

1 UNITED STATES OF AMERICA
 2 NUCLEAR REGULATORY COMMISSION
 3 ***
 4 MEETING WITH ADVISORY COMMITTEE
 5 ON REACTOR SAFEGUARDS (ACRS)
 6 ***
 7 PUBLIC MEETING
 8 ***

9
 10 Nuclear Regulatory Commission
 11 One White Flint North, Room 1F-16
 12 11555 Rockville Pike
 13 Rockville, Maryland
 14
 15 Thursday, April 2, 1998

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 17 The Commission met in open session, pursuant to
 18 notice, at 1:08 p.m., the Honorable SHIRLEY A. JACKSON,
 19 Chairman of the Commission, presiding.

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 21 COMMISSIONERS PRESENT:

- 22 SHIRLEY A. JACKSON, Chairman of the Commission
 23 NILS J. DIAZ, Member of the Commission
 24 EDWARD McGAFFIGAN, JR., Member of the Commission
 25 GRETA J. DICUS, Member of the Commission

1 STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

- 2 DR. ROBERT L. SEALE, Chairman, ACRS
 3 DR. DANA POWERS, Vice-Chairman, ACRS
 4 DR. GRAHAM B. WALLIS, Member, ACRS
 5 DR. GEORGE APOSTOLAKIS, Member, ACRS
 6 MR. JOHN BARTON, Member, ACRS
 7 DR. THOMAS S. KRESS, Member, ACRS
 8 DR. MARIO H. FONTANA, Member, ACRS

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

2 [1:08 p.m.]

3 CHAIRMAN JACKSON: Good afternoon, ladies and
 4 gentlemen. It's a pleasure to meet again with Dr. Seale and
 5 the members of the NRC Advisory Committee on Reactor
 6 Safeguards, who plan to discuss a number of topics of
 7 interest to the Commission at today's session.

8 But first, I would like to welcome, if he is here,
 9 Dr. Graham B. Wallis to the Commission's Advisory Committee
 10 on Reactor Safeguards. We're pleased to have you on board.

11 The Commission is fortunate to be able to draw
12 upon views and experiences of this selected group of experts
13 as we try to solve and address various technical concerns in
14 licensing and regulation.

15 During today's briefing, the Commission -- I'm
16 sorry -- the Committee will discuss the following topics.

17 First, improvements to the Senior Management
18 Meeting process; next proposed revisions to 10 CFR 50.59 and
19 related issues; third, risk-informed and performance-based
20 regulation, including the use of PRA in the regulatory
21 decision-making process; fourth, status of the AP600 review;
22 fifth, shut-down and low-power operations; sixth, NRC safety
23 research programs; seventh, license renewal; and eighth,
24 fire protection rule-making.

25 Commissioner McGaffigan has already made note of

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1 the fact that our two Commission meetings this afternoon
2 have been scheduled for three hours but probably each
3 involve about five hours.

4 So, Dr. Seale, my colleagues and I welcome you to
5 this meeting and anticipate another candid and informative
6 session with the Committee, and I understand that copies of
7 the briefing material are available at the entrances to the
8 room.

9 Unless anyone has any opening comments, I think we
10 had better proceed.

11 DR. SEALE: Very good.

12 Well, good afternoon, Chairman Jackson,
13 Commissioner Dicus, Commissioner Diaz, and Commissioner
14 McGaffigan.

15 As always, the ACRS is pleased to have the
16 opportunity to meet with the Commission and exchange
17 information and for us to provide our views on items of
18 interest to you.

19 We have a very ambitious agenda today and would
20 not be offended if most or all of the discussion time were
21 consumed in the first four items or so, because --

22 CHAIRMAN JACKSON: It may come to that.

23 DR. SEALE: It may come to that. And as the last
24 four items are all work in progress and the view-graphs
25 summarize these items fairly succinctly, I don't think

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1 there's a lot of pressure to necessarily pound the program
2 into the time.

3 Occasionally -- or additionally, I'd like to
4 mention that we have submitted copies of the ACRS operating
5 plan, and this contains planned activities, priorities, and
6 metrics for assessing ACRS performance. Any comments you
7 may have on that plan we would very much appreciate. We
8 expect to update it quarterly -- that is, July being our
9 first update.

10 I think we'll get right into the program, and John
11 Barton, Plant Operations Subcommittee Chairman, will begin
12 with a discussion of the ACRS deliberations on the Senior
13 Management Meeting process.

14 John?

15 MR. BARTON: Thank you, Dr. Seale.

16 ACRS has been actively involved in the review of
17 the proposed improvements to the SMM process. In March
18 1997, the Committee reviewed the prepared Arthur Anderson
19 report and, since then, has had several meetings with the
20 staff and prepared two reports to the Commission.

21 In the September report to the Commission -- some
22 highlights of that report,

23 The Committee supported the goal of codifying the
24 SMM information-gathering and review process. However, the
25 basis for the top-level criteria contained in the template

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1 was not clear to the Committee.

2 Furthermore, the process by which the template led
3 to formation -- formulation of decisions also was not
4 apparent to the Committee.

5 The Committee preferred to see a top-down
6 structure that starts with a point of decision, identified
7 the objectives of the decision, and then proceeded to define
8 the informational needs to support the decisions.

9 In a memorandum subsequent to the Committee report
10 -- it was a memo from the ACRS Executive Director --
11 forwarded comments from an ACRS member, Dr. Apostolakis,
12 which laid out for the staff an approach to the top-down
13 decision-making approach.

14 Also, another item in the September report, we
15 talked about the assurance of the needs of the new
16 performance standards to be objective and reduce reliance on
17 event-driven assessments, and we made the point that,
18 although progress had been made improving information basis
19 of the senior management process, considerable work remained
20 in areas such as developing tools for assessing management
21 and organizational effectiveness and testing their
22 implementation before being included in the SMM process.

23 Also, in our September report, with regards to
24 staff's integrated review of the assessment process, we
25 noted the staff had not defined requirements, preferably

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1 quantitative requirements, for an adequate program to assess
2 license performance.

3 It was not apparent to the Committee at that time
4 how well-designed recommendations could be formulated
5 without explicit definition of the requirements for an
6 assessment program that met the agency's needs.

7 It was also not clear how preferred opinions --
8 options could be selected absent these requirements, and we
9 recommend the NRC staff develop these requirements for an
10 adequate licensing performance assessment program.

11 Subsequent to that report, we had additional
12 meetings with the staff and issued a second report on the
13 subject in March of this year, and in that report, we
14 reviewed the draft Commission paper.

15 We looked at the overall objectives. We felt that
16 they were not sufficiently specific to allow evaluation of
17 the proposed assessment process. We recommended at that
18 time the development of specific objectives and performance
19 measures that could be applied directly to the process.

20 The assessment decision model, logic model, we
21 felt should show how the selected decision options noted in
22 the draft paper would utilize the performance measures.

23 CHAIRMAN JACKSON: Dr. Barton, I think
24 Commissioner Dicus has a question.

25 COMMISSIONER DICUS: Yes. About the objectives

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1 and the performance measures, could you be a little more
2 specific on what sort of measures you think would be useful
3 to provide the clarity?

4 MR. BARTON: George?

5 Dr. Apostolakis led this thought, and I'd like him
6 to expand on that.

7 DR. APOSTOLAKIS: Well, the overall objective of a

8 process like the Senior Management Meeting is usually
9 something that is general, noble, but not operational. So,
10 as I recall, it says something to the effect that we want to
11 make sure that the plants are safe.

12 Now, that doesn't mean anything. You have to tell
13 me what safe means.

14 For example, if you want this to be risk-informed,
15 would you like to prevent the occurrence of initiating
16 events?

17 Now, that's something specific, that's something I
18 understand, and that certain contributes to safety.

19 Would you like to make sure that the safety
20 functions have a certain reliability? Again, that's
21 operational.

22 Now, operational -- well, maybe that's an
23 exaggeration, but -- so, the second level, the second tier
24 would be objectives of this type that elaborate on the top
25 level.

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1 Then you might ask yourself, well, what does it
2 mean to assure the safety function, reliability? You go
3 down one further level.

4 Now you become more specific. Maybe you will say
5 I don't want such-and-such an event to happen, and you may
6 have to go down two or three or four levels until you reach
7 a point where you say, well, now, this I can measure, this I
8 can track, and then you have this hierarchy construction
9 that shows the rest of us why you selected certain things to
10 monitor and why you left certain other things out.

