean, Category 1, 2, 3, do this, do that --

10 MS. DROUIN: I would prefer to clarify it
11 because that paragraph was added based on comments
12 because people kept thinking, "Well, you know, we are
13 going to make you do a PRA on everything."

14 And we are saying, "No, that is not the
15 intent here." We are just going to say for a
16 full-scope PRA, here is what we think a technically
17 acceptable full-scope PRA is. That doesn't mean you
18 necessarily have to have it for every application.

19 MEMBER APOSTOLAKIS: Yes, but that is not
20 qualitative.

21 MS. DROUIN: That is a poor choice of
22 words. We can clarify that.

23 MEMBER KRESS: While we're on this page,
24 let me ask you another question. The two paragraphs
25 above that one we were just dealing with say, "The CDF

NEAL R. GROSS

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

1 is a surrogate for latent fatalities risk."

2 Now, I have never seen the technical
3 justification. It could be. It could be. There
4 could be. You know, I think you mean the 10^{-4} CDF is
5 probably, but I have never seen the technical
6 justification for that where we ask you to show that
7 if you only have 10^{-4} , that you meet the latent safety
8 goal, latent risk safety goal.

9 I have never seen that anywhere. Have
10 you? Actually, has it been done somewhere?

11 MS. DROUIN: Yes, it has.

12 MEMBER KRESS: And 10^{-4} actually will meet
13 that --

14 MS. DROUIN: Yes.

15 MEMBER KRESS: -- for basically all plant
16 sites?

17 MS. DROUIN: Yes, and if we can as part of
18 the option 3 -- I'm told never to use the words
19 "Option 3." As part of risk-informing Part 50, one of
20 the things we were asked to do was to show that
21 relationship and that justification. We would be more
22 than willing to give you that in an appendix.

23 MEMBER KRESS: I would like to see that,
24 yes.

25 MS. DROUIN: It goes through and shows how

NEAL R. GROSS

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

1 the LERF, the $1E^{-5}$ and $1E^{-4}$, how those will meet the
2 QHOs.

3 MEMBER KRESS: Was that based on the Level
4 3 analysis at every site? It had to be somehow.

5 MS. DROUIN: It was based on insights from
6 1150.

7 MEMBER KRESS: Could be coming from that,
8 yes.

9 MEMBER APOSTOLAKIS: Now, LERF, of course,
10 includes CDF. So it does affect --

11 MEMBER KRESS: I'm assuming what they did
12 is take 10^{-4} CDF, call that a LERF, associated it
13 somehow with a source term and for every site,
14 calculated and showed that that meets the latent
15 safety goal. I don't know that that is why. I have
16 never seen that.

17 MS. DROUIN: We'll be more than willing to
18 give you a copy of that document.

19 MEMBER WALLIS: I think there is something
20 like 15 percent through your slides.

21 MEMBER APOSTOLAKIS: She's not going
22 through all of --

23 MEMBER WALLIS: I was going to ask you.
24 Are you going to go through all of the slides?

25 MEMBER APOSTOLAKIS: No.

NEAL R. GROSS

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

1 MR. SNODDERLY: Chairman Bonaca --

2 MS. DROVIN: No, no. I was going to jump.
3 I was going to do a major leap.

4 MR. SNODDERLY: Chair Bonaca, this is Mike
5 Snodderly. If I could make a suggestion? I think to
6 help focus these discussions, we should remember that
7 I think what we are being asked to write a letter on
8 is whether this draft guidance is sufficient for trial
9 for use relative to the guidance that we have now,
10 which is nothing.

11 So I think we ought to consider what are
12 the differences between the staff and ASME and the
13 staff and industry. And we're going to hear from
14 industry in a 20-minute presentation. Perhaps it
15 would be a good time to go and try to understand the
16 differences between the staff and ASME and the issues
17 that were discussed in the Bernsen letter concerning
18 the quantitative definitions of risk-significant and
19 dominant.

20 MEMBER APOSTOLAKIS: Sure, but we are
21 concurring on the issuance of the guide. So we have
22 to make comments. And there are not very many more.
23 Then we will go to your stuff.

24 One of the things that you are asking
25 repeatedly here is "Calculations are performed by

NEAL R. GROSS

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

1 personnel who are qualified to perform the types of
2 analysis of interest and are well-trained in the use
3 of the codes."

4 Now, why do you need that? Do you mean in
5 other places, you don't need qualified people? And
6 how are you going to check that? I mean, I don't
7 understand that. It is a sentence that is gratuitous.
8 Page 6, "Success Criteria Analysis."

9 MEMBER WALLIS: I thought it was a rather
10 useful sentence.

11 MEMBER POWERS: Yes. I will comment that
12 one of the things we had talked earlier about were
13 these containment codes. We find that the users who
14 have not been explicitly trained in the use of the
15 code tend to get worse answers in the sense that they
16 agree less with experimental data than those who have
17 gone through an explicit training --

18 MEMBER APOSTOLAKIS: But this applies to
19 the full PRA. I mean, if you have a guy who is not
20 experienced with accident sequence development, he may
21 produce things that are wrong or unrealistic. I mean,
22 the use of qualified personnel to perform analysis is
23 a universal requirement, it seems to me, first. And,
24 second, it's not enforceable.

25 Did you use qualified people? Fine.

NEAL R. GROSS

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

1 MEMBER POWERS: I believe they --

2 MEMBER APOSTOLAKIS: Yes, I do.

3 MEMBER POWERS: I believe the
4 qualifications of the individuals doing analysis are
5 part of the submissions I have seen. There's a
6 section that says, "Here is the guy who did it, and
7 here is what his background is."

8 MEMBER APOSTOLAKIS: But that applies to
9 the other part of the PRA.

10 MEMBER ROSEN: I would argue that you are
11 on target, George. I think there are standards for
12 the selection, training, and qualification of
13 engineering support personnel. They are INPO
14 standards, and they are met. It's a very rigorous
15 kind of business in the utility.

16 I don't have the document with me, but I
17 think I could put my finger on the right set of words
18 in those documents and then ask whether or not, in
19 fact, the utilities are complying with that and is
20 INPO accrediting the fact that they're complying with
21 that. I think you can go through that --

22 MEMBER APOSTOLAKIS: All I'm saying is
23 singling it out for success criteria and LERF
24 calculations seems kind of odd.

25 MEMBER ROSEN: Yes. Because of the broad

NEAL R. GROSS

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

1 scope of the selection, training, and qualification
2 requirements for engineering and support personnel
3 which are imposed, I think it is odd that you would
4 pick this one out.

5 MEMBER APOSTOLAKIS: Okay.

6 MEMBER WALLIS: It's because there is a
7 problem with the integration of phenomenological stuff
8 in the codes with PRA.

9 MEMBER APOSTOLAKIS: But if you ask the
10 guys who develop the accident sequences, they will
11 tell you the same thing, that if you don't have a guy
12 who really understands the plant and how to do that,
13 you are not going to get the results. So that's --

14 MEMBER KRESS: But this is probably
15 because the PRA severe accident codes are not the ones
16 they use to calculate success criteria. It's another
17 set of codes or hand calculations. They're different
18 from the PRA, and it's an input to the PRA. And it's
19 determined a different way.

20 So I could see how one might to single
21 that out and say, "Hey, you'd better be sure you do
22 this right or have the right people doing it."

23 MEMBER WALLIS: Let's leave it in, George.
24 Leave it in.

25 MEMBER APOSTOLAKIS: Which implies that

NEAL R. GROSS

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

1 other things you don't have to make sure you heard
2 them right.

3 MEMBER LEITCH: But it's inherent in the
4 task qualification and everything that we do. Whether
5 it's operating, maintenance, sweeping the floor, the
6 individual has to be qualified for the task that he is
7 doing.

8 MEMBER KRESS: But my point is the people
9 who develop these success criteria are probably
10 somebody other than the PRA person.

11 MEMBER APOSTOLAKIS: Sure.

12 MEMBER KRESS: So he's going to have
13 different qualifications than a PRA.

14 MEMBER APOSTOLAKIS: Sure, but that
15 doesn't say different -- I mean, it just says they
16 should be qualified and well-trained. I mean, I can
17 take a --

18 MEMBER KRESS: Intelligent and --

19 MEMBER WALLIS: Experienced.

20 MEMBER KRESS: Good physical condition.

21 MEMBER WALLIS: I think we ought to move
22 on.

23 CHAIRMAN BONACA: I don't think there is
24 any other field of engineering right now where you
25 have such a mix of experiences in the team that

NEAL R. GROSS

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

1 develops and supports the PRA. That's a difference
2 that I see there than if you have -- so that statement
3 doesn't bother me.

4 MEMBER APOSTOLAKIS: Now, one last
5 comment. And then we will go to your issues. The
6 sensitivity analysis, there is I think confusion out
7 there as to what the sensitivity analysis is supposed
8 to do.

9 A lot of people follow the old engineering
10 approach that says, you know, you do a best estimate
11 of point calculation. And then you do sensitivities
12 to account for uncertainties.

13 In a risk-informed environment,
14 sensitivity analysis has a very specific role in my
15 opinion. It identifies the major drivers to the
16 result. And then you do an uncertainty analysis on
17 all of these. It's not a replacement for uncertainty
18 analysis.

19 Given this confusion, it seems to me you
20 ought to give a little better because you say on page
21 8, "The sensitivity of the model results to model
22 boundary conditions and other key assumptions is
23 evaluated using sensitivity analysis to look at key
24 assumptions, both individually and in logical
25 combinations." And then what? Okay. I found 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 sensitivity. Now what do I do?

2 MR. PARRY: Remember, I think all of this
3 is saying is that this is how you interpret the
4 results of a PRA. This guide doesn't really
5 specifically tell you very much about that. In fact,
6 neither does the ASME standard, I don't believe.

7 Where we focus on sensitivity studies I
8 think is in places like reg guide 1.174. The purpose
9 is to determine whether the sources of uncertainty
10 that you have identified can alter the decision you
11 are trying to make.

12 So I think it is the usage of it in there
13 that we should be concerned about.

14 MEMBER APOSTOLAKIS: Let's go to page 84
15 of the ASME guide. It deals with LERF. So that's as
16 good as any. I haven't heard Dr. Kress complain about
17 your allowance for a limited-scope LERF calculation.
18 Do you agree with that or is that a separate issue?

19 MEMBER KRESS: I don't know how I feel
20 about that.

21 MEMBER APOSTOLAKIS: I'll tell you what it
22 is if you want to think about it. Anyway, if we go to
23 this page 84, the top table, it says, "Provide
24 uncertainty analysis which identifies the key sources
25 of uncertainty and includes sensitivity studies for

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 dominant contributors to LERF."

2 The message is clear: sensitivity
3 studies, the uncertainty analysis. I don't know what
4 it means, actually. I wouldn't know what to do here.
5 If I had this to comply with, I wouldn't know what to
6 do with it.

7 The uncertainty analysis will identify the
8 key sources of uncertainty.

9 MR. PARRY: Right.

10 MEMBER APOSTOLAKIS: And then it will
11 include sensitivity studies for dominant contributors.
12 The uncertainty analysis does not identify anything.
13 It just propagates uncertainties. The sensitivity
14 analysis identifies sensitivities.