11 Right now, we have the top objective, and then we
12 jump way down to the six categories, what is called a
13 template, and the connection is not clear. I mean it's not
14 that there is no logic. I'm sure there is some logic
15 someplace, but it's not evident from reading the document
16 why, for example, I have to worry about human error, I mean
17 besides the general feeling that human error is important.

18 So, that was really the idea of requiring that.

19 COMMISSIONER DICUS: Okay. Thank you.

20 MR. BARTON: Also in our March report we made the
21 comment and recommendation regarding that the staff should
22 work through at least one example that uses the actual
23 inspection reports and demonstrate the implementation of the
24 new assessment decision logic.

25 We wanted to be sure that the new engineered

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1 approach, taken to an actual case and worked through, would
2 lead you to the same decision that was arrived without this
3 approach. It was kind of a test of the new approach.

4 CHAIRMAN JACKSON: Now, my understanding is that
5 there has been some piloting of the process since the time
6 you had the discussions with the staff. Do you have any
7 updated commentary?

8 MR. BARTON: No, we do not, not at this time. We
9 know that they were going to try that process, but we
10 haven't had feedback as to how well that process worked.

11 We also recommended at that time that the
12 categories in the proposed templates -- the six categories
13 of the template be evaluated and see if they were at the
14 appropriate level and whether there was any unnecessary
15 overlap.

16 We recommended the assessment process contain
17 provisions to ensure consistent results are obtained among
18 the regions. The new process really drives back to the
19 regions most of the work; decision-making is done at the

20 region level.

21 We wanted to assure that there would be
22 consistency, that in the new process would be enough built
23 into it that we could assure consistency among the regions
24 without having to rely on headquarters people down at the
25 regions looking for the consistency.

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1 The process itself should have built in reasonable
2 assurance of consistency among the regions. That was a
3 concern we had, and we didn't see how -- weren't sure how
4 that was in the model.

5 CHAIRMAN JACKSON: Commissioner Dicus.

6 COMMISSIONER DICUS: I want to dwell a little bit
7 just briefly on the consistency issue, because I think it is
8 a problem.

9 Are you talking about consistency of
10 implementation of the process, or is there a greater problem
11 or another problem with regard to the consistency of plant
12 performance from a regional or a national basis?

13 MR. BARTON: We were concerned with consistency in
14 the process. You know, no process is perfect. That's
15 probably the reason we're changing the current process, to
16 improve it, make it more scrutable, more objective.

17 We wanted to ensure that, in designing that new
18 process, that the same performance indicators that you were
19 measuring in one region, you measured in another region and
20 gave you the same result. That's what we were looking at.

21 We also made a recommendation that the measured --
22 plant performance be measured at a more global level.

23 We had some discussions with industry at one of
24 the Committee meetings, and we felt that the input to the
25 new process that the staff was proposing was set a real low

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1 compliance enforcement level and saw some opportunity in
2 what the industry was proposing as performance indicators
3 that maybe the staff and industry might get together and
4 raise the performance indicators and the input into the
5 process.

6 CHAIRMAN JACKSON: Have you had discussions among
7 yourselves about the connectivity between the suggested
8 performance indicators from the industry to the kinds of
9 issues that Dr. Apostolakis raised?

10 I mean is there a migratory path? Are those --
11 have you looked at whether those would be the appropriate
12 performance indicators to achieve what he wants? Have you
13 agreed as a committee that you agree with what was in its
14 memo?

15 MR. BARTON: We have discussed this amongst
16 ourselves, and I think there is an agreement that -- based
17 on what Dr. Apostolakis mentioned before and where the
18 industry was coming from, I believe there's agreement in the
19 Committee -- if I'm not right in that, please, any member
20 speak up -- that there should be more attention paid at the
21 higher level.

22 Anybody want to comment on it?

23 DR. APOSTOLAKIS: I don't believe, Chairman
24 Jackson, that, as a Committee, we looked at that specific
25 aspect of the NEI presentation, but that should be

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1 relatively easy to check, because it's higher level, higher
2 level requirements.

3 But that is an issue that will keep coming back.
4 Where do you set the performance measures? We had a

5 presentation this morning on the new performance-based
6 initiative. Where do you do that? Do you use risk
7 information? Do you use something else?

8 Because ideally -- not ideally -- you would like
9 them to be as high as possible where the highest level is,
10 of course, the QHOs. Practically, you can't do that.

11 So, where is the optimum so that we will satisfy
12 that third feature, I believe, of performance-based
13 regulation, namely giving flexibility to the licensees. The
14 lower you go, the less flexibility they will have.

15 CHAIRMAN JACKSON: Right. But I'm really actually
16 turning back on you something that you said the staff needs
17 to ensure, and that has to do with consistency.

18 If you're going to talk, on the one hand, about
19 the need to agree on performance indicators starting with
20 some that may have already been developed by the industry or
21 somewhere else and if you're going to make that
22 recommendation, then there has to be a connectivity between
23 that recommendation at whatever level these performance
24 indicators would come in, with a judgement as to (a) is that
25 the right level, (b) if it is, you know, what the connection

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1 has to be to what the staff would, quote/unquote, actually
2 measure or look at, because in the end, it doesn't do -- you
3 have recommendations that go like this or like this, but at
4 any rate, you have to ensure that, if you're going to make
5 the recommendations on the one hand, in one area, that they
6 are consistent with the recommendations you make in the
7 other.

8 DR. SEALE: If I may make a comment, it strikes me
9 that, realistically, what you have to do is to erect this
10 connective tissue between -- or lines between the low level
11 and the high level indicators, and once you've done that,
12 then the kind of gradation that occurs is deciding how you
13 tune to get blips on your radar screen.

14 One of the things you have to have is a scheme or
15 a system that gives you data that tells you what's going on
16 in the plant.

17 CHAIRMAN JACKSON: Well, I think that's where we
18 all want to get, obviously, and the issue is that, if you're
19 starting at the -- if you want a hierarchical scheme, right,
20 you have to have the connectivity all the way down.

21 However, what I'm saying is something slightly
22 different. I'm saying that, if you're talking about
23 imposing a set of performance indicators, that you've got
24 have a fundamental decision made as to whether they are the
25 right performance indicators for regulatory agency.

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1 DR. SEALE: Yes.

2 CHAIRMAN JACKSON: Okay. And then you're dealing
3 with in the context of this hierarchical or connected
4 approach.

5 Yes, Commissioner Diaz.

6 COMMISSIONER DIAZ: If I might build up on that, I
7 think, essentially, what we should be asking, also, is is
8 there a process of convergence between the different
9 opinions and if that convergence is naturally happening or
10 does it need to be a function, you know, that will make it
11 happen?

12 DR. POWERS: It strikes me that you need to be
13 careful not to misinterpret what the Committee was saying
14 when it made its recommendations.

15 It was saying that we feel there should be a
16 hierarchical structure, and in that hierarchical structure,

17 you will arrive at high-level performance indicators, higher
18 level than perhaps what the staff is proposing, like what
19 the industry was saying.

20 We did not espouse the industry's indicators per
21 se but, rather, suggested that, when they created this
22 structure, they would encounter these higher level and those
23 might be better to use than the lower-level indicators.

24 I don't think the Committee was saying adopt these
25 that the industry has proposed.

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1 DR. SEALE: No, we did not come to that
2 conclusion.

3 DR. POWERS: Rather, these industry proposed
4 indicators looked to be higher and you will arrive at them
5 in the course of your hierarchy.

6 CHAIRMAN JACKSON: But I would also argue that,
7 from an implementation point of view, you've got to ask who
8 uses what when, and I assume this is implicit in what Dr.
9 Apostolakis is talking about, because you can talk about
10 having your higher-level indicators, but the issue is who's
11 making use of them and to what end?

12 Are they being used as a consistency check? Are
13 they being used in decision-making? Are they best used at a
14 very high senior management level? That may be different
15 than what the guy does in the field, and so, we have to be
16 very clear in that.

17 DR. POWERS: In a moment or two, Mr. Barton, we'll
18 get to the issue of requirements -- agency requirements for
19 the assessment process, and that will come up in spades.

20 CHAIRMAN JACKSON: All right. Well, then I better
21 let Mr. Barton proceed, then.

22 DR. APOSTOLAKIS: A forcing function in the form
23 of a delta function will be very welcome, by the way.

24 CHAIRMAN JACKSON: A delta function -- a forcing
25 function to you or a forcing function to the staff? Let's

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1 be clear on who we're forcing to do what.

2 COMMISSIONER DIAZ: If I may amend the record, the
3 Chairman who uses what when, also for what, and that goes
4 back to your performance measures.

5 DR. KRESS: That would call for different sets of
6 performance measures, one for the inspector and another one
7 for the senior management and even a different one for you
8 guys.

9 CHAIRMAN JACKSON: Let Mr. Barton continue.

10 MR. BARTON: Dana, in our September report -- I
11 mentioned earlier -- this was a comment that we had made.
12 We had noted that we had not -- staff had not yet defined
13 the requirements for the program to assess licensee
14 performance. Would you like to expand on that? It was also
15 in our September report.

16 DR. POWERS: Staff is now attempting to develop an
17 integrated assessment program, and what we saw was what I
18 would characterize as an assumed solution to that
19 assessment, to integrate together assessment that currently
20 takes place in three different areas into a single
21 assessment.

22 I call it assumed, because there did not appear to
23 us to have been an attempt to define what the agency needs
24 for its own purposes as an assessment of plant performance,
25 what are the requirements that you had.

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1 Then, once you had those requirements, one could

2 presumably define a number of strategies for obtaining those
3 assessments and compare them on the basis of some ranking
4 system, some preferred alternatives, preferences that you
5 had, how you would compare various strategies, all of which
6 met the requirements the agency had but some of which may be
7 preferred because they're less costly, less
8 manpower-intensive, more transparent to the public.

9 We had not seen that kind of structure in
10 developing this integrated assessment and found it very
11 difficult, then, to look at this integrated assessment and
12 say does it, in fact, meet all the agency needs, as you
13 said, from the front line inspector, the eyes and the ears
14 of the agencies at the plant itself, to the top level
15 sitting at this table.

16 You need to have an assessment that meets all
17 those needs. It's difficult to judge if we don't know what
18 all those needs are.

19 COMMISSIONER MCGAFFIGAN: My concern comes at it
20 from a slightly different direction.

21 The staff is going to talk to us -- I don't want
22 to spend a lot of time on this, but they're going to talk to
23 us in an hour-and-a-half about this stuff, and they have a
24 slide of boundary conditions, which boundary conditions are
25 sort of like requirements, and I'm not sure I agree with all

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1 of them. I probably don't. And I've heard additional
2 requirements coming from you all this morning that aren't
3 among their boundary conditions, that this should be
4 risk-informed. That's not something that they're aspiring
5 to at the moment. They do aspire to line up better with
6 enforcement, which I'm hearing some criticism of and I have
7 concerns.

8 But I think there's a real danger in
9 over-constraining this problem so that there is zero
10 solutions. In fact, it may already been well past that
11 point, and when you try to design a single process to meet,
12 you know, a multiplicity of requirements and the
13 requirements keep growing, you know, if we aren't at the
14 point where there's zero solution, we'll certainly get there
15 rapidly.

16 DR. POWERS: The one thing you have to have in any
17 kind of design-making is to have an agreed-upon set of
18 requirements, and I forgot to say agreed.

19 COMMISSIONER MCGAFFIGAN: Agreed-upon, right.

20 DR. POWERS: That's an essential step, and it is
21 not beyond the bounds of credulity to say that I can create
22 enough requirements that there is no solution, and then you
23 have to have an agreement upon reduction in those
24 requirements.

25 I think it is better to do that, to follow that

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1 tact, than to have a set of requirements created after you
2 have assumed the solution, and I think that's all we were
3 trying to communicate.

4 COMMISSIONER MCGAFFIGAN: You think the staff has
5 this rock, as some people call it, and has the following
6 characteristics which they then say are the boundary
7 conditions for the rock.

8 DR. POWERS: I think there is a strong component
9 of that. I think that they, indeed, did see criticism of
10 having three or four, depending on how you count them,
11 different approaches to doing plant assessments, and they
12 said my requirement for this is to have one, and they took
13 that.

14 CHAIRMAN JACKSON: I'm not here to be the defender
15 of the staff, but in fact, I think we all have to take
16 ownership, because I think, in fact, the staff was trying to
17 be responsive to what it thought it was hearing from the
18 Commission.

19 DR. POWERS: I have no doubt.

20 CHAIRMAN JACKSON: So, that defined at least part
21 of the rock.

22 DR. POWERS: I have no doubt that's true. You
23 have an excellent staff that's very responsive, and in this
24 particular case, you have a particularly ambitious fellow
25 leading this product that's anxious to produce a product

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1 that everybody likes.

2 I mean he really is trying very hard, and we're
3 simply trying to hone his strategy a little bit here in our
4 comments.

5 COMMISSIONER MCGAFFIGAN: He may have produced
6 something that nobody likes.

7 DR. POWERS: And he won't be the first.

8 COMMISSIONER MCGAFFIGAN: Right.

9 CHAIRMAN JACKSON: Well, the real question I
10 really have in terms of an over-arching way, since I think
11 this is the last view-graph on this subject -- it's a
12 question but embodied in it is a comment, and that is how
13 much did you treat this as a work in progress and an
14 opportunity to help shape where it's going as opposed to
15 assuming that it is the product that needs to be accepted or
16 rejected?

17 DR. POWERS: I think we recognized exactly that it
18 was very much a work in progress. That's how it was
19 presented to us, if I can characterize it.

20 DR. FONTANA: Yes.

21 MR. BARTON: Yes. And tried to help the staff
22 develop the process as they went along.

23 COMMISSIONER MCGAFFIGAN: Can I ask one other
24 question? One item you slipped over on the previous
25 view-graph was perform additional research prior to use of

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1 economic indicators. I don't know whether that is a kind
2 way of putting this off to the third millennium or later.

3 Is there any prospect that we're going to be able
4 to come up with something that's useful in economic
5 indicators if we throw research dollars at it, or is that
6 something that we should just --

7 MR. BARTON: I'm not sure we were talking about
8 throwing a lot of research dollars at it. I think we were
9 coming at it from the perspective of can you really gain --
10 what can you really gain from some of the economic
11 indicators?

12 There's changes in how plants spend money that go
13 on for years before you see some performance changes.

14 So, I think what we're really saying is be careful
15 how you use economic indicators. It may be a data point,
16 but we're not sure at this point that it should be a
17 decision point. I think that's where we are on the economic
18 indicators.

19 DR. SEALE: But it's certainly an input to the
20 product, and so, you should keep track of the economic
21 activity supporting the plant.

22 CHAIRMAN JACKSON: That's interesting. I mean the
23 comments that the two of you have made actually have raised
24 a point of another clarification that perhaps needs to be in

25 the process and that is making distinctions between what is

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1 input and knowing how that input is to be used versus the
2 decision point.

3 DR. SEALE: Yes.

4 CHAIRMAN JACKSON: Okay.

5 DR. SEALE: Well, you're back in the barrel again,
6 John, along with Tom on proposed revision to 50.59.

7 CHAIRMAN JACKSON: Proposed.

8 DR. SEALE: Proposed. We try to be careful with
9 some of these words.

10 CHAIRMAN JACKSON: Okay.

11 MR. BARTON: Again, just some background.

12 We provided the reports in April, October, and
13 December on the proposed 50.59 process change.

14 The first slide, which is the April report -- I
15 won't go a lot into that. That's kind of -- it's history.
16 We proposed something and it went out for public comment.

17 So, skipping ahead till our October report, we
18 proposed that the NRC should issue revision 1 to Generic
19 Letter 91-18. We felt that it did clarify the applicability
20 of 50.59 evaluations to address the degraded and
21 non-conforming conditions. Also, it addressed completeness
22 and some inconsistency.

23 Also in that report, we recommended that there be
24 work continued to continue to develop the plan for a 50.59
25 process that's consistent with the risk-informed

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1 performance-based regulation.

2 This is where Dr. Kress was driving the Committee
3 to focus on the risk-informed piece of the regulation.

4 Tom, would you like to expand on that?

5 DR. KRESS: Certainly.

6 I guess it would be easier to tell you what we
7 didn't mean by that bullet rather than what we did mean.

8 We did not mean that the 50.59 process ought to be
9 done by means of a PRA looking at delta-CDF and delta-LERF
10 like the Reg. Guide 1.174, and in fact, we don't think
11 that's even possible.

12 The consistency part meant that any changes that
13 are proposed that have a direction of risk increase, even
14 though it's small or minimal, should not be inconsistent
15 with the values that are in here. They should be very
16 small.

17 CHAIRMAN JACKSON: But to the extent that there
18 could be a direct comparison or could be cast --

19 DR. KRESS: If they could be.

20 Now, the other part of this is we take those
21 levels of risk change or outside the purview of PRA, that
22 PRA is just not good enough to quantify at those levels, so
23 that the challenge is going to be, for the staff, to
24 quantify both this word "minimal" or "small," as well as to
25 develop ways at which one could -- criteria or attributes

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1 that one could use for a licensee to be guided on what
2 qualifies for that kind of change.