15 MR. PARRY: Okay. Maybe that should be
16 "provide an analysis of uncertainties," which would
17 mean identification of sources and interpretation of
18 their impact on the results, which is what I think is
19 what this uncertainty analysis means.

20 MEMBER APOSTOLAKIS: Exactly. And to
21 identify the impact, you have to have some idea of how
22 likely those changes are.

23 MR. PARRY: Not necessarily. I mean, you
24 can look at them just in terms of their consequences.

25 MEMBER APOSTOLAKIS: Not necessarily but

NEAL R. GROSS

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

1 in general.

2 MR. PARRY: Then I think when you make a
3 decision, that is when you need to understand the
4 likelihood of those --

5 MEMBER ROSEN: There's a definition of
6 uncertainty analysis in the standard. It says, "the
7 process of identifying and characterizing the sources
8 of uncertainty in the analysis and evaluating their
9 impact on the PRA results and developing a
10 quantitative measure to the extent practicable."

11 MR. PARRY: That's fine. There you go.
12 So, actually, that fits that definition.

13 MEMBER ROSEN: Yes.

14 MR. PARRY: Thank you.

15 MEMBER APOSTOLAKIS: Well, all I know is
16 that all of the NEI documents that have come to us
17 propose sensitivity analysis, not uncertainty
18 analysis. The latest one was -- what was it? -- 00-04
19 or something.

20 MR. PARRY: But they're in the context of
21 making decisions.

22 MEMBER APOSTOLAKIS: Yes. Why would I do
23 an uncertainty analysis otherwise? In the context of
24 making a decision, especially when we calculate
25 delta-CDF; whereas, we know the variance of the

NEAL R. GROSS

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

1 difference of two random variables. This is the sum
2 of the variances, right? The uncertainty goes up.

3 MR. PARRY: Yes.

4 MEMBER APOSTOLAKIS: And, yet, we are
5 completely ignoring that.

6 Look, there is a part of the agency that
7 does this very rigorously. And that is the
8 repositories. Okay? They do a lot of our statistical
9 analysis. We don't do much about it, but at least we
10 should clarify the concepts that the sensitivity
11 analysis is not a substitute for uncertainty analysis.

12 I mean, we have already violated theories
13 by calling unavailability something that most people
14 don't call unavailability. Now we are going to
15 redefine uncertainty and sensitivity?

16 Anyway, there is another letter that we
17 are writing that maybe the committee will have an
18 opportunity to discuss these things.

19 MR. PARRY: I think the sensitivity
20 analysis --

21 MEMBER APOSTOLAKIS: A lot of people, by
22 the way, who have nothing to do with this say,
23 "informed," like my colleague Professor Wallis likes
24 to say, "informed laymen." They say, "Well, we hear
25 that PRA is so uncertain, orders of magnitude."

NEAL R. GROSS

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

1 And then you guys are telling us that you
2 are risk-informing the regulations based on delta-CDF
3 that is less than 10^{-5} or 4 . Do you really trust this
4 result? It seems to me we are doing everything on the
5 basis of point estimates.

6 Tom, Page 5.

7 MEMBER KRESS: Page 5 on what?

8 MEMBER APOSTOLAKIS: Of the DG.

9 MEMBER KRESS: DG. Okay. I've got that.

10 MEMBER APOSTOLAKIS: "Scope of PRA."

11 MEMBER KRESS: Okay.

12 MEMBER APOSTOLAKIS: Under the bullets,
13 the last sentence of the paragraph under the bullets,
14 "A limited Level 2 PRA is needed to address." Do you
15 agree with that?

16 MEMBER KRESS: I'm still trying to find
17 where you are readying.

18 MR. PARRY: This paragraph right here.

19 MEMBER APOSTOLAKIS: The first paragraph
20 under the bullets.

21 MR. PARRY: All that means is that you
22 don't have to have all the bells and whistles to allow
23 you to --

24 MEMBER KRESS: All it says is you don't
25 need to count fission products.

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 MS. DROUIN: That you're just not doing a
2 full-scope Level 2. That's all that states.

3 MEMBER KRESS: Yes.

4 MEMBER APOSTOLAKIS: Well, we can move on
5 to the disagreements, then. I don't think you can --

6 MEMBER KRESS: I think that is all right.

7 MEMBER APOSTOLAKIS: -- you need to do
8 anything else.

9 MEMBER WALLIS: We're going to move back
10 to Mary's schedule here.

11 MEMBER APOSTOLAKIS: Well, to the
12 disagreements with the ASME people. Go to significant
13 and dominant. Tell her what "significant" means.

14 MEMBER POWERS: George, you're denying the
15 rest of us the benefit of all of this material she has
16 prepared.

17 MEMBER APOSTOLAKIS: Well, if she goes
18 back to the full presentation, we'll never get --

19 MS. DROUIN: What I was going to propose
20 is jumping to --

21 MEMBER POWERS: Well, you're jumping to.

22 MS. DROUIN: If you don't want me to jump
23 here, I will back up.

24 MEMBER WALLIS: Are we going to miss
25 something significant or dominant?

NEAL R. GROSS

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

1 MS. DROUIN: No. We had not planned on
2 giving a detailed presentation of the bulk of the
3 content of DG-1122 because the bulk of what is in
4 DG-1122 was taken from SECY 162 and we had had
5 numerous exchanges in the past with this committee.

6 So we didn't feel the need to come back
7 and go back through all of this because we had had
8 those discussions in the past and there was nothing
9 new that we had added. We had literally looked at
10 that information. So, really, we were going to skip
11 through all of those slides very, very quickly.

12 This is where we had hoped to spend the
13 bulk of the presentation, of where we are in discord,
14 where we still have objections in the appendices in
15 DG-1122. We went out for review and comment.

16 MEMBER WALLIS: You're skipping forward.
17 You're skipping forward about eight pages. You don't
18 have page numbers on your slides.

19 MEMBER APOSTOLAKIS: You don't have page
20 numbers.

21 MS. DROUIN: I apologize for that. I
22 meant to do it and --

23 MEMBER APOSTOLAKIS: So where is it now?

24 MEMBER WALLIS: This is a Level 1
25 presentation, Category 1.

NEAL R. GROSS

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

1 MS. DROUIN: I really do apologize for
2 that.

3 MEMBER POWERS: But I will point out that
4 it survived peer review.

5 MEMBER ROSEN: Not completely.

6 MS. DROUIN: Actually, I had to take the
7 --

8 MEMBER ROSEN: We're part of them here.

9 MS. DROUIN: I had printed this out. And
10 I said, "Oh, I've got to remember to page-number it."
11 And then I forgot. Now, peer review might have caught
12 that, Dana.

13 MEMBER ROSEN: That's right.

14 MEMBER WALLIS: So you're going to give us
15 an important message now, Mary.

16 MS. DROUIN: Are we all on the same page?

17 MEMBER WALLIS: The bottom line is the
18 bottom line on this slide, isn't it?

19 MS. DROUIN: That is a very good
20 observation. The bottom line is that among all of the
21 public review we have had is to move forward and
22 publish this for trial for use and to go for some
23 pilots. But in the interim, I think there are some
24 interesting things to note before we get into where we
25 still have not come to total resolution.

NEAL R. GROSS

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

1 We received very few comments on the main
2 body of the reg guide. We received absolutely no
3 comments on the SRP. The majority of the comments
4 were on Appendix A; very few comments -- they were
5 mostly editorial in nature, which surprised us -- on
6 Appendix B.

7 MEMBER APOSTOLAKIS: In other words, they
8 agree with what you said about Appendix B.

9 MS. DROUIN: That is our position. If
10 they did not object to our objections, then the fact
11 that there are no comments tells me that they agree
12 with our objections of what we have as we documented,
13 then, in Appendix B. We received no public comments
14 otherwise.

15 MEMBER WALLIS: You did a very good job of
16 detailing all of your comments. I'm just saying I
17 thought you did a very good job of detailing all of
18 your comments.

19 MS. DROUIN: Oh, thank you.

20 MEMBER APOSTOLAKIS: Mary has difficulty
21 appreciating and accepting.

22 MS. DROUIN: They are so seldom I can't
23 believe them when I get them.

24 MEMBER APOSTOLAKIS: She's stunned for
25 five seconds and says, "Okay."

NEAL R. GROSS

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

1 MR. PARRY: However, I think that our
2 comments in Appendix B would have to change if the
3 ASME standard changed.

4 MEMBER WALLIS: Possibly.

5 MR. PARRY: At least we would have to
6 revisit them.

7 MS. DROUIN: Yes. Okay. I am missing a
8 viewgraph.

9 MR. PARRY: No, you're not.

10 MS. DROUIN: They're just not in order.

11 MEMBER WALLIS: It's not significant.

12 MS. DROUIN: Okay.

13 MEMBER APOSTOLAKIS: The next one is
14 several objections to ASME standard, right?

15 MS. DROUIN: Right. We have had a lot of
16 discourse in conversation with ASME. We have come to
17 a resolution, I think, for the bulk. Unlike Sid, who
18 said in his letter two, we feel there are three areas
19 where we haven't come to resolution.

20 The first one, which he mentions in this
21 letter, is the definition of the terms "dominant,
22 important, key, and significant"; the second one, the
23 peer review to assess the validity of the key
24 assumptions and uncertainties, which I believe is the
25 one that was not in his letter. Is that his letter

NEAL R. GROSS

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

1 there?

2 MR. PARRY: Yes. Yes, that wasn't in
3 there.

4 MS. DROUIN: And then the third one, the
5 minimum list of topics required by the peer review
6 team.

7 So if we go to the first one, when you go
8 through the standard, you do have a definition
9 provided for the word "dominant." You will see that
10 up in chapter 2. It's very subjective, very
11 open-ended. My personal feeling is if you've got ten
12 different people reading it, you would see ten
13 different definitions.

14 Certainly I go back to the insights that
15 we gleaned from the IPE program and looking at the
16 PRAs, the term "dominant, significant" was used all
17 over the place by all the different people there. In
18 some cases, that may be okay, but they are used
19 interchangeably in the standard to mean the same
20 thing. And in some places, they are used
21 interchangeably to mean different things.

22 These words are used in the standard to
23 determine whether a requirement is imposed. So it is
24 also used to distinguish between your capability
25 categories. And because of that, you need a more

NEAL R. GROSS

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

1 solid, robust definition. It certainly would increase
2 the staff review time. That's in a quick nutshell
3 going very fast where our problems are in terms of
4 these definitions.

5 There has been a lot of discussion, I
6 said, on this. There is agreement between the NRC and
7 industry that there is a problem. Everybody agrees
8 there is a problem. They agree that the standard
9 contains ambiguities and inconsistencies. Where we
10 are not in agreement is how to resolve the difference.

11 We have proposed a definition. Some
12 places it's okay. In other places, it's not okay.
13 And we are in disagreement of how we should resolve
14 it. There is some feeling that it should be resolved
15 via the pilot. Some leave it to the peer review.
16 These are just two examples of some of the views of
17 how this should be reviewed.