3 Now, that's going to be a real challenge, and my
4 personal view is that you don't set up a set of criteria
5 that says, if the change meets these criteria, that it
6 qualifies. I think that's almost an infinite set.

7 I think what you do is set up criteria that, if
8 the change meets these things, then it does not qualify, and
9 clearly, one of these would be, if it's a decrease in risk,
10 it automatically qualifies.

11 But some of the other things for increases in risk
12 are going to be much more difficult to come by, and they are
13 performance in nature because we have already said you can't
14 quantify them with a PRA, so you have to use intuition,
15 judgement, and I think there would be things like do they
16 impact defense-in-depth, is the change on some system or
17 component that's safety-important or safety-related.

18 I don't claim to know what these rules ought to
19 be, but I think that's where the challenge lies, and that's,
20 I think, how you make it risk-informed and consistent. That
21 was the intent of that bullet.

22 CHAIRMAN JACKSON: Can you look at it in terms of
23 how it might affect design basis or FSAR accident frequency?

24 DR. KRESS: Yes, I think that would be one of the
25 criteria, if it affects the design basis.

26

1 Another one would be, if you can -- if it's
2 obvious that you can use a PRA to quantify the change in
3 risk, then I don't think it's 50.59. I think that
4 automatically puts it in 1.174.

5 COMMISSIONER MCGAFFIGAN: Can I ask a question?

6 CHAIRMAN JACKSON: Please.

7 COMMISSIONER MCGAFFIGAN: The staff has shown you
8 a view-graph that isn't quite the one that's in Reg. Guide
9 1.174 at the moment where 10 to the minus 7 core damage
10 frequency is described as negligible in terms of
11 risk-informed regulations, and presumably, things are going
12 to get handled very rapidly if somebody can convince the
13 staff that they're in that range, and there was at one point
14 a claim that 10 to the minus 7 was the limit of resolution
15 of PRA technology, and then that was clarified to say no,
16 there are lower levels of resolution that you all can deal
17 with, as low as 10 to the 10th, 10 minus 10, 10 minus 12.

18 DR. KRESS: I think the Committee disagrees.

19 COMMISSIONER MCGAFFIGAN: Disagrees with that.
20 Okay.

21 That gets us maybe back to where we originally
22 were. If it's 10 to the minus 7 or below in core damage
23 frequency, is that a -- I know you're going to talk about
24 severe accident space versus design basis accident space,
25 but if it's that level, should it be a 50.59 issue or should

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1 it be an issue that comes to the Commission staff for review
2 and approval?

3 DR. KRESS: I think the feeling of the Committee
4 was we're not quite certain yet what that level ought to be,
5 because we're talking about cumulative risk over -- there
6 may be hundreds or even thousands at a given plant.

7 COMMISSIONER MCGAFFIGAN: Right.

8 DR. KRESS: So, we're not quite sure that 10 to
9 the minus 7 is the correct level, but assuming there is some
10 level down there that's about there or even lower, we just
11 do not think that there is a good way to quantify that, and
12 you'll have to come up with a set of rules that you feel
13 qualifies a change to be in that level even though you can't
14 quantify it, and that's going to be a real challenge.
15 That's where we think the challenge is going to be.

16 CHAIRMAN JACKSON: But don't you think a point
17 that one has to keep in mind -- and that's the difference
18 between the intended use of the reg guide and the Standard
19 Review Plan, is that, in fact, the kinds of changes -- let's
20 leave aside the issue of whether you can put the kinds of
21 changes to the plant that would occur under 50.59 into this

22 space, but those levels are determined within a context
23 that, by definition, the staff is going to be reviewing
24 those, whereas 50.59 is meant to be a screening rule that
25 relates to screening in terms of things that can happen

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1 without coming to the staff, coming to NRC, so that one has
2 to keep in mind, if you're talking about numbers, that the
3 one has a set of numbers that's being used together with
4 other things but being used in the context of changes to the
5 licensing basis that, by definition, are being reviewed by
6 the staff.

7 The other is a screening set of criteria, and
8 that's a very different kind of thing.

9 DR. KRESS: Yes, I think that captures the essence
10 of it.

11 CHAIRMAN JACKSON: Let me just follow on for a
12 minute. If one wanted to do to risk-informed -- and I think
13 that's what you're really talking about, as opposed to
14 having performance-based per se approaches -- is it possible
15 to do something within design basis accident space, where
16 one can talk about a comparable kind of thing, like design
17 basis accident, frequency of probability in a quantifiable
18 way.

19 DR. KRESS: We have not discussed that, but I
20 personally don't think so. In fact, I don't think there is
21 a good connection now between risk and design basis space.
22 There is a connection. I don't think we have it well
23 quantified or well thought out.

24 CHAIRMAN JACKSON: Well, let's talk about it for a
25 second, because I'm trying to understand something. Isn't

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1 what you would call a design basis accident something that,
2 at least for certain things, really what would be an
3 initiator in a PRA calculation?

4 DR. KRESS: Yes. It's generally an initiator, and
5 then there's stylized --

6 CHAIRMAN JACKSON: -- stylized sequences that
7 would lead to having you determine whether Part 100 limits
8 would be exceeded, right?

9 DR. KRESS: Yes.

10 CHAIRMAN JACKSON: So, is there a possibility of
11 starting with a design basis accident, as laid out within --

12 DR. KRESS: Well, certainly, because those were
13 selected --

14 CHAIRMAN JACKSON: Right. And then taking those
15 and going through -- is it possible to arrive at, going
16 through a sequence of things that could lead you to exceed
17 Part 100, if you then were able to assign the same kinds of
18 probabilities --

19 DR. KRESS: You certainly could do it that way --

20 CHAIRMAN JACKSON: -- and then arrive at some
21 probability of exceeding Part 100?

22 DR. KRESS: I think you could certainly do it that
23 way. I would not recommend that.

24 CHAIRMAN JACKSON: Okay.

25 DR. KRESS: Because I don't think that's true in

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1 risk-informed.

2 CHAIRMAN JACKSON: Purity of risk-informed means
3 tied to severe accident analyses, but risk-informed, in many
4 people's mind, has come to mean tied to severe accident
5 consequences.

6 One could argue that you could have a
7 risk-informed process that examines the probabilities of

8 some other consequence, of coming to some other consequence.
9 DR. KRESS: Oh, certainly.
10 CHAIRMAN JACKSON: And in that sense, I disagree
11 with your statement that you can risk-inform an analysis to
12 a different consequence.
13 DR. FONTANA: I can understand what you're saying.
14 I think, in the best of all worlds, there would be
15 a seamless spectrum from a severe accident all the way down
16 to --
17 CHAIRMAN JACKSON: Absolutely.
18 DR. FONTANA: -- and design basis would be a set
19 in those accidents. So, one ought to be able to do a risk
20 analysis with the lowest spectrum of accidents.
21 CHAIRMAN JACKSON: Right.
22 DR. FONTANA: We're not there yet.
23 CHAIRMAN JACKSON: Well, all I'm saying is that my
24 understanding is that, essentially, what you would call a
25 design basis accident, in many ways, is an initiator when

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1 you do your typical PRA calculation, and so, you could have
2 a way, it strikes me, if it is an initiator, to put it into
3 the kind of methodology that 1.174 envisions, and you come
4 out with an answer, which in that case would be expressed in
5 terms of something like a core damage frequency or large
6 early release frequency, and that's one part of a screen if
7 there were some level set.
8 DR. KRESS: You could certainly put that on the
9 initiating frequency itself.
10 CHAIRMAN JACKSON: Right, exactly.
11 DR. KRESS: But once again, you're going to have a
12 great deal of difficulty quantifying these types of changes
13 that will propagate through and end up at 10 to the minus
14 8-like levels.
15 CHAIRMAN JACKSON: All I'm trying to say is --
16 DR. KRESS: There certainly would be a way to do
17 it.
18 CHAIRMAN JACKSON: There are two pieces, because I
19 said that's one part of a screen. Okay? The other part of
20 a screen may be one that's rooted in, you know, the
21 defense-in-depth concepts, etcetera.
22 DR. SEALE: Yes.
23 DR. KRESS: Yes.
24 CHAIRMAN JACKSON: And so, since we're talking
25 screens, we're talking gates.