18 CHAIRMAN BONACA: Looking at this, there
19 has been quite a bit of experienced in the reg guide
20 1.174 applications. I mean, the staff has reviewed a
21 lot of those already. Do you have a sense that the
22 pilot would help resolve this issue?

23 MS. DROUIN: I think the pilot could help
24 resolve it if you come in with a position. I think to
25 come in without a position and have the pilot dictate

NEAL R. GROSS

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

1 the position I don't think is a very effective or
2 efficient way to move forward.

3 MEMBER APOSTOLAKIS: By the way, how do
4 you do a pilot on this, for pilot applications, right?
5 What does that mean?

6 MS. DROUIN: Well, right now you would
7 come in with an actual application where you --

8 MEMBER APOSTOLAKIS: Oh, and there you
9 will go through DG to see whether --

10 MS. DROUIN: Right.

11 MR. PARRY: Yes.

12 MEMBER APOSTOLAKIS: Okay.

13 MR. PARRY: Yes. I think one of the
14 problems with any issue that relates to inconsistency
15 unless you have a number of pilots, then you are
16 really not going to resolve the issue.

17 MEMBER APOSTOLAKIS: Okay. So what do you
18 report?

19 MS. DROUIN: So the staff is proposing a
20 more robust definition. I used the word "robust" in
21 quotes because I was struggling late last night with
22 the right word to put there. It should provide
23 self-consistency and uniformity in the usage of the
24 term.

25 We think the definition should be

NEAL R. GROSS

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

1 consistent with good industry practice. For your
2 capability Category 2, you should consider the
3 definition in the context where you are going to use
4 the entire PRA to truly test.

5 We don't think the peer review is an
6 appropriate place to leave it because the peer review
7 would just look at that PRA and in the way they define
8 it, that they defined it correctly. That is broader
9 than what the standard is trying to do because it is
10 trying to cut across.

11 Again, we don't think the definition
12 should be developed as part of the pilot. It should
13 test it and refine it as necessary.

14 MEMBER LEITCH: Now, we received a
15 document that had like 17 pages of changes to address
16 this issue. Is that correct? I mean, is that what we
17 are talking about? I mean, it was a --

18 MS. DROUIN: That's our Table 5, what you
19 received. We had a public meeting back in January.
20 And we offered to go through the standard every single
21 place that term was used.

22 I mean, we had just pointed out the
23 problem initially in DG-1122, and we took exception to
24 the definition. Then at the public meeting we had in
25 January, we said, "We will go back. And we will look

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 at every place and try and point out exactly where the
2 inconsistencies are and offer a solution."

3 MEMBER LEITCH: Now, does the difference
4 of opinion relate to the facts of the matter or is it
5 really a matter of the timing? In other words, I
6 guess what I understand the staff's position to be is
7 you ought to go make these changes and industry say,
8 "Well, that is going to seriously delay the whole
9 thing. Why not just get it out the way it is for
10 pilot use, rather than subsequent delay?"

11 MEMBER APOSTOLAKIS: What's the rush? Why
12 do we need to --

13 MEMBER LEITCH: That's what I am trying to
14 understand. Is that the issue? It's not so much the
15 substance of these things, is it? It's whether it's
16 better to get it right initially or --

17 MS. DROUIN: There are two problems. One
18 problem is the inconsistency where words are used
19 interchangeably. It is my understanding that ASME has
20 agreed to fix the inconsistency problem. And in that
21 regard, I think we have resolution.

22 The other problem is now what is the
23 definition of these words.

24 MEMBER APOSTOLAKIS: So are you saying
25 "important" and "significant" should not be used

NEAL R. GROSS

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

1 interchangeably?

2 MS. DROUIN: I think that if you mean
3 something by the word "important," then use that word.
4 Don't come in one place and use the word "important,"
5 someplace use "significant," and someplace --

6 MEMBER APOSTOLAKIS: Okay. Fine.

7 MS. DROUIN: You know, that's what you
8 mean.

9 MEMBER APOSTOLAKIS: So let's define one,
10 and let's go get it.

11 MS. DROUIN: Let's define it if that's
12 what you mean now. If you mean something different by
13 the word "important," if you mean "significant," --

14 MEMBER APOSTOLAKIS: Then you should say
15 that.

16 MS. DROUIN: -- then you should say that.
17 And don't use them interchangeably, then.

18 MEMBER APOSTOLAKIS: Okay.

19 MS. DROUIN: We all agree on that, in
20 part. It is my understanding that ASME is going to
21 fix that part in the addendum.

22 MEMBER APOSTOLAKIS: Right.

23 MS. DROUIN: But now where the difference
24 is now what do you mean by those words?

25 MR. PARRY: And I think Mary will point

NEAL R. GROSS

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

1 out that one of the things that we are trying to do is
2 come up with a quantitative definition of what these
3 terms mean. The industry I think is leaning towards
4 saying we don't need a quantitative decision, we can
5 do it qualitatively, which I think opens up more
6 subjectivity, which is I think what we are concerned
7 about.

8 MEMBER APOSTOLAKIS: But you see, then if
9 that definition of Category 1 relies on the word
10 "dominant," all of them, actually, you have to find
11 the dominant --

12 MR. PARRY: No. We've changed that. I
13 mean, we are suggesting -- sorry -- that that should
14 be changed.

15 MEMBER APOSTOLAKIS: So they should delete
16 the word "dominant"?

17 MR. PARRY: That it should be replaced in
18 some way, which is what is included in Table 5.

19 MEMBER APOSTOLAKIS: Coming back to the
20 question that Dr. Leitch asked, is there an urgency to
21 publish this? Why not take a few weeks and resolve
22 the issue?

23 Why is the industry insisting that it is
24 going to be delayed? And if it is delayed, so what?
25 Has anybody now submitted a risk-informed application

NEAL R. GROSS

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

1 request that is back because of lack of guidance?

2 Maybe we should ask them when they come.

3 MS. DROUIN: I don't want to speak for
4 ASME, but I think what their concern is or their view,
5 we want to publish this as a regulatory guide for
6 trial for use.

7 Now, what our position is going to be can
8 only be on what is formally out there. I think from
9 ASME's perspective, they would like to see as few
10 objections in our guide as possible.

11 MEMBER APOSTOLAKIS: So it's not the
12 timing of the release. It's just that they don't like
13 objections.

14 MR. PARRY: But that is related to timing
15 of release since we want to get this out before when,
16 the end of the year.

17 MEMBER APOSTOLAKIS: Why?

18 MS. DROUIN: Our schedule is we are trying
19 to get this out for trial for use early this summer.

20 MEMBER APOSTOLAKIS: Yes, but why? I am
21 asking why. What is the urgency. I mean, why don't
22 we take a few more weeks to do it right?

23 MS. DROUIN: I think if you are talking
24 about a few more weeks, that is within that schedule.

25 MEMBER APOSTOLAKIS: Now, as you said,

NEAL R. GROSS

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

1 from day one of PRA technology, people have been using
2 the words "dominant" and "significant." And now 25-30
3 years later, we're saying there is going to be a major
4 delay because we all have to agree what they mean.

5 MR. PARRY: I think part of that, we have
6 been using the words "dominant" and "significant." We
7 have been using them very sloppily.

8 MS. DROUIN: Yes.

9 MR. PARRY: We know that.

10 MEMBER APOSTOLAKIS: Come on. Maybe it
11 was not the 95 percent, but, you know --

12 MR. PARRY: I think we individually knew
13 what we meant by the terms, but --

14 MEMBER APOSTOLAKIS: And as a community,
15 too.

16 MS. DROUIN: George, I --

17 MEMBER APOSTOLAKIS: Let's not do the
18 definitions because this has no relevance.

19 CHAIRMAN BONACA: I can see the need of
20 the NRC is somewhat different from the ones because,
21 I mean, they are reviewing, assuming the spectrum of
22 applications. And then they have to cope with these
23 differences in definition and reconcile somewhat and
24 be like an arbiter of --

25 MS. DROUIN: Needs more review.

NEAL R. GROSS

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

1 CHAIRMAN BONACA: I can see how it creates
2 some different challenge for you than for individual
3 applicants.

4 MS. DROUIN: If one of our goals is to
5 make the staff review more effective and efficient,
6 that is what these all come down to.

7 MEMBER APOSTOLAKIS: That is right.

8 MS. DROUIN: Are we trying to minimize the
9 list of REIs? Are we trying to make this --

10 MEMBER APOSTOLAKIS: I will tell you why
11 I --

12 MS. DROUIN: These are issues that would
13 help go a long way in doing that.

14 MEMBER APOSTOLAKIS: I guess the reason
15 why I am a little disturbed by this apparent urgency
16 is that it happens all of the time, not just here. If
17 you do this, it will delay the least. And we all say,
18 "My God. It will?" Why? Let it delay. If we have
19 to do it, we have to do it.

20 MEMBER WALLIS: My experience with thermal
21 hydraulic guides is it takes forever to get them out.
22 You have to struggle to not delay them.

23 MEMBER APOSTOLAKIS: Shall we see the
24 definitions at some point?

25 MS. DROUIN: I'm getting ready to go to it

NEAL R. GROSS

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

1 in the next slide.

2 I just wanted to point out when we went
3 through very systematically and looked at every place
4 the terms "significant," "important," "dominant,"
5 "key" were used. There were some interesting
6 observations that we came across.

7 First of all, the biggest one is probably
8 on the second bullet. The meaning of the term is
9 dependent on the object. What we meant by that -- and
10 this is why we felt you could get rid of the word
11 "dominant" is because it really wasn't so much a
12 difference between dominant and significant.

13 It was whether you were applying it to a
14 sequence versus to an initiating event versus to a
15 basic event because when you stand back and think
16 about it and think and if you try to define the word
17 "dominant," for example, a dominant basic event is
18 going to have a different definition than a dominant
19 sequence.

20 MEMBER WALLIS: There may not be any
21 dominant sequence. And there may not be any important
22 sequence. But everything may be significant, it seems
23 to me.

24 MS. DROUIN: Right.

25 MR. PARRY: And you are using the word

NEAL R. GROSS

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

1 "dominant" in the way that the dictionary defines it.
2 I think PRA people have tended to use it not quite
3 enough.

4 MS. DROUIN: And the other thing that we
5 came across was the use of the word "sequence" was
6 coming across the same problem, inconsistent and
7 unclear. In some cases, they truly meant a sequence
8 class versus a functional sequence. That is
9 something, then, when you were talking about the
10 definition of significant and dominant. Anyway --

11 MEMBER APOSTOLAKIS: We had that problem
12 this morning as the committee members.

13 MS. DROUIN: So our position that we have
14 taken in DG-1122, first of all, it is strictly in the
15 context of the requirement as it is used in the
16 standard.

17 MEMBER APOSTOLAKIS: But you have a
18 different definition in this document.

19 MS. DROUIN: What we have here is what we
20 proposed. Okay. I apologize.

21 MEMBER APOSTOLAKIS: Significant sequence.
22 Those sequences comprise 95 percent of the core damage
23 frequency. Is that what you mean there?

24 MS. DROUIN: The definition that is
25 currently in DG-22, we have revised that. This is our

NEAL R. GROSS

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

1 current staff position.