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1 DR. KRESS: yes.
2 CHAIRMAN JACKSON: Okay. And so, maybe you have
3 an "and" gate that you have "and, and," that you have a
4 screen or a gate that's related to your defense-in-depth
5 pieces but you also do a consistency check.
6 DR. KRESS: That is, in fact, what I meant by
7 these sets of rules.
8 CHAIRMAN JACKSON: Right.
9 DR. KRESS: They would be that sort of "and" gate.
10 CHAIRMAN JACKSON: Commissioner McGaffigan.
11 COMMISSIONER MCGAFFIGAN: My understanding was --
12 and you can correct me, because I haven't looked at the
13 documents, but I thought the staff, in the follow-on reg
14 guides for in-service testing, in-service inspection,
15 etcetera -- that they were struggling with exactly these
16 issues, because some of -- they're going to be looking at
17 license amendments in the context of design basis
18 evaluations and yet have to make risk-informed judgements.

19 So, I hope they're ahead of us in this discussion,
20 but you all probably have looked at these later reg guides,
21 and how are they doing in the more issue-specific reg guides
22 in trying to make this translation from severe accident
23 space to design basis accident space and back?
24 DR. SEALE: Of course, they're change tech specs,
25 so there's no doubt they have to go through a 1.174.

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1 CHAIRMAN JACKSON: I think his point --
2 DR. SEALE: I agree.
3 CHAIRMAN JACKSON: -- that you're talking about
4 changes the things that fall within design basis.
5 DR. SEALE: That's an interesting template, if you
6 will, or connection.
7 COMMISSIONER MCGAFFIGAN: We just know they're
8 struggling. I don't know whether they're succeeding, but I
9 know that they're working on it.
10 CHAIRMAN JACKSON: Is there struggling, Gary?
11 MR. HOLOHAN: Gary Holohan, Staff.
12 I'd like to think the staff is succeeding.
13 CHAIRMAN JACKSON: Thank you so much.
14 All right. Let's go on.
15 MR. BARTON: The other recommendations in our
16 December report have been overcome by events. You've issued
17 directions to the staff, and essentially we agree.
18 CHAIRMAN JACKSON: Well, in fact, I think the
19 direction agrees with -- I mean it resolves essentially all
20 of the kinds of issues --
21 MR. BARTON: Yes, it does.
22 CHAIRMAN JACKSON: -- that you had raised.
23 MR. BARTON: Yes.
24 DR. SEALE: Okay. Are we through with that one
25 now?

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1 MR. BARTON: Yes.
2 DR. SEALE: Okay. Fine.
3 The next one is on risk-informed performance-based
4 regulation, including use of PRA in the regulatory
5 decision-making process, and if this sounds like deja vu all
6 over again, it's because it is.
7 George?
8 DR. APOSTOLAKIS: Thank you, Bob.
9 The first slide is just some of the activities of
10 the Committee the last several months, so we can skip that.
11 The next one, on ISI, we are, in fact, meeting
12 with the staff tomorrow morning to discuss the new version
13 of the guide, so I don't have anything to say right now.
14 What we said last July still stands, but I think, in the
15 next few weeks, you will see a letter from us on this guide.
16 The next one is the major recommendations that the
17 Committee made on Regulatory Guide 1.174 and associated
18 Standard Review Plan. Obviously, we agree with what the
19 staff did there. We think they are succeeding. There's no
20 reason to read what's here.
21 We have a figure later which will give me an
22 opportunity to talk about some of these things.
23 Now, the other guides on IST, GQA, and technical
24 specifications -- we also recommended that they be approved.
25 We were not too excited by the GQA guide, 1.176,

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1 as you probably have guessed already from the letter.
2 We felt that this version of a guide was a
3 significant improvement over the first one that we had seen,
4 which I believe we had called timid, but still, it doesn't

5 go far enough, even if one accepts the fact, which is true,
6 that the lack of a model for assessing the quantitative
7 impact of QA requirements is really a major problem here.

8 CHAIRMAN JACKSON: Does that imply that you think
9 we have a difficulty or no way of assessing the benefits of
10 our QA program, period?

11 DR. APOSTOLAKIS: I think the benefits of the QA
12 requirements are grossly exaggerated.

13 CHAIRMAN JACKSON: This is a Committee point of
14 view?

15 MR. BARTON: There are some members that agree
16 with Dr. Apostolakis.

17 CHAIRMAN JACKSON: Let's take a poll.

18 DR. KRESS: I agree.

19 CHAIRMAN JACKSON: Do you agree?

20 DR. SEALE: I think so.

21 CHAIRMAN JACKSON: Do you agree?

22 DR. POWERS: I think we have to be very careful
23 about saying we have no way of assessing the benefits of our
24 QA program, period. I think we definitely do have ways of
25 assessing the benefits of our QA program. Are the QA

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1 benefits grossly exaggerated? In the minds of whom?

2 What I think the more pertinent issue here is, do
3 we have a way to quantitatively describe those benefits and
4 to translate them into a reduction in risk? We do not now,
5 and so, when you ask us to do a risk-informed gradation of
6 QA, we quickly get very handicapped.

7 What we can do is a risk-informed gradation of
8 systems and components and structures in this system, and
9 then we can assert that surely there must be some gradation
10 in the QA associated with them accordingly.

11 The problem is how do you judge that?

12 CHAIRMAN JACKSON: So, it has to do with
13 quantitative modeling.

14 DR. POWERS: It's the quantitative modeling here.
15 I don't think we ought to get into the subjective and
16 sometimes pejorative statements concerning the QA and QC
17 programs that exist.

18 There's no question that there's a benefit, and
19 there's no question in people's mind that, even without
20 quantification, for those items that deal with very
21 risk-significant systems, I think everyone, licensee and
22 regulator alike, would just as soon err on the conservative
23 side to assure we have QA.

24 It is in the lower regions that I think that we
25 worry that too much work is expended, too much work and cost

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1 is expended on assuring the QA of particularly procurement
2 on items that are probably adequately reliable off the shelf
3 rather than having a QA back to the mine in which the metal
4 came from.

5 Our concern as a Committee, a Committee position,
6 has been the first steps here were timid, that it was
7 possible to take bolder steps.

8 Our view on the current version of this is a
9 bolder step has been taken, and we understand the
10 inhibitions to going yet farther, and that's why we caveat
11 our endorsement of this by suggesting it be revisited both
12 after experience and additional research.

13 CHAIRMAN JACKSON: Okay.

14 DR. POWERS: I think there's room for more here.

15 COMMISSIONER DIAZ: If I try to extrapolate from

16 what you said, will it be fair to say that a graded QA focus
17 resources on a matter that there are safety.

18 DR. POWERS: That's right.

19 Now, a licensee might well find it in his own
20 interest to grade his QA on reliability and economic impact
21 and loss of time and things like that, but as a regulatory
22 institution, we would want to focus on safety.

23 CHAIRMAN JACKSON: But nonetheless, you're saying
24 that, in the graded QA area, that the reg guides and the
25 associated SRP sections ought to be issued for use because

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1 you think that out of that will come --

2 DR. POWERS: We think that experience and comfort
3 -- and in fact, if one looks at this whole business of the
4 quantification of risk since 1974 -- I think that was when
5 it first became very apparent to the community at large --
6 you find that there is a substantial component of becoming
7 comfortable, to see that it does not immediately result in
8 the madmen running wild on the plants, that in fact this is
9 not a license to kill, it's a license to focus, and so, it
10 takes some comfort, especially as you move in these
11 non-traditional areas.

12 My own experience within the application of PRA
13 within the Department of Energy was that, before it became
14 at all tolerable to people in maintenance, the PRA people
15 had to learn to speak maintenance-ese instead of PRA-ese,
16 and I think that's -- the graded QA may be a classic example
17 of where we need to develop that language out of the
18 quantification of PRA that the QA/QC professionals in the
19 organization can understand in their context, and then we
20 can take these bolder steps with comfort and assurance.

21 CHAIRMAN JACKSON: Okay.

22 DR. FONTANA: I take it we don't have to answer.

23 CHAIRMAN JACKSON: I'm letting you off the hook,
24 let the record show.

25 DR. APOSTOLAKIS: Well, when I say they were

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1 grossly exaggerated, I didn't mean that -- we have to be
2 precise here. I'm not saying that we should throw out of
3 the window all the requirements.

4 What has been grossly exaggerated is the
5 significance of the difference between the current
6 requirements and some form of relaxation.

7 CHAIRMAN JACKSON: I think we understood that.

8 DR. APOSTOLAKIS: Okay.

9 CHAIRMAN JACKSON: And to the extent that your
10 recommendation relates to that, then that's the point you
11 want to make to us. Is that correct?

12 DR. APOSTOLAKIS: Yes.

13 CHAIRMAN JACKSON: I think you should go on.

14 DR. APOSTOLAKIS: Risk-informed regulation -- this
15 was an attempt to -- which I thought was successful -- to
16 show that PRA -- that this is an evolutionary process. We
17 are not about to drop defense-in-depth and safety margins.
18 We do want to proceed in a cautious way. Therefore, changes
19 should be small, and of course, they should be monitored
20 using some strategy.

21 So, I think these five principles -- the
22 formulation of these principles was a significant step
23 forward.

24 The next slide shows one of the figures -- one
25 refers to CDF, the other to LERF. This is on CDF, and I

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1 think I should make a few comments here.

2 First of all, the lines between Region I and the
3 other regions should not have been so bright, but I think
4 it's a problem of software. It should have been a smoother
5 transition to send a message that there are uncertainties in
6 PRA, there are imprecisions.

7 We are not going to make a decision based on
8 whether a number is 10 to the minus 5 or 1.1 10 to the minus
9 5 . So, the transition should have been smoother.

10 I think the text makes it very clear, but I think
11 it's worth mentioning that.

12 Second, the issue of -- well, it doesn't show very
13 well there, but as you see in the actual figures in the
14 guide, we have this shade of gray that becomes darker and
15 darker as we approach areas that we don't like, and it's
16 explained in the footnote that this means we'll pay more
17 attention, we'll scrutinize what you're doing more, and I
18 think that's very important because recognizing explicitly
19 again that there are some issues with PRA, but we are aware
20 of them, we're willing to spend the appropriate time to
21 understand what you're proposing if you are in that region.

22 So, I think that there is an adequate message
23 that's being sent by these two figures, and of course, the
24 text elaborates on these.

25 Sometimes, you know, trying, again, to be as

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1 complete as we can, maybe we turn people off, because
2 somebody who does not intend to do a complete PRA picks it
3 up and sees all this discussion on model uncertainty and
4 parameter uncertainty and say, my God, I can't do this. But
5 again, it's trying to satisfy many requirements in one
6 document.

7 But I think it was the right thing to do.

8 CHAIRMAN JACKSON: Yes, Commissioner McGaffigan.

9 COMMISSIONER MCGAFFIGAN: When you all saw this
10 view-graph last fall, it had that 10 to the minus 7 and
11 negligible category in it. Should it have been retained?
12 It basically had one ore -- it had Region IV, I guess.

13 DR. APOSTOLAKIS: I don't remember that.

14 COMMISSIONER MCGAFFIGAN: You don't remember that.

15 DR. APOSTOLAKIS: I remember that Region III was
16 not going to the right as far as it goes now. No, Region
17 III did not exist at all. That's why I'm confused.

18 COMMISSIONER MCGAFFIGAN: Region III didn't exist?
19 I have seen a view-graph where there is a 10 to the minus 7
20 and below -- it would imply that the degree of review would
21 be quite modest for things down in that category, and I was
22 wondering whether you had any views on retaining that
23 category or not.

24 DR. APOSTOLAKIS: My personal view is that it
25 would not really serve any purpose to add it there, but

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1 that's personal. The Committee hasn't discussed this.

2 COMMISSIONER MCGAFFIGAN: You talked about the
3 words, you think, make up for the fact that the lines look
4 sort of bright on the view-graph. I'm not absolutely
5 convinced of that. I think proof will be when somebody
6 comes in at the margins of one of these bright lines and
7 asks something where no changes are allowed.

8 If I'm not $.9$ times 10 to the minus 5 today and I
9 propose something that's going to be 1.1 times 10 to the
10 minus 5 and, therefore, is in the region where no changes
11 are allowed, then I'd still be a 2 , which is a factor of 5
12 better than this goal that we don't have of 10 to the minus

13 4. Should I not be considered at that point, or should I be
14 considered?

15 I take your remarks to mean that maybe I should
16 get considered even though -- if there's a good reason for
17 it. If I'm going to save large amounts of money and I'm
18 still well within any regulatory requirement, maybe I should
19 be considered.

20 I'm not sure the words in the reg guide reflect
21 that, but you all are saying put it out and let's get some
22 practice and maybe we'll get some hard cases at that point.

23 DR. POWERS: I definitely think practice is
24 essential here, but you raised the question of review, how
25 much review is required, a very minimal amount of review.

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1 I think we ought not forget there is a big tough
2 nut to crack when you come into this risk-informed
3 regulation, and that is the review on your PRA that you're
4 basing this on.

5 That is a non-trivial review that the staff is
6 going to have to undertake, and it's compounded by the fact
7 that, in many cases, the total quantification of risk is
8 going to involve some estimations.

9 Those estimations become more pandemic once you go
10 to any kind of WARF number. This is a non-trivial burden
11 for a licensee to approach even if he's coming in with one
12 of his 10 to the minus 7th sort of things.

13 Now, I think he gets over that once -- once he's
14 done one, it becomes a lot easier after that, because
15 staff's not going to go back to ground zero on every review
16 for every licensee, I'm sure, but there is a tough issue we
17 face here for -- in thinking about where your resources --
18 your manpower resources are going to go in regards to this
19 risk-based regulation.

20 You've got a front-end cost on this that's
21 non-trivial, and I assure you, the licensees are concerned
22 about that cost. They are not interested in getting
23 involved in something where they will, to quote them, be run
24 ragged chasing thousands of our requests for additional
25 information.

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1 They need some confidence and some standardization
2 here to approach -- whenever we get to talk about fire
3 protection, we'll get into that issue more realistically,
4 because it is a barrier there.

5 DR. SEALE: I would add, I think the prompt
6 attention to Reg. Guide 1.174-type requests and pilot
7 studies and so forth is probably the single most important
8 aspect of encouraging licensees to be responsive to the
9 offer of risk-informed regulation.

10 DR. APOSTOLAKIS: Okay.

11 The next topic is the report we sent in December
12 on uncertainties versus point values, and again, this
13 summarizes the recommendations.

14 I would like to say a few words about the first
15 bullet, which sounds like a trivial thought, you know, to
16 what degrees are confidence of the PRA results and insights
17 will improve on the existing regulatory system.

18 I submit to you that is a question that is never
19 asked. The question that is always asked is, is PRA perfect
20 to be applied to this new area and not whether PRA can
21 contribute to doing things better.

22 So, we thought it was important to put that there
23 even though it doesn't really relate to uncertainties and
24 point values.

1 question?

2 DR. APOSTOLAKIS: What question?

3 CHAIRMAN JACKSON: The question posed here.

4 DR. APOSTOLAKIS: It's situation-specific. We had
5 the presentation of higher perfection the other day, and the
6 discussion was all on the limitations of higher PRA. Nobody
7 told me anything about the limitations of the existing
8 regulations regarding fires.

9 I would like to see two columns. The existing
10 regulation has these problems and it does certain things
11 well. PRA has these problems, but it also does certain
12 things well, and when you put the two together, you have a
13 better system.

14 CHAIRMAN JACKSON: I think that I would warn
15 against statements that go too far to the pejorative,
16 because I think, in fact, the kinds of questions the
17 Commission was asking in the fire protection briefing, in
18 fact, were exploring just that issue in terms of what the
19 limitations are of the current situation vice where we might
20 go in a risk-informed approach, and the Commission has not
21 made a decision on that yet, and so, I think we should leave
22 it at that.

23 DR. APOSTOLAKIS: I was not referring to that.

24 DR. SEALE: We get the language from other places,
25 as well.

1 DR. APOSTOLAKIS: It was a theme that was coming
2 back when we were discussing the regulatory guides and so
3 on. It was always how good is PRA, PRA doesn't do this, PRA
4 doesn't do that, and what we're saying here that's only one
5 part of the question.

6 CHAIRMAN JACKSON: I think what you're doing is --
7 I think we're moving down this track, so let's keep moving
8 down the track.

9 DR. APOSTOLAKIS: Now, plant-specific application
10 of safety goals -- Dr. Kress will say a few words about
11 that.

12 CHAIRMAN JACKSON: Slide 23.

13 DR. APOSTOLAKIS: Twenty-three.

14 DR. KRESS: The question arose, of course, because
15 the safety goal policy statement specifically says not to do
16 this, and then we come up against what's here called
17 DG-1061, which is now Reg. Guide 1.174, which goes right
18 ahead and does that in the context of requests for changes
19 to licensing basis, and it came to us as a question as to
20 whether that was appropriate or not, and we came down on the
21 side that it certainly was; in fact, there was no other way
22 to do 1.174.