2 MR. PARRY: You are looking at Table 5,
3 aren't you?

4 MEMBER APOSTOLAKIS: It is from Table 5.
5 It is actually --

6 MS. DROUIN: You are looking at Table 5.

7 MEMBER APOSTOLAKIS: A memo from Mr. Singh
8 dated February 25th to Allen Ruben through Mary
9 Drouin.

10 MS. DROUIN: Yes. Did I not type
11 something right?

12 MR. PARRY: Yes, that's right.

13 MEMBER APOSTOLAKIS: Well, explain what
14 this "95 percent provide confidence in CDF," I don't
15 understand. What is the definition?

16 MS. DROUIN: I was trying to get to Table
17 5.

18 MEMBER APOSTOLAKIS: Okay.

19 MS. DROUIN: I was paraphrasing for the
20 slide. The actual definition is what you have on
21 Table 5.

22 MEMBER APOSTOLAKIS: Well, it is actually
23 distracted, I guess. It says, "New definitions."

24 MS. DROUIN: Why can't I find Table 5?

25 MEMBER APOSTOLAKIS: It is no longer

NEAL R. GROSS

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

1 operative.

2 MS. DROUIN: Here it is. Sorry. Here it
3 is.

4 MEMBER APOSTOLAKIS: It is no longer
5 operative. Okay.

6 MS. DROUIN: Again, it's done in the
7 context of whether you mean sequence, basic event,
8 initiating event.

9 MEMBER APOSTOLAKIS: No. What is
10 sequence? Let's look at --

11 MS. DROUIN: Significant sequence is one
12 of the set of sequences defined at the function or
13 systemic level that when ranked comprised 95 percent
14 of the core damage frequency or that individually
15 contribute more than one percent to the CDF.

16 MEMBER APOSTOLAKIS: That's what it says.
17 "Those sequences when ranked comprised 95 percent of
18 the core damage frequency or that individually," more
19 or less the same. Now, when ranked, you mean and then
20 the frequencies --

21 MS. DROUIN: Yes.

22 MEMBER APOSTOLAKIS: I am having
23 difficulty with an individual contributing more than
24 one percent because I can see that they are
25 cumulative, which makes sense, but because the notion

NEAL R. GROSS

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

1 of a sequence is ill-defined, I do not -- why do you
2 need that, the one percent? I mean, if you say those
3 when ranked comprise 95 percent, I am happy with that.

4 MS. DROUIN: Well, the problem with just
5 doing the 95th percent --

6 MEMBER APOSTOLAKIS: Or 99, whatever.

7 MS. DROUIN: Or 99, whatever, whether it
8 is 90 percent, any of those --

9 MEMBER APOSTOLAKIS: Right.

10 MS. DROUIN: And these situations do exist
11 where you have a risk profile where you might have
12 something that is 9 percent, 11 percent, 10 percent.

13 MEMBER APOSTOLAKIS: And?

14 MS. DROUIN: Do you cut something up? Say
15 that you are using a --

16 MEMBER APOSTOLAKIS: If all of them are
17 ten percent, then I can use the ten sequences, right?

18 MS. DROUIN: So which one do you throw
19 away?

20 MEMBER APOSTOLAKIS: None.

21 MS. DROUIN: But you only have to capture
22 90 percent. But let me tell you, you put that
23 definition out. And one of those sequences that is a
24 ten percent will get thrown out.

25 MEMBER APOSTOLAKIS: No.

NEAL R. GROSS

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

1 MS. DROUIN: Oh, yes.

2 MEMBER APOSTOLAKIS: It is ten percent of
3 the total.

4 MR. PARRY: It won't get thrown out. It
5 might be treated in the definition.

6 MEMBER APOSTOLAKIS: How can it be thrown
7 out if I include it in my dominant sequences 95
8 percent?

9 MEMBER KRESS: Especially if you ranked
10 them.

11 MS. DROUIN: I'm saying if --

12 MEMBER APOSTOLAKIS: Yes. That's what I
13 say. You rank them, and you are.

14 MS. DROUIN: At 95 percent.

15 MEMBER APOSTOLAKIS: Right. So ten
16 percent is more than five percent.

17 MS. DROUIN: I was using the case where
18 you use 90 percent. You can come up with something
19 equal.

20 MEMBER APOSTOLAKIS: Then we are arguing
21 you should not use 90 percent. That's what you're
22 saying. See, the problem is that -- and, again, we
23 have had this this morning. I can have a sequence and
24 break it up into ten sequences.

25 So I applied the one percent to what, to

NEAL R. GROSS

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

1 the aggregate, to one?

2 MR. PARRY: No, but that's why it says in
3 this one it's the functional or systemic level.
4 That's actually put in there because --

5 MEMBER APOSTOLAKIS: That puts a limit to
6 it. I agree.

7 MR. PARRY: That puts a limit to the level
8 of decomposition.

9 MEMBER APOSTOLAKIS: The question then is,
10 do you really care about that if you have a 95
11 percent? Do you mean that there is another sequence
12 that is 5 percent and you are really ignoring it
13 because it is outside the night depository?

14 MR. PARRY: 4.9 percent maybe.

15 MEMBER WALLIS: After they had been
16 ranked.

17 MR. PARRY: You say you ranked them.

18 MEMBER WALLIS: You ranked them first.

19 MEMBER APOSTOLAKIS: I think these things
20 are much more meaningful if you do them on a
21 cumulative basis because the other one I don't know.
22 I mean, maybe you can put a qualitative statement and
23 look at the rest and if something happens, do
24 something.

25 MR. PARRY: Let's take a hypothetical

NEAL R. GROSS

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

1 example. You could have 100 sequences. That is not
2 unusual. I mean, that wouldn't be an unusual
3 circumstance for a Category 1 PRA.

4 MEMBER APOSTOLAKIS: And all of them are
5 one percent?

6 MR. PARRY: All of them are one percent.

7 MEMBER WALLIS: Nothing is dominant or
8 important, but they are all significant.

9 MEMBER APOSTOLAKIS: Why should they --

10 MS. DROUIN: Let me rephrase that. You
11 shouldn't.

12 MEMBER APOSTOLAKIS: You shouldn't.

13 MS. DROUIN: You shouldn't. But I'm
14 telling you I have seen people do it because you have
15 only had to do it to the 95.

16 MR. PARRY: Ninety-four of them might be
17 1.0. The others might be .099 percent. It would
18 drop.

19 MEMBER APOSTOLAKIS: Well, if you can find
20 the way around this one percent. I mean, I see what
21 you are saying. Maybe some qualitative statement that
22 you should look at. Usually we call them pathological
23 situations, where you have everything having one
24 percent or something, then you do something else. But
25 most of the time this works.

NEAL R. GROSS

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

1 MS. DROUIN: I do agree that I think you
2 could address that one percent with some explanation.
3 And you wouldn't have to put the hard one percent in
4 there.

5 MEMBER APOSTOLAKIS: Exactly.

6 MS. DROUIN: I agree with that.

7 MEMBER APOSTOLAKIS: That would make me
8 much happier because essentially I think you are
9 right. I mean, this is a good definition. It's just
10 that we don't want to get -- again, these are
11 pathological situations where in 100 sequences, each
12 one has one percent.

13 MEMBER WALLIS: George, isn't this much
14 better than what we had before?

15 MEMBER APOSTOLAKIS: Oh, no, no. That
16 argument drives me crazy. This would be good enough,
17 too, --

18 MS. DROUIN: Again, you have to go --

19 MEMBER APOSTOLAKIS: -- especially coming
20 from you, Professor Wallis. It has to be good enough.

21 MEMBER WALLIS: Yes, good enough, much
22 better than we had before. That's also very important
23 criteria.

24 MEMBER APOSTOLAKIS: Oh, yes, yes.

25 CHAIRMAN BONACA: I think it is wonderful,

NEAL R. GROSS

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

1 the idea of subdividing until nothing is significant.
2 That seems the ultimate bureaucratic goal.

3 MS. DROUIN: Okay. Move on.

4 MEMBER APOSTOLAKIS: Wait.

5 MS. DROUIN: I am trying to be efficient
6 and effective here, George.

7 MEMBER APOSTOLAKIS: No, but you have more
8 stuff there.

9 MS. DROUIN: Sorry.

10 MEMBER APOSTOLAKIS: We talk about the
11 components now, the events.

12 MS. DROUIN: Yes, sorry, sorry.

13 MEMBER APOSTOLAKIS: Now, we make a big
14 deal out of consistency here, but, as we have all
15 agreed in the past, the role in fossil vessel criteria
16 are not necessarily consistent with risk criteria. I
17 think Dr. Parry has written that in one of his early
18 papers, when he was young and more aggressive.

19 MS. DROUIN: I think this is a very good
20 example of why we felt you did not have to use the
21 word "dominant" in the standard. Again, you have to
22 go back to the actual context and where these words
23 are used. So saying a dominant sequence, say, for
24 example, the word "dominant" then takes on this
25 definition of 95 percent. Now, if you apply the word

NEAL R. GROSS

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

1 "dominant" to a basic event, you never would want to
2 live with that definition.

3 MEMBER APOSTOLAKIS: First of all, the
4 numbers 2 and 005 I guess now have become law because
5 they have been used so long, right?

6 MR. PARRY: It's folk law.

7 MEMBER APOSTOLAKIS: Now, in the text, you
8 saw you are also allowing burn bond? I don't see any
9 criteria for burn bond.

10 MS. DROUIN: Where did we say that in the
11 text?

12 MEMBER APOSTOLAKIS: Yes, you do. Yes,
13 you do.

14 MR. PARRY: It's probably in section 2,
15 right?

16 MEMBER WALLIS: I don't want to get into
17 too many details, George. We'll never get there.

18 CHAIRMAN BONACA: Twenty minutes left for
19 this presentation.

20 MEMBER APOSTOLAKIS: Number 7, page --

21 MR. PARRY: Forget that. This is in the
22 context of Appendix A.

23 MEMBER APOSTOLAKIS: All right.

24 CHAIRMAN BONACA: There are about 20
25 minutes left for this presentation. Make sure 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 MEMBER APOSTOLAKIS: So what do we do?

2 CHAIRMAN BONACA: They have a coordinated
3 presentation here with many slides. I would like to
4 hear the other points that they have to make. I am
5 just saying that we need to stay, just make sure that
6 they tell us about the issues that they are
7 presenting.

8 MEMBER APOSTOLAKIS: So we shouldn't
9 question?

10 CHAIRMAN BONACA: I don't think we should
11 disrupt the presentation. That's all, George.

12 MEMBER WALLIS: Mary, can you move on?

13 MS. DROUIN: Are we ready to go to the
14 next one?

15 MEMBER APOSTOLAKIS: Yes.

16 MS. DROUIN: The next one is -- and we
17 think this one is very critical -- the peer review
18 team to assess the key assumptions and uncertainties.
19 The standard does not require the peer review team to
20 assess the key assumptions and uncertainties. They do
21 not pass a value judgment on whether those assumptions
22 are appropriate or not, and that's the key point.

23 MEMBER POWERS: Let me ask you a question,
24 Mary. I've looked ahead at your viewgraphs, and I
25 know you are going to say more on this. But I just

NEAL R. GROSS

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

1 wondered in the course of your career, when asked to
2 peer review something, have you ever not been asked to
3 address the key assumptions and uncertainties?

4 MR. PARRY: I'm not sure that you were
5 ever asked to do it. You just do it naturally.

6 MS. DROUIN: You just do it.

7 MEMBER POWERS: Gee, it seems for every
8 journal I review, it's line number 1.

9 MR. PARRY: Review the assumptions.

10 MEMBER WALLIS: That may be for journals,
11 but for things like thermal hydraulic codes, it seems
12 that very often, this is the part that is passed over.

13 MEMBER KRESS: The industry apparently
14 doesn't want to do it, according to your next slide.

15 MR. PARRY: Part of this, though, part of
16 their action may be, too, that we have been discussing
17 what we mean by key uncertainties and key assumptions.
18 I think there was a fair that by just saying, "Review
19 the assumptions," you could be reviewing a tremendous
20 number of things that probably are not important.

21 I think Table 5, which I will go back to
22 briefly, we have had a public meeting on that March
23 11th. And we got some very helpful comments,
24 primarily from Doug True, where some of the
25 suggestions we made were perhaps too far-reaching.

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 had ramifications that we hadn't thought of.

2 We are still in the process of looking at
3 that, but I think that may be one of the -- I can't
4 speak for sure, but I think that may be one of the
5 reactions to this that there is a fear that we might
6 be asking too much.

7 MEMBER APOSTOLAKIS: Are the peer
8 reviewers usually industry people?

9 MR. PARRY: Usually, yes.

10 MS. DROUIN: Usually.

11 MEMBER APOSTOLAKIS: Do they ever question
12 NEI documents?

13 MS. DROUIN: Do they ever question the --

14 MEMBER APOSTOLAKIS: Yes.

15 MS. DROUIN: I would hope so, but you're
16 not asking the right person.

17 MEMBER WALLIS: It seems to me very good
18 to include this. Even though, Dr. Powers, that any
19 component review team is going to do it, there is no
20 harm in stating the obvious because it is an important
21 aspect of the review.

22 MS. DROUIN: We have clarified with ASME
23 that we are not asking them to pass judgment on every
24 single assumption. So we have had that. And the
25 feedback that we have still gotten is that they

NEAL R. GROSS

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

1 disagree with this. Our feeling is that there are
2 certain key assumptions that a value judgment does
3 need to be looked at.

4 MEMBER APOSTOLAKIS: So if everyone uses,
5 say, the EPRI human reliability model and everyone is
6 an industry reviewer, nobody will say, "Gee, is there
7 another model that would give different results?"
8 That is what you are trying to avoid here?

9 I mean, they will all accept this because
10 this is an industry-sponsored model without
11 questioning it; whereas, if Gareth is on the panel or
12 Mary, they might raise some questions. What is the
13 issue here?

14 Key assumptions. I mean, here is an area
15 where major assumptions are made in order to get some
16 results, right?

17 MR. PARRY: Yes. And I think where we had
18 an agreed-upon industry position on some particular
19 modeling aspect, we wouldn't need to address this
20 issue, like, for example, if we get agreement on CLOCA
21 models, for example, if everybody uses the agreed-upon
22 CLOCA model, that no longer becomes --

23 MEMBER APOSTOLAKIS: Is there a --

24 MR. PARRY: I don't know. But yes, what
25 we are trying to avoid is that it's just accepted

NEAL R. GROSS

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

1 because we need -- fortunately, we are in a position
2 where I think there are differences in most of the key
3 models.

4 MEMBER APOSTOLAKIS: But I do agree with
5 my colleagues here. I mean, this is done, really, by
6 reviewers, maybe not in a systematic way, but it is
7 done. If somebody sees something that she thinks is
8 not proper, she will raise the issue.

9 MEMBER ROSEN: I don't think there is any
10 harm in stating the obvious.

11 MEMBER APOSTOLAKIS: No, there is no harm
12 in stating it.

13 MEMBER WALLIS: So let's move on.

14 MS. DROUIN: Okay. The third one is the
15 minimum list of topics required by the peer review
16 team. There is no minimum requirement in the standard
17 for the peer review team.

18 If you look at the second bullet, the
19 standard states specific suggestions for the peer
20 review team to consider. These suggestions are not
21 intended to be a minimum or comprehensive list of
22 requirements.

23 We disagree. We think that there ought to
24 be a minimum list of topics. We are not asking for
25 ASME to be prescriptive. We agree you shouldn't 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 prescriptive but to provide a minimum list of topics
2 that you know so that at least when you go from each
3 PRA, that those have been covered and addressed, the
4 level of detail they go into, the scope they can go
5 into each one. We agree that should be left up to the
6 peer review team, but there ought to be at least a
7 minimum list of topics for each of the elements that
8 ought to be in the standard.

9 So I have kind of summarized our three
10 slides in those two sentences. That is our position.

11 MEMBER WALLIS: I think that will be
12 useful thinking. I don't know anything about the PRA,
13 but in, say, thermal hydraulic codes, if you require
14 that they evaluate the basic equations and the
15 assumptions, then it becomes true at the end that at
16 a later review, you find some defects there. You can
17 go back and say, "How did this ever happen since the
18 peer review team was required to meet this minimum
19 requirement of reviewing that aspect?" It would be
20 useful.

21 MEMBER APOSTOLAKIS: Okay. Now, since
22 ASME is not here, maybe we can spend a couple of
23 minutes discussing the objections. At this point, the
24 level of detail, Mr. Bernsen says, "A significant
25 number of committee members disagreed with this

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 change, believing that it goes beyond the
2 intent of the peer review. That is, it is more like
3 a checklist audit and is too prescriptive an
4 instruction to be mandated for use by a competent team
5 of reviewers, that it would be counterproductive. By
6 forcing the peer review team to exam, recommend items
7 that they know through experience are reasonable."

8 Are you asking them to do that? If they
9 know from experience that they are reasonable and they
10 look at it, then they are passing judgment. They are
11 passing judgment. So this is not extra burden.

12 But the first point that this becomes a
13 checklist audit, I don't know what you guys have to
14 say.

15 MS. DROUIN: I would disagree with that
16 comment.

17 MR. PARRY: Actually, I think that's why
18 we do want peer reviewers to make value judgments and
19 assess the assumptions and approximations because if
20 not, it could become a checklist.

21 MEMBER APOSTOLAKIS: Regarding the
22 definition of significance, are the majority of the
23 members opposed because of the technical complexity of
24 implementation in the scope of documentation needed to
25 demonstrate compliance. Compliance with what? With

NEAL R. GROSS

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

1 a dominant?

2 And others are disagreeing because of the
3 degree of precision that is implied in setting
4 boundaries for determining whether to use realistic or
5 conservative values or where to switch from precise
6 modeling to approximations.

7 MEMBER POWERS: I don't understand it.

8 MEMBER APOSTOLAKIS: I don't understand
9 what that means. Okay. Are you don't?

10 CHAIRMAN BONACA: On that other issue,
11 going back a moment on this issue here of prescribing
12 a number of topics, how would they expect that this
13 staff could be satisfied of a peer review if the staff
14 doesn't even know that the certain basic number of
15 topics had been covered? Right? I mean, on a peer
16 review, it's a standard judgment.

17 MEMBER POWERS: Has the staff received the
18 peer review? Do they have access to it?

19 MR. PARRY: Oh, sure.

20 MS. DROUIN: My understanding is they have
21 access I thought to the F&O's.

22 MR. PARRY: Well, I'm not really sure, but
23 I think that typically what has been submitted, if
24 anything, it would be yes, probably the summary.
25 That's an observation, rather than the complete

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 report. Whether we would have access, I am sure under
2 an RAI, we would have access to it.

3 MEMBER ROSEN: A resident inspector can go
4 look at it any time he wants.

5 MR. PARRY: Presumably, yes.

6 MEMBER ROSEN: Nothing is secret.

7 MEMBER APOSTOLAKIS: Are there any other
8 questions for the staff?

9 MEMBER WALLIS: We seem to be supporting
10 the staff on this one, too, generally speaking.

11 MS. DROUIN: And then just our last one,
12 you know, we are asking for your concurrence -- we
13 don't like the word "approval" -- for us to publish
14 this regulatory guide for trial for use. I apologize
15 I didn't put the words "for trial for use" there.

16 MEMBER APOSTOLAKIS: Why do you always go
17 to the CRGR last?

18 MS. DROUIN: I don't think that we go to
19 them last. It's just when we can get on people's
20 calendars.

21 MEMBER APOSTOLAKIS: You do.

22 MS. DROUIN: It wasn't intent that we went
23 to them last.

24 MEMBER APOSTOLAKIS: Not just you, the
25 staff in general goes to the CRGR last.

NEAL R. GROSS

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

1 MS. DROUIN: Well, I can't --

2 MEMBER APOSTOLAKIS: And sometimes there
3 are changes to the document we approve here.

4 MS. DROUIN: I can just comment. This was
5 the date available for us to come and when the CRGR is
6 available for us to speak to them. It just ended up
7 in this order for this particular program.

8 MEMBER APOSTOLAKIS: So what happens now
9 to the detail? Maybe we can discuss this afternoon
10 what we want to do.

11 MEMBER ROSEN: I would like two sentences
12 about what a pilot would be. What are you really
13 talking about, a pilot?

14 MS. DROUIN: What are we talking about?
15 South Texas, for example, has volunteered to be a
16 pilot. Their application is a tech spec. There are
17 going to be issues of PRA quality. How those issues
18 are addressed will be through this DG-1122, the use of
19 how South Texas is using that, how we are using the
20 SRP to deal with that issue.

21 MEMBER APOSTOLAKIS: Has any other utility
22 with a PRA or less quality than the South Texas
23 volunteered to be a pilot?

24 MS. DROUIN: No one has yet. Someone else
25 has volunteered? Formally? I was going to say there

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 has been a lot of discussion, and I am aware of
2 people. But I would hate to volunteer --

3 MEMBER APOSTOLAKIS: The problem is you
4 don't learn much from binding these things to a very
5 good PRA.

6 MS. DROUIN: South Texas is the only
7 utility that has formally let us know. We have had a
8 lot of discussion with other utilities, who have
9 indicated very serious interest.

10 MEMBER APOSTOLAKIS: Okay. Because I
11 don't think you are going to learn much from South
12 Texas PRA. I think they are --

13 MS. DROUIN: I don't disagree.

14 MR. SNODDERLY: Excuse me, George. My
15 understanding is that NEI will address this as part of
16 their presentation.

17 MEMBER APOSTOLAKIS: Fine, if we ever get
18 to it.

19 MS. DROUIN: Okay.

20 MEMBER APOSTOLAKIS: Are you done?

21 MS. DROUIN: I am done. The only thing I
22 would add, I am not going to go through them, but
23 there were some other -- I thought maybe of interest
24 if we had time and there really were backup slides
25 that are some other types of general comments that we

NEAL R. GROSS

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

1 received.