23 Then the question broadened itself to the whole
24 subject of risk-informed regulations in general, not just in
25 the context of changes to the licensing basis, and it was

1 our feeling that, in order to have a coherent system like
2 that, you have to do it on a plant-specific basis, and that
3 if you're going to use the safety goals as your top-level
4 criteria, that they have to be applied on a plant-specific
5 basis. It was just apparent to us. So, there was nothing
6 very deep there.

7 The question then got down to the surrogates, the
8 LERF and the CDF, to the

the

possible to use

9 those on a plant-specific basis when the QHOs actually
10 involve site characteristics and population and so forth,
11 and our final conclusion was, yes, there's not that much
12 variability in the effects of the site, that you can
13 actually use those and they will focus your attention on the
14 things that we can best deal with in a regulatory agency,
15 and that's the meaning of the other two bullets.

16 CHAIRMAN JACKSON: Okay.

17 DR. KRESS: We also did note on this last bullet
18 that there probably ought to be more attention to developing
19 -- if we revisit the safety goal policy statement, there
20 ought to be more attention given to developing a societal
21 risk measure, because the ones we have now intend to do
22 that, but in practice, they focus on individual risk, and we
23 felt one risk -- societal risk was total early fatalities as
24 opposed to individual, was a rather robust one.

25 It's not the only one. One should think about

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1 land interdiction and other things, but we think that would
2 be a good listing to the safety goals if, indeed, they are
3 revisited.

4 CHAIRMAN JACKSON: Okay.

5 DR. APOSTOLAKIS: The final subject is elevation
6 of CDF for fundamental safety goal and possible revision of
7 safety goal policy.

8 As you see here, we have very carefully listed
9 only facts. We're still debating the issue. There is a
10 meeting tomorrow with the staff to discuss certain things,
11 and we felt it was important to schedule a subcommittee
12 meeting two weeks from today to go more deeply into these
13 issues. So, maybe we should leave it at that today.

14 COMMISSIONER DIAZ: I just wanted to look at the
15 entire presentation, and like Chairman Jackson said, we
16 already engaged the staff on this.

17 If you look at your presentation, the presentation
18 was really on risk-informed regulation. Yet, the title says
19 risk-informed performance-based, and I think we are trying
20 to make the point that these issues should be separated, and
21 when they are together, that's fine. They're together, they
22 mean something different, because the process is much more
23 complex than if you look at each one of them by themselves.

24 And if I might go as bold as going to when I asked
25 what is the answer, I think it would be important if the

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1 Commission would get some sense from the Committee in that,
2 when applied properly, cases in which PRA have definitely
3 improved the regulatory system, because asking a question is
4 great, but if we could have at least some specific answers,
5 like you said, that are area-specific, then that will
6 certainly help us to get a better idea.

7 DR. APOSTOLAKIS: Did you ask where PRA can or
8 has? I didn't catch the verb.

9 COMMISSIONER DIAZ: I think both.

10 DR. APOSTOLAKIS: Okay.

11 COMMISSIONER DIAZ: It will be an important
12 contribution to our body of knowledge.

13 DR. APOSTOLAKIS: Regarding the title, I think we
14 sort of routinely, since day one, have been using
15 risk-informed performance-based regulation, you are right,
16 this was on risk-informed part only. From now on we should
17 be more careful.

18 We did have a discussion today on
19 performance-based regulation, by the way, so we are

20 following that, but you're absolutely right, this was not
21 part of it.

22 CHAIRMAN JACKSON: That is not a statement,
23 because you have performance-based regulation without
24 risk-informed.

25 DR. APOSTOLAKIS: Exactly.

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1 CHAIRMAN JACKSON: And vice versa or both.

2 DR. APOSTOLAKIS: That's right.

3 CHAIRMAN JACKSON: That's the point.

4 DR. APOSTOLAKIS: But this presentation did not
5 address performance-based regulation at all.

6 CHAIRMAN JACKSON: Well, in some ways one could
7 argue that this presentation was PRA regulation.

8 DR. APOSTOLAKIS: As it should be.

9 DR. SEALE: Is that all, George?

10 CHAIRMAN JACKSON: I think so.

11 DR. APOSTOLAKIS: Yes.

12 DR. SEALE: Next we'll discuss --

13 CHAIRMAN JACKSON: Because I'm chairing this
14 meeting, that's all.

15 DR. SEALE: We'll discuss the AP600 review.

16 MR. BARTON: AP600 -- it seems that the meetings
17 have been going on forever, since 1991, the Subcommittee
18 first met with Westinghouse and the staff. We seem to be
19 able to see the light at the end of the tunnel. There have
20 been no recent contentious issues such as in-containment
21 spray system, but I think the process is moving. We've had
22 meetings with Westinghouse this week. Six more chapters
23 were reviewed -- SAR plus draft SERs -- and questions are
24 getting closed out raised by the staff and also by the
25 Subcommittee and the full Committee.

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1 The major hard spots between -- we see between now
2 and the schedule and issuance of the final report are the
3 issues that the thermal hydraulics subcommittee has had with
4 the test analysis program, and Dr. Kress has a few comments
5 on those issues and where he sees their resolution.

6 DR. KRESS: I don't know that most of these issues
7 arise, thermal hydraulics, because thermal hydraulics is so
8 important or because of personalities. I get different
9 views from the Committee on that.

10 It does seem that most of the bones of contention
11 have been in that area.

12 I would like to say that the test analysis program
13 that Westinghouse has done to demonstrate that their plant
14 meets the requirements and that their codes are valid has
15 been very impressive and, I think, a very good set of
16 programs, and we think, as a Committee, that the -- we've
17 listed a number of issues that have come up in the thermal
18 hydraulics subcommittee. We put them, in I think, in our
19 interim AP600 letter -- I forget the date. They were
20 divided between the RCS and the containment in terms of
21 issues.

22 I don't really see any show-stoppers in either of
23 those. These have been -- the staff has been very
24 responsive in putting these together as requests for
25 additional information from Westinghouse. We are looking

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1 for responses back to those.

2 I think there are legitimate good answers to all
3 of them, particularly with the RCS.

4 The one area that I see may still be a problem has

5 to do with the containment, and the problem is hard to put
6 into words, because I think, if you look at the codes they
7 use, which, in particular, GOTHIC is one of them, it's a
8 lump-parameter code, and in order for the thermal hydraulics
9 part and the fission product behavior part of those to be
10 appropriate for AP600, you have to demonstrate that AP600 is
11 a well-mixed containment, and they have not come forth with
12 an appropriate demonstration to us to convince us that they
13 do, sure enough, have a well-mixed and handle the
14 stratification problem well.

15 CHAIRMAN JACKSON: Was this the first time these
16 issues had been raised?

17 DR. KRESS: I think we raised them -- it's a
18 question of how much emphasis is actually put on them,
19 because sometimes you raise an issue in a meeting, a
20 subcommittee meeting, and it gets on the minutes and not
21 much more gets done about it sometimes. But they have been
22 raised.

23 DR. POWERS: These issues have been focuses of
24 attention -- foci of attention since the AP600 design was
25 first advanced as a passive plant with natural circulation.

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1 COMMISSIONER DIAZ: If I might go to that first
2 bullet, I think this is a matter that even I am confused at
3 times. Lack of adequate justification for level of
4 conservatism. I understand lack of adequate justification,
5 but as to level of conservatism, is it too high, adequate,
6 or too low? It doesn't tell me there which way you're
7 pointing.

8 And then, in relation to the Chairman's question,
9 there's an enormous laundry list of issues that came very
10 late.

11 DR. KRESS: Those didn't come very late. They
12 were just consolidated from various lists that existed up to
13 then. We wanted to get them all on one plate.

14 This one bullet -- number one, I don't think there
15 is a regulatory requirement for level of conservatism.
16 We're talking about peak clad temperature here in design
17 basis space. This is the RCS.

18 The regulatory requirement says that, when making
19 the analysis to determine what your peak clad temperature is
20 for the various design basis accidents, that you use a
21 conservative analysis.

22 They haven't demonstrated yet to us that the
23 conservatisms they have claimed for the analysis are really
24 conservatisms that add up to a conservatism that one would
25 be comfortable with.

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1 But I have to say, personally, I think the RCS is
2 not a problem, that they have good ECCS systems. The
3 analysis codes, why they have a lot of difficulties dealing
4 with these low-pressure flows and stuff -- the test and
5 analysis program is very robust and has demonstrated to me
6 that they really do not have a problem. They're a much
7 better system than standard plants.

8 COMMISSIONER DIAZ: So you would say the level of
9 conservatism in the proposed design based on the calculation
10 is adequate.

11 DR. KRESS: Not based on the calculation, based on
12 the test and analysis program. But the calculations still
13 need to be -- some issues still need to be -- I do not think
14 they will -- when their issues are finally ironed and the
15 questions are answered, I don't think the answer will be
16 yes, we are in bad shape and the conservatisms aren't there.

17 I think the answer will be it's okay, we've proven it for
18 the RCS.

19 It's a little different with the containment. The
20 containment -- what I see there is a code that is a
21 lump-parameter. It has known errors in it that we pointed
22 out. The calculations -- the conservatisms they claim in
23 the calculations haven't been demonstrated at all and are,
24 indeed, somewhat small.

25 The calculated peak pressure with respect to

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1 design pressure requires you to take credit for all the heat
2 transfer mechanisms, to the thermo-dynamics of mixing with
3 the atmosphere, heat transfer to the walls, heat transfer to
4 the structures, plus the passive containment cooling system,
5 and then you barely peak at the peak pressure, and this is
6 coupled with the fact that they haven't demonstrated it's
7 well-mixed, and if it's not well-mixed, this is not
8 conservative.

9 Plus they have an aerosol calculation that
10 involves using the lambda, the decay factor, that invokes
11 diffusiophoresis, diffusion, sedimentation, agglomeration,
12 as well as thermophoresis, and basically that's
13 unprecedented in our regulations, we have never allowed that
14 before, and to me, they haven't demonstrated that they've
15 conservatively chosen those values, and with this
16 combination, you end up just barely meeting 10 CFR 100
17 guidelines, just barely, and what we have is a containment
18 that's basically a volume like a standard plant.

19 It's relatively weak in pressure, like 45 psi
20 design pressure. That's pretty strong, but -- compared to a
21 BWR, but compared to a large dry -- and it's a thin shell,
22 which we've had little experience with, and think shells
23 tend to fail catastrophically as opposed to leaking like a
24 containment, and you barely meet the design basis criteria
25 and you don't have a spray.

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1 The aerosols stay in there a long time, the
2 pressures stay in there a long time, and although you meet
3 what appears to be all the regulatory requirements, it
4 doesn't leave us with a warm feeling.

5 COMMISSIONER DIAZ: It might be worthwhile if you
6 would bound your real concerns in this area so the staff
7 will have an area which they can point and focus on.

8 DR. KRESS: I think we have, and I think it
9 involves looking at the answers to the requests for
10 additional information and seeing what the revised scaling
11 analysis, what the revised code results give us, and then we
12 could make a better assessment.

13 CHAIRMAN JACKSON: Let me ask you two questions.

14 You know, the staff has stated that ITAAC will be
15 open still on May 1st on their FSER submittal to you, but
16 they hope to close it out shortly thereafter. Does that
17 pose a problem for you?

18 MR. BARTON: The information they gave us at the
19 Subcommittee, if they meet the commitment, that will not be
20 a problem. The Final SER by May 1 is the only question-mark
21 at this point, whether they can support that date.

22 COMMISSIONER MCGAFFIGAN: Sort of following on
23 Commissioner Diaz, as I understand this issue --

24 CHAIRMAN JACKSON: Actually, I wasn't done.

25 COMMISSIONER MCGAFFIGAN: I'm sorry.

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1 CHAIRMAN JACKSON: The second question -- the

2 staff reduced the open items from about 500 to 7 over the
3 last couple of months, and I understand that you were
4 briefed on one of these open items, fire protection, this
5 week. Do you have some initial assessment of the staff's
6 position in this area?

7 DR. POWERS: We have an initial assessment that
8 we're going to look at it more carefully. We've asked for
9 that through a fire protection subcommittee activity.

10 My assessment is that we will find the staff
11 position in their SER and the Westinghouse position in their
12 application supportable, that it's essentially taking an
13 Appendix R position.

14 We just want to look at it a little more closely,
15 and we have some concerns about feedwater supply and things
16 of detail like that that we just need to look at a little
17 more closely than we were able to do in our grander
18 subcommittee meeting.

19 MR. BARTON: We will re-look at those in the May
20 subcommittee meeting.

21 DR. POWERS: We are committed to close that out
22 for Mr. Barton and his work for the may subcommittee
23 meeting, and I would not want to leave you feeling that we
24 have identified some red-flag issue. We just want to walk
25 through the details fairly carefully on this.

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1 This is one of those lovely prescriptive
2 regulations that you can go through check-lists, and we're
3 going through the check-list.

4 CHAIRMAN JACKSON: Commissioner McGaffigan.

5 COMMISSIONER MCGAFFIGAN: I just want to
6 understand the issue that you're talking about with
7 containment.

8 The staff isn't here, but I understand the staff
9 doesn't share the same concerns that you all have with the
10 use of the codes, and I'm just trying to understand how we
11 are going to -- whether that is a resolvable matter in the
12 next month.

13 DR. KRESS: I think it's resolvable. I think the
14 staff has asked for requests for additional information that
15 reflect the concerns that we have on containment, and we're
16 awaiting these answers to come back, and so is the staff. I
17 don't know whether they actually --

18 COMMISSIONER MCGAFFIGAN: When I listen to you,
19 just to try to -- theoretically, one could construe you as
20 saying they have to come up with a new code --

21 DR. KRESS: Oh, no.

22 COMMISSIONER MCGAFFIGAN: -- invent it as they go
23 along.

24 DR. KRESS: No.

25 COMMISSIONER MCGAFFIGAN: No?

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1 DR. KRESS: No. In fact, a demonstration by other
2 means that the AP600 is well mixed would certainly go a long
3 way in my mind to saying that the GOTHIC code is an
4 appropriate way to treat the analysis for AP600. No,
5 there's definitely not a need for a new code.

6 DR. POWERS: I think that, when the examination of
7 AP600 began, it certainly became clear that it would sure be
8 nice to have a code that solved the momentum equation
9 instead of lump-parameter codes, but a stride that has been
10 made over the last few years has been to recognize, indeed,
11 with appropriate calibration against experiments, it is
12 possible to justify the use of a lump-parameter code.

13 There's no question in our mind that, if we'd had

14 a fast-running CDF-type code -- competition fluid dynamics
15 code, I'm sorry -- that could apply to this containment,
16 things might have gone more smoothly, but we don't, and we
17 have to rely on a lump-parameter code.

18 That means you have to have an excellent
19 calibration against experiments and scale properly to the
20 actual plant, and it's those details that you go through,
21 and it's a grinding sort of thing to go through, because you
22 are doing an approximation to the Navier-Stokes equation,
23 and those approximations need to be justified, and there's a
24 rigorous, precise science associated with that. That's all
25 we're doing.

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1 MR. BARTON: That's it for AP600.

2 CHAIRMAN JACKSON: I actually think I'm going to
3 allow the Commissioners to ask any final questions. We're
4 actually going to end the meeting on this subject.

5 COMMISSIONER DICUS: To reiterate, you said
6 there's no red flags so far. You should know by now if
7 there are. You don't anticipate any?

8 DR. SEALE: Well, certainly, if we can get a
9 satisfactory word on this mixing problem in the containment,
10 that's the one area where I see an issue that could give all
11 of us pause.

12 COMMISSIONER DICUS: Okay. But given that, you
13 think this September date is meetable?

14 DR. SEALE: Yes. We certainly plan to meet our
15 schedule.

16 MR. BARTON: Which is a July report to the
17 Commission.

18 DR. SEALE: That's right. Yes.

19 CHAIRMAN JACKSON: Very good. Thank you.

20 I think this has been a very healthy discussion --

21 DR. SEALE: Thank you.

22 CHAIRMAN JACKSON: -- and your views are critical
23 in our evaluation of a number of difficulty and, frankly, I
24 think very forward-looking stances and issues that the
25 Commission is dealing with, and I, therefore, encourage you

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1 to continue to be forward-looking in bringing issues to our
2 attention, and we'll cull through the remaining list and see
3 which ones might be appropriate for our next discussion.

4 DR. SEALE: Let me make one statement.

5 CHAIRMAN JACKSON: Please.

6 DR. SEALE: It's a real pleasure for us to get
7 again a demonstration that, when we make our
8 recommendations, they are not recommendations that are --
9 well, they receive scrutiny --

10 CHAIRMAN JACKSON: Yes.

11 DR. SEALE: -- receive critical thought on your
12 part, and that's the only way we can possibly have an
13 impact, is if they do, and we appreciate it very much.

14 CHAIRMAN JACKSON: Well, that's the game in town.
15 We're adjourned.

16 [Whereupon, at 2:35 p.m., the public meeting was
17 concluded.]

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