2 MEMBER ROSEN: But we can read them.

3 MS. DROUIN: They are there for your
4 information.

5 MEMBER APOSTOLAKIS: And enjoyment.

6 MEMBER POWERS: Since most of your
7 comments I am going to have to read anyway, we will
8 read those as well.

9 MS. DROUIN: Thank you.

10 MEMBER APOSTOLAKIS: Okay. Thank you very
11 much, Mary and Gareth.

12 MS. DROUIN: Thank you.

13 MEMBER APOSTOLAKIS: Biff Bradley from NEI
14 is walking towards the microphone. Do we have a copy
15 of your slides?

16 MR. BRADLEY: Yes.

17 MEMBER APOSTOLAKIS: All right.

18 MR. BRADLEY: I am Biff Bradley of NEI and
19 appreciate the opportunity to provide the industry
20 perspective on the DG-1122. It has been a long effort
21 to get to this point and a lot of hard work on all
22 sides by NRC staff as well as industry and the ASME
23 and CNRM.

24 Before I get into our specific comments on
25 the reg guide, I wanted to provide a little bit of

NEAL R. GROSS

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

1 context to some of the discussion that has taken place
2 already. I think a lot of what, at least in our
3 discussions with the staff in the context of the
4 standard, a lot of what drives their perceptions tends
5 to be results of the IPE reviews, which actually took
6 place about 14 years ago. There have been substantial
7 improvements to all PRAs since that era.

8 Back a couple of years ago, we took the
9 initiative as an industry to try to provide updated
10 information to try to capture the improvements to the
11 models, the new risk metrics, the new
12 dominant/significant sequences, what have you.
13 Unfortunately, due to world events, we were unable to
14 go forward with that initiative.

15 It's unfortunate that we don't have the
16 benefit of the staff's better understanding of the
17 current state of the models in the discussions we have
18 had in developing the standard and the need for, the
19 perceived need for prescription in some of the areas
20 we have talked about.

21 Also, in the area of peer review, at this
22 point we have completed 101, actually, peer reviews.
23 There are only two left. That is Susquehanna and San
24 Onofre, both of which will be complete. San Onofre is
25 scheduled for June and Susquehanna for this fall.

NEAL R. GROSS

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

1 That will be the final, the initial round, at least,
2 of peer reviews for the industry.

3 A final thing, I just wanted to mention
4 that the standard -- there are other checks and
5 balances on PRA capability outside of the standard.
6 As you know, NRC has developed their own models, the
7 SPAR models. The plants involved in the MSPI program,
8 the risk-based performance indicators have spent a lot
9 of time and effort with the staff addressing the SPAR
10 models. And we are seeing convergence of the SPAR
11 models with the plant models to the point that those
12 plants in that project have seen the CDFs pretty good
13 convergence, the point here being that there are other
14 methods NRC has to check and balance on PRA adequacy
15 beyond just the standard.

16 Let me get back to the standard now. This
17 has been a long effort, five years of effort on the
18 part of the ASME to write the standard. It has been
19 a good team of industry and NRC as well as other
20 experts involved.

21 We did issue a final standard in February
22 of last year. There was tremendous consideration of
23 all of the points that have been discussed today: the
24 need for qualitative versus quantitative definitions
25 of key terms, the extent to which the peer review

NEAL R. GROSS

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

1 process could be relied on to make informed judgments
2 with regard to issues of this nature. And the
3 standard came out the way it did following five years
4 of deliberation of those topics.

5 I do believe that NRC's current position
6 that a quantitative definition of significant needs to
7 be applied is a significant and fundamental change to
8 the standard as proposed or actually finalized by
9 ASME. I would like to spend a little bit of time
10 talking about why in developing the standard, we chose
11 not to put a quantitative terminology for that term
12 in.

13 Another concern I think primarily in the
14 area of documentation, the standard requires
15 documentation of how you meet those requirements as
16 they pertain to these specific sequences of interest.

17 I think it is safe to say that no existing
18 PRA in the industry would meet the standard with
19 regard to documenting how all the requirements that
20 pertain were met for 95 percent for those sequences
21 comprising 95 percent of the CDF.

22 And I am not complaining. I am just
23 noting here that there would have to be a fairly
24 substantial effort on the part of all plants to
25 provide that documentation.

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 MEMBER APOSTOLAKIS: So when the staff
2 proposes to define dominant sequences using some
3 percentage, say, then there is a requirement that you
4 do certain things to those.

5 MR. BRADLEY: Correct.

6 MEMBER APOSTOLAKIS: And that is where
7 your objection is, that that is an unnecessary burden
8 that we will have to go back and look at the sequence.
9 We may have missed two, for example.

10 MR. BRADLEY: It is more than just a
11 burden issue. I think that under-characterizes. I
12 think there are issues with how the models are done.
13 I would like to get into that a little bit. We can
14 come back to that.

15 The general issues we have are the
16 capability of an expert peer review team to make an
17 informed judgment relative to what is significant or
18 dominant with regard to a plant model, as opposed to
19 the need to explicitly define that in the standard.
20 There is also a concern that when we wrote the
21 standard, dominant and significant were intended to
22 really have two different meanings.

23 The word "dominant" was used less
24 extensively. The word "significant" was used
25 throughout the standard in many connotations, some 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 which could be implied to be quantitative. Others we
2 were just using the word "significant" like you tend
3 to use the word "significant" in day-to-day
4 conversation.

5 The real issue we have is with the
6 proposed quantitative definition of the term
7 "significant." And the reason we didn't put it in the
8 standard to start with was because there are
9 variabilities in a number of areas that impact the
10 capability to do that. We believe the right way to do
11 that is to have the expert peer review team make that
12 judgment of what is dominant or significant or a
13 certain requirement.

14 Some of the things that vary, BWRs versus
15 PWRs. BWRs tend to have lower CDFs and with a wider
16 distribution of risk because of the numerous ways you
17 can get water in a core in a BWR.

18 The modeling approach I will talk about in
19 a minute. We basically have four platforms we are
20 using in the industry for modeling. This definition
21 doesn't necessarily fit all of those platforms. It
22 fits some of them.

23 Plants that have dominant contributors
24 that chew up a whole bunch of their CDF and a handful
25 of contributors are much more capable of using 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 definition like that than a plant that has the risk
2 profile spread out and doesn't really have single
3 contributors chewing up most of their CDF or LERF.

4 The final concern we have is in going
5 through this exercise and imposing to pose a
6 quantitative definition for certain terms and actually
7 eliminating the word "significant" where it was used
8 qualitatively in many cases, this is going to be a reg
9 guide. This is going to be imposed into regulatory
10 space used by resident inspectors, the regions, et
11 cetera.

12 And our experience has been that having
13 these types of rigid definitions without some type of
14 qualifier can be a problem, a practical problem,
15 relative to implementation.

16 MEMBER WALLIS: What's the basis of the
17 decision? If the word "dominant" implies that you
18 treat something differently on the basis of making
19 decisions, someone has to decide.

20 MR. BRADLEY: Correct.

21 MEMBER WALLIS: If you had a common
22 definition that everyone agreed on, it would help the
23 decisionmaking.

24 MR. BRADLEY: Yes. And I think we can get
25 to that here to talk about.

NEAL R. GROSS

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

1 MEMBER WALLIS: If it's all up to the
2 guesswork of some peer review team, then I don't see
3 how you get that consistency.

4 MR. BRADLEY: Well, I think I wouldn't
5 characterize it as "guesswork." These are expert peer
6 reviewers.

7 MEMBER WALLIS: Judgment. Let's call it
8 judgment.

9 MR. BRADLEY: Right. And let me talk
10 about why we felt it was necessary to leave that up to
11 the peer review team. I don't really want to talk
12 about the one percent. Let's talk about the 95
13 percent.

14 As I mentioned, we have four different
15 platforms we are using in the industry for PRAs, PRAs
16 base on functional sequences. And both of those types
17 tend to have a fairly small number of sequences, which
18 this definition would probably work for those plants
19 in all cases.

20 When you get into other types of models,
21 such as the linked event tree, which is the
22 risk-manned model, or the single fault tree, which is
23 a type of model used by plants with safety monitors,
24 which is capable of being solved more rapidly than the
25 other types of plants' models, the top two here,

NEAL R. GROSS

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

1 neither of those last two really define sequences per
2 se.

3 The way you would have to interpret this
4 standard, those plants would have for the risk-manned
5 10 to 20 thousand sequences that have fallen to the
6 definition of the standard. And for the single fault
7 tree, you could actually have over a million sequences
8 that would fall under that definition.

9 MEMBER APOSTOLAKIS: Because these are
10 minimal --

11 MR. BRADLEY: Correct.

12 MEMBER APOSTOLAKIS: You go down to
13 detail.

14 MR. BRADLEY: Right, and I would like to
15 say that maybe given enough time and effort, we could
16 go back into the standard and really address how to do
17 this specifically for the individual requirements, for
18 each of these types of platforms.

19 MEMBER APOSTOLAKIS: Would the compromise
20 be to use the 95th percentile definition and limit it
21 to functional and systemic sequences?

22 MS. DROUIN: That is our definition, our
23 proposed definition.

24 MR. BRADLEY: But the problem is --

25 MEMBER APOSTOLAKIS: Because in PRAs,

NEAL R. GROSS

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

1 really, without any definitions, when people say
2 "dominant sequences," they really mean the top two.
3 Nobody in his right mind will go to the minimal.

4 MS. DROVIN: It's there on his slide, our
5 definition, "function or systemic."

6 MEMBER APOSTOLAKIS: Is that what it says?

7 MR. BRADLEY: Right. But the problem is
8 that the plants that don't have functional or systemic
9 sequences --

10 MEMBER APOSTOLAKIS: What do they do?

11 MR. BRADLEY: -- in order to comply with
12 the standard would have to somehow generate those from
13 what they have, which tends to be down here.

14 MEMBER APOSTOLAKIS: But Biff, aren't we
15 missing some useful insights from the PRAs for those
16 plants if we don't know what the dominant or
17 functional sequences are?

18 MR. BRADLEY: I'm not suggesting that that
19 may be --

20 MEMBER APOSTOLAKIS: Maybe they should do
21 it, in other words.

22 MR. BRADLEY: Yes. I'm just saying that
23 right now the way the standard is set up, there is a
24 hole there. To go forward and issue it now into a
25 regulatory environment with this 95 percent leaves a

NEAL R. GROSS

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

1 large number of plants hanging out in terms of how
2 they would do that.

3 And there are no definitions in the
4 standard currently as to how you would go about
5 grouping these other groups of cut sets into these
6 types of definitions. That's missing from the
7 standard right now because --

8 MR. PARRY: Can I make a comment here that
9 the single fault tree approach is going to have many
10 more difficulties with the standard than this one
11 because they don't have accident sequences. There is
12 a whole number of things that they are going to have
13 trouble with.

14 Now, there were accident sequences that
15 were developed to develop the single fault tree model.
16 But if they are not maintained, they are going to have
17 other difficulties in the standard --

18 MEMBER APOSTOLAKIS: That's what I meant.
19 And part of it is that you are really missing out on
20 the value of PRA if you don't end up with some
21 high-level sequences and you say, "These dominate."

22 MEMBER ROSEN: Now I know why South Texas
23 volunteered, I think, because they have a very nice
24 set of accident sequence analyses that are high-level.

25 MEMBER APOSTOLAKIS: You are contributing

NEAL R. GROSS

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

1 to their ulterior motives.

2 MEMBER ROSEN: I didn't even know they
3 volunteered.

4 MEMBER APOSTOLAKIS: They volunteered
5 because they are noble people.

6 MEMBER ROSEN: They did it because they
7 had high-level functional systemic sequences. It's
8 well-documented. So I am making a point here about
9 why would you pick them because you will get an answer
10 presumably, "We can do it. Here it is."

11 MEMBER APOSTOLAKIS: That's why they are
12 looking for --

13 MEMBER ROSEN: Yes. You needed some
14 volunteers who were of the kind that you are alluding
15 to. We would have difficulty because otherwise we
16 won't get any data.

17 MEMBER APOSTOLAKIS: With any PRA, a major
18 insight is the dominant function of all systemic
19 sequences. If you don't reduce that independently of
20 what Biff is telling us here, if you have a single
21 fault tree approach that doesn't reduce that, you are
22 missing something.

23 MR. BRADLEY: I don't disagree.

24 MEMBER WALLIS: You are not giving
25 information to the decisionmakers.

NEAL R. GROSS

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

1 MR. BRADLEY: That is why we put the term
2 "dominant' into the standard as a separate entity from
3 "significant."

4 This is just an example of one of the
5 requirements and one of many in the standard. This is
6 what the original standard said, "Provide a detailed
7 description of dominant accidents sequences or
8 functional failure groups." And the NRC's proposal is
9 to change that word to "significant." Again,
10 depending on how your model is set up, how your risk
11 contributors are laid out, you could end up having to
12 document, generate thousands of pages of
13 documentation.

14 Whether that is appropriate or not, maybe
15 it is, but it certainly is a fairly large step from
16 what we have now for most models.

17 MEMBER WALLIS: Well, the changing the
18 words isn't changing anything unless you have changed
19 the definition of those words.

20 MEMBER POWERS: I think we agreed to that.

21 MR. BRADLEY: And they did. That is what
22 they are proposing to do. I wanted to say there has
23 been some progress. All of the proposed tables of
24 definitions that NRC talked about today have come out
25 since the public notice, the public comment notice,

NEAL R. GROSS

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

1 for the standard.

2 These have all actually been informally
3 shared with us. So what you see published in the
4 *Federal Register* didn't include the 95 percent or any
5 of what was talked about today. We have had some
6 progress in going through these things.

7 Really, what is needed to resolve this is
8 to go through line by line every requirement in the
9 standard and see, "Does that definition work? Can you
10 really fit a 95 in there or does that really make
11 sense in that context?"

12 In some cases, the staff agreed that it
13 was better to use importance measures for some of the
14 basic events dealing with HRA. Those are good changes
15 that move it toward a practical definition.

16 The other thing having to do with having
17 to document how you dealt with thousands or tens of
18 thousands of cut sets has to lend itself to some type
19 of sampling approach. The staff has recognized that
20 as well.

21 So we have had some progress since the FRN
22 came out in a series of meetings. And I think we are
23 working and converging in some areas here and the
24 staff has recognized that some of these requirements
25 need to be rethought.

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 Relative to the discussion on key
2 assumptions and uncertainties, I wanted to clarify
3 that. The industry's position was not that that was
4 a burdensome thing to do. The industry's position was
5 that given that prior to recently that had never been
6 nebulously defined or not defined at all, as Gareth
7 indicated, we would prefer to do that in the context
8 of an application, where it would be easier to
9 identify for a specific application what were the key
10 uncertainties or assumptions.

11 Now, subsequently NRC has provided some
12 definitions in Table 5 of key uncertainties and key
13 assumptions that I think do focus that better. That
14 is a significant improvement over what led us to make
15 the original comment responsive to the FRN notice,
16 where you just had an unbounded requirement to address
17 key uncertainties and assumptions and no one knew what
18 that meant.

19 So I think these are all areas where we
20 have made progress. I hope we can continue to make
21 progress to resolve this and come up with a standard
22 to resolve this that serves NRC's needs as well as
23 practically implementable.

24 MEMBER APOSTOLAKIS: Now, when? Are you
25 proposing they issue what they have now and then 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 continue?

2 MR. BRADLEY: I'm going to get to that.
3 Just to mention, with regard to the peer review
4 section, the minimal set of requirements, our concern
5 there was when we wrote that. In addition to that, I
6 think Sid's concerns, which I think were correct in
7 some degree that once you set out a minimal set of
8 regulatory requirements, that tends to drive the team
9 to focus on those, perhaps inordinately so and to the
10 loss of being able to really function as a peer review
11 team and use their expertise to hone in on those areas
12 that are most important.

13 In addition to that, when we wrote the
14 section, section 6.3 of the standard, we put a very
15 extensive list in there based on the peer reviews we
16 have done already, but it was never intended when we
17 wrote that list that all of those would always be done
18 for every peer review.

19 There are specific requirements in there
20 that simply are not -- there are specific ones that we
21 need to go in and visit one at a time before we can
22 agree that those could be a minimal set of
23 requirements because some of them would require a
24 level of effort that goes way beyond what you can do
25 in a one-week peer review.

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 I think, again, that is probably something
2 where we can converge, but we need to revisit that
3 list but rather than just imposing the existing
4 suggestive list as a minimal list.

5 Also, some issues with the LERF section
6 that remain to be worked out, mainly due to the fact
7 that it was written a little bit differently than the
8 other sections and still while working on that.

9 There was another issue where in many,
10 many instances, the word "significant" had been used.
11 And if NRC couldn't determine that it was used in a
12 quantitative sense, they just eliminated it.

13 There are many examples in their table
14 where they just eliminated the term and basically left
15 an unbounded requirement. It could be inferred in
16 regulatory space to have any number of meanings.

17 We are concerned there that in the zeal to
18 get "significant" out where it didn't have a
19 quantitative meaning, we got a little carried away.
20 We need to go back and revisit those requirements with
21 the knowledge that this is going to be a reg guide and
22 it's going to be out there being used in the regulated
23 environment.

24 Finally, in terms of where we think this
25 should go, we did spend five years as an industry 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 as ASME developing this. We do believe it places the
2 appropriate emphasis on the peer review versus
3 prescription. That's the way the consensus standard
4 came out. We would like to try the consensus
5 standard.

6 And I would also like to recognize that a
7 lot of the review and modifications NRC proposed were
8 constructive and have been implemented or are in the
9 process of being implemented into a near-term revision
10 to the standard absent the ones that we talked about
11 today that are still controversial.

12 Given that and given that we can implement
13 those, we would like to be able to try using the
14 consensus standard and see how that works before we
15 jump off the cliff into quantitative definitions and
16 imposing significant new concepts into the standard
17 that really weren't there when we wrote it.

18 The San Onofre peer review, which is
19 coming up in June assuming they continue to be capable
20 of meeting that date looking at all of the issues in
21 this standard, would provide an opportunity to do
22 that.

23 They actually want to perform that peer
24 review to the subelements of the standard. So,
25 instead of using the existing criteria that are in

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 NEI-00-02, they are going to take the ASME standard
2 supporting requirements and apply those through the
3 peer review process.

4 MEMBER WALLIS: Why not have two reviews
5 in parallel, one using your framework and one using
6 NRC framework, see which one works out better?

7 MR. BRADLEY: That's a thought. We could
8 explore that. It is an issue for the licensee and the
9 resources involved. Certainly the --

10 MEMBER APOSTOLAKIS: The peer review that
11 San Onofre would go through, that is part of the
12 NEI-sponsored peer review, right?

13 MR. BRADLEY: It is.

14 MEMBER APOSTOLAKIS: So it's not ASME?

15 MR. BRADLEY: Well, no. It's different
16 because they are one of the last two plants that has
17 come along for this. And now we actually have a final
18 ASME standard out that they can use.

19 MEMBER APOSTOLAKIS: So you are going to
20 use also the ASME standard?

21 MR. BRADLEY: Yes. So they are actually
22 going to do that part of it to judge how well they
23 meet the ASME standard. We believe that would provide
24 an excellent opportunity for all parties, including
25 NRC, to see how this standard works. And then

NEAL R. GROSS

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

1 following that, we can maybe have a better position to
2 determine if we need to move forward.

3 San Onofre is actually one of those plants
4 that uses the single fault tree. So it would be
5 interesting to see how we could try to apply the
6 standard there.

7 MEMBER APOSTOLAKIS: But they developed
8 that because they wanted the monitor. They had the
9 PRA before the monitor.

10 MR. BRADLEY: They may have had one
11 before, but that is not what they have now.

12 MEMBER APOSTOLAKIS: By the way, there was
13 a statement by someone there from NEI that you believe
14 that Category 2 means more or less the same as Grade
15 3 of the NEI review process, as I remember.

16 MR. BRADLEY: Well, in developing Appendix
17 B and assuming that the shoulds were shalls and a few
18 other things, we generally made that inference.
19 Actually, NRC reviewed that on a requirement by
20 requirement basis to see if they agreed with that.

21 MEMBER APOSTOLAKIS: So what you are doing
22 really makes more explicit what Mary told us earlier,
23 that no PRA is really Category 1 or Category 2 or
24 Category 3. You come in and say yes, we agree. In
25 fact, this element is Category 1, this element is

NEAL R. GROSS

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

1 Category 2.

2 MR. BRADLEY: I guess personally I
3 wouldn't call a PRA Category 1 or Category 2.

4 MEMBER APOSTOLAKIS: Well, that is what
5 they said, too.

6 MR. BRADLEY: They only really apply to
7 the elements. And the same in the peer review, you
8 don't have a Grade 1 or a Grade 3 PRA. All of those
9 grades are applied on the individual elements.

10 MEMBER APOSTOLAKIS: Yes.

11 MR. BRADLEY: I know there was a lot of
12 discussion of that this morning, but the way we view
13 that is in the context of an application. Now, we
14 didn't have these categories before. So obviously if
15 you go back and look at reg guide 1.177 or something,
16 it is not going to have anything in there. But going
17 forward, we would expect regulatory guidance or
18 guidance from some source on what capability levels
19 you need for the various elements of a PRA for an
20 application.

21 Actually, we have developed that for
22 Option 2 to some degree already, where NRC looked at
23 all of the subelements of the peer review process and
24 looked at those versus the Option 2 categorization
25 process and gave us review guidance on how to do that.

NEAL R. GROSS

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

1 So there is an example where they go line
2 by line through there and look at those categories.
3 But I think going forward, we would need to do that.

4 The last thing, I had attached this slide.
5 This was just a backup slide. At the risk of going
6 into a five-hour discussion, which hopefully lunch
7 will preclude, the other issue and one of the reasons
8 the authors of the standard did not impose that 95
9 percent definition is that, really, the question comes
10 up, "Ninety-five percent of what? Is it 95 percent of
11 your fully converged solution? Is it 95 percent of
12 the truncation value you chose?"

13 That leads into a whole other can of
14 worms, which, really, you have to go back and look at
15 how you truncated and how you converged a specific
16 model to determine where the 95 percent would apply.

17 In this case, if one assumed -- and I
18 don't think this is really the intent, but if one
19 assumed that the 95 percent was applying to the fully
20 converged solution, you are looking at about half a
21 million cut sets that the requirements of the standard
22 would conceivably apply to for this one specific
23 model.

24 MEMBER WALLIS: How do you know what 100
25 percent is? Don't you need to have an infinite number

NEAL R. GROSS

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

1 of cut sets?

2 MR. BRADLEY: You iterate. You basically
3 iterate. You take it up. You can generally see --

4 MEMBER WALLIS: Where it is going.

5 MR. BRADLEY: -- where it will converge,
6 yes.

7 MEMBER WALLIS: If you ever get there.

8 MR. BRADLEY: I don't want to open up a
9 huge can of worms here. I am just saying that if we
10 are really going to impose a 95 percent criterion into
11 the standard, there is a lot more work that needs to
12 be done in terms of different model types. What do
13 you really mean by 95 percent?

14 These things weren't envisioned when we
15 wrote the standard. I think you can't just stick a 95
16 percent in where there wasn't that intent before
17 without a significant amount of additional work.

18 I don't want to say the industry objects
19 to the use of a quantitative definition, period, but
20 I do think we are concerned that you just take the
21 existing standard and put this one size fits all 95
22 percent in there and issue this thing out as
23 regulatory guidance. We may create a difficult
24 situation and --

25 MEMBER ROSEN: It's regulatory guidance

NEAL R. GROSS

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

1 for trial for use, right?

2 MR. BRADLEY: Right.

3 MEMBER ROSEN: Not regulatory guidance
4 quite.

5 MR. BRADLEY: Yes, whatever that means.
6 I guess --

7 MEMBER APOSTOLAKIS: I don't know what is
8 trial for use. How is trial for use different from
9 issuing a guide and then revising?

10 CHAIRMAN BONACA: First of all, when is it
11 going to be issued? I mean, this is not a final.

12 MEMBER APOSTOLAKIS: The end of the year.

13 CHAIRMAN BONACA: So we are reviewing it
14 now, but there may be changes in it before you issue
15 it.

16 MS. DROUIN: The changes that were are
17 going to make are the ones based on the public
18 comments.

19 MEMBER WALLIS: Will you make any changes
20 based on our comments?

21 MS. DROUIN: We may make some based on
22 comments we have received from the ACRS. That is
23 entirely possible, yes.

24 MEMBER APOSTOLAKIS: It's less likely. We
25 are not in the dominant set.

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 MS. DROUIN: We may make comments also
2 based on CRGR.

3 CHAIRMAN BONACA: Are we going to make
4 comments based on a document which is not final yet?
5 I mean, I would be reluctant to do that?

6 MEMBER APOSTOLAKIS: Is there still dollop
7 between you and the industry? Now it's do or die?

8 MS. DROUIN: What our schedule is is we
9 have a position right now. We are going to have a
10 public meeting to share. We have had a lot of
11 dialogue. I was just down in Florida at the ASME
12 meeting. The most recent Table 5 that you have, we
13 haven't sent it to ASME yet, but it reflects a lot of
14 the discussions that were held in Florida. We are
15 going to have a public meeting, present this.

16 Our final position will be dependent on
17 when ASME issues the addenda. If ASME comes in and
18 says, for example, they can issue the addenda in July,
19 I would make a strong recommendation to my management
20 that we hold off and have our position based on the
21 addenda.

22 If ASME comes in and says the addenda is
23 going to take a year, no. We don't want to wait a
24 year. We want to get this thing out there.

25 MEMBER APOSTOLAKIS: So the best we can do

NEAL R. GROSS

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

1 is write an entering letter.

2 CHAIRMAN BONACA: Well, we'll discuss that
3 later on.

4 MEMBER SIEBER: Let me ask a question to
5 Mr. Bradley. If you had your druthers, would you like
6 to see or not like to see an interim reg guide for
7 trial for use or the alternative is resolve all of
8 these issues before you issue the guide?

9 MR. BRADLEY: I think that is really a
10 function of what trial for use means. It is not
11 something we do routinely in the industry where you
12 issue a reg guide for trial for use. And to the
13 extent that it is not case in concrete and if we issue
14 it for trial for use and find out that we can still
15 make what could be substantive changes to it, maybe
16 make it go back to more of what the standard was is my
17 opinion where we would end up. That would be okay.

18 It is probably more a question for OGC or
19 someone who could help better explain what the
20 function of a trial reg guide is. I think certainly
21 we would like the opportunity to -- we are concerned
22 that there are substantial iterations in progress.

23 And we haven't even had time to use the
24 standard for a single peer review or a single pilot
25 application yet. It is a moving target. And we need

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 resolve that through some regulatory mechanism. I
2 am not sure what that is.

3 MEMBER KRESS: Does it have to be issued
4 to have a trial for use?

5 MR. BRADLEY: Yes.

6 MEMBER ROSEN: Of course not. It seems to
7 me they could take the draft guide however --

8 MEMBER KRESS: Let's check that out and
9 see.

10 MEMBER ROSEN: If Mary wants to correct it
11 and run the Xerox machine and hand it to Biff, that
12 will be the end of it.

13 MR. BRADLEY: As I understand it, there
14 are two sets of -- there is one addenda to the
15 standard that is going to come out in the near term to
16 pick up those areas that the CNRM did agree NRC had
17 made changes that were accepted. I think that is
18 going to come out this summer sometime.

19 I think any further changes involving
20 these definitions will be delayed until the 2004
21 addendum of the standard.

22 MEMBER APOSTOLAKIS: But the point is,
23 though --

24 MS. DROUIN: That has not been decided by
25 ASME yet.

NEAL R. GROSS

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

1 MEMBER APOSTOLAKIS: But the point is I
2 think what Mr. Rosen just said, the pilots will be
3 volunteers. Let's just use what we have, see whether
4 the 95 percent works or not but without having a
5 formal regulatory guide issued because then the
6 changes I think would be much easier to effect.

7 MR. BRADLEY: We have already explored
8 this.

9 MS. DROUIN: That's why we want to issue
10 it for trial for use.

11 MR. BRADLEY: Unfortunately, all --

12 MEMBER APOSTOLAKIS: There is a legal
13 standing for trial for use because Biff doesn't seem
14 to be sure what that means.

15 MR. BRADLEY: We have two Option 2 pilots.
16 And we have the South Texas tech spec initiative 4B
17 pilot. And then we have the San Onofre peer review,
18 I think, at least in the case of South Texas and at
19 least one of the Option 2 pilots, these are plants
20 that can use the 95 percent type definition because
21 they have relatively small numbers of "significant
22 sequences." It's fairly practical for them to apply
23 it.

24 San Onofre is a different case. I don't
25 know about the other Option 2 plant, but it would be

NEAL R. GROSS

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

1 good to try this out on all of the permutations.

2 MEMBER APOSTOLAKIS: When this is issued,
3 Mary, is it going to still be DG-1122 or it will be RG
4 something?

5 MS. DROUIN: It goes out as an RG, but it
6 goes with the title "Trial for Use." I mean, this is
7 very typical. We have done this many times. For
8 example, 1.178 has been out there trial for use.

9 MEMBER APOSTOLAKIS: And?

10 MS. DROUIN: And now it is going to be
11 issued as a regulatory guide and the terms "trial for
12 use" will be removed.

13 MEMBER APOSTOLAKIS: It has been modified
14 and --

15 MS. DROUIN: Being modified, et cetera.

16 MEMBER APOSTOLAKIS: Mr. Dinsmore?

17 MR. DINSMORE: Steve Dinsmore from the
18 staff.

19 I don't know generically what it means,
20 but for 178, it meant the reg guide didn't establish
21 regulatory positions, which meant you could later
22 change it easier than if you released it as a final
23 reg guide.

24 MEMBER APOSTOLAKIS: So the words "for
25 trial for use" allow you to do that?

1 MR. DINSMORE: That is correct.

2 MS. DROUIN: It makes the process --

3 MR. DINSMORE: It also means that you
4 don't have to backfit analysis if you want to increase
5 the requirements.

6 MEMBER APOSTOLAKIS: So it is a legal
7 term, then. I mean, it is not just we invented it.
8 It means something, the OGC.

9 MR. DINSMORE: Yes. But that's what it
10 meant for the ISI.

11 MEMBER APOSTOLAKIS: Yes.

12 MS. DROUIN: It's the weight --

13 MEMBER APOSTOLAKIS: Okay. Any other
14 questions?

15 (No response.)

16 CHAIRMAN BONACA: Okay. Let's go to
17 lunch.

18 (Whereupon, at 12:45 p.m., the foregoing
19 matter was recessed for lunch, to
20 reconvene at 1:45 p.m. the same day.)

21 CHAIRMAN BONACA: This meeting is called
22 to order again, and we are going to move on to the
23 next item on the agenda. That is Control Room
24 Habitability, and Dr. Powers is going to lead us
25 through this presentation. I understand there are two

NEAL R. GROSS

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

1 presentations, and --

2 MEMBER POWERS: We've got this table over
3 here -- to the left of us, we've got reg guides,
4 generic letters, guidance. We've got everything.

5 CHAIRMAN BONACA: We are lucky.

6 MEMBER POWERS: We're in tremendous shape.

7 CHAIRMAN BONACA: All right.

8 MEMBER POWERS: I think most of the
9 members are generally familiar with the revelation
10 that measured inleakage to the control room envelope
11 for several plants was found to exceed, often by a
12 dramatic amount, the unfiltered inleakage that was
13 assumed in the plant safety analysis, and that, of
14 course, this could have profound consequences on the
15 kinds of doses that you would anticipate operators
16 might receive in the course of design basis accidents.

17 The challenge that seemed to arise is that
18 differential pressure surveillances that are done in
19 many plants to assure that their control room envelope
20 is maintaining its function is just not adequate as a
21 measure of inleakage. This issue has been before the
22 committee before. We have written letters on it.

23 Our letter has addressed primarily
24 guidance that has been prepared by NEI as they work
25 with the staff, and there has obviously been a

NEAL R. GROSS

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

1 tremendous amount of work on this. And today we're
2 going to hear what the status of that work is and to
3 look at some materials the staff has had out for
4 public comment and is now ready to issue in final
5 form.

6 Now, since I have been on this committee,
7 we have always done things by having the staff present
8 followed by a presentation by the industry. So I'm
9 starting a new trend here. We're going to reverse
10 that, and we're going to begin with a presentation
11 from the industry.

12 And I think, Steve Schultz, are you going
13 to --

14 MR. SCHULTZ: Yes.

15 MEMBER POWERS: Wherever he is. There he
16 is. You hide from me all the time, Steve.

17 Steve is going to begin and give us what's
18 been going on with NEI 9903 since we last heard about
19 it, which is, what, about 18 months ago. Is that
20 right?

21 MR. SCHULTZ: November of 2000.

22 MEMBER POWERS: Oh, okay. Time flies when
23 you're having fun.

24 Okay. Steve, your show. And if you're
25 going to stand up there, you've got to be wired, dude.

NEAL R. GROSS

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