

# Official Transcript of Proceedings

## NUCLEAR REGULATORY COMMISSION

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435th Meeting

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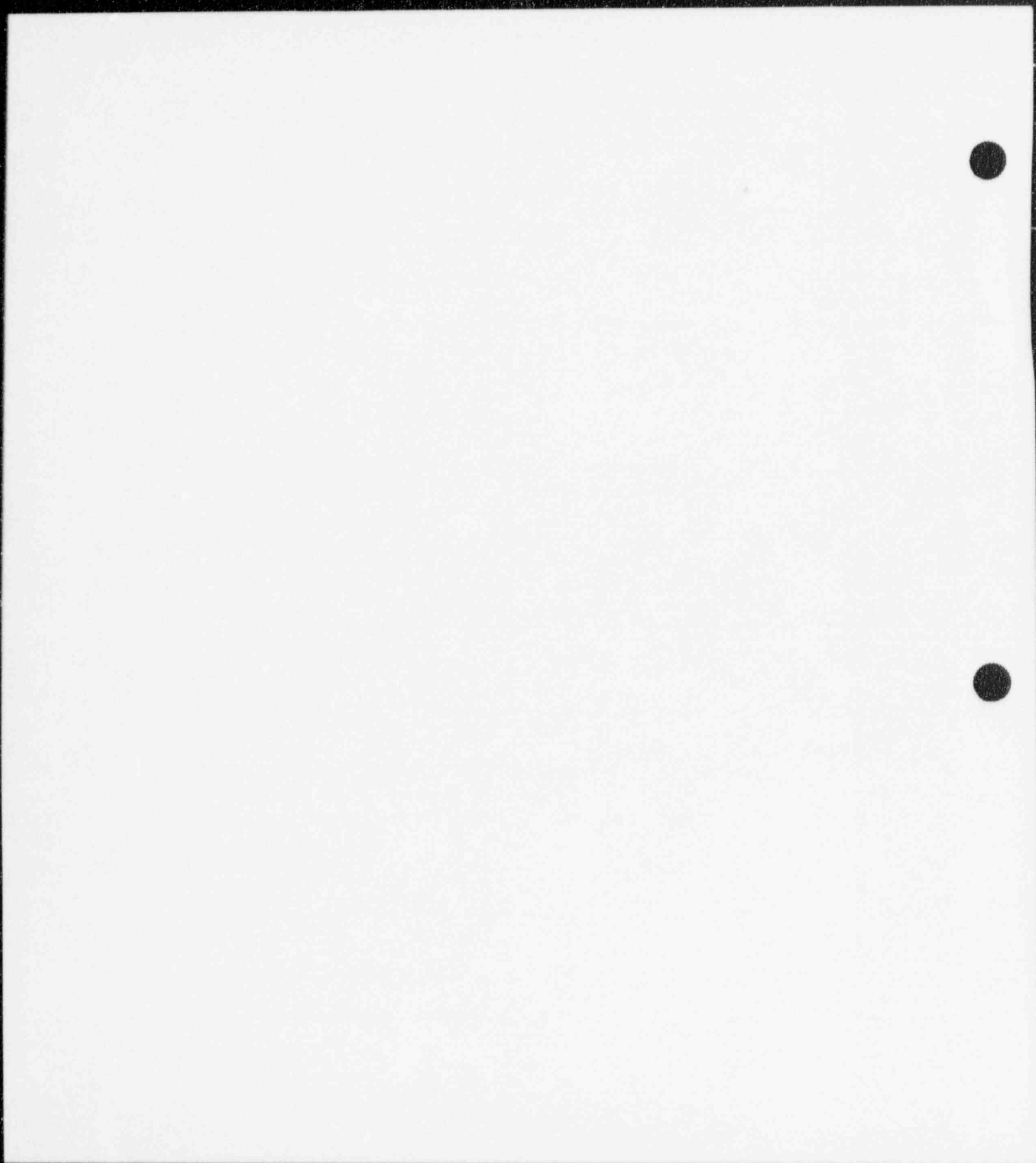
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**D I S C L A I M E R**

**PUBLIC NOTICE  
BY THE  
UNITED STATES NUCLEAR REGULATORY COMMISSION'S  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS**

**OCTOBER 10, 1996**

The contents of this transcript of the proceedings of the United States Nuclear Regulatory Commission's Advisory Committee on Reactor Safeguards on OCTOBER 10, 1996, as reported herein, is a record of the discussions recorded at the meeting held on the above date.

This transcript has not been reviewed, corrected and edited and it may contain inaccuracies.

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

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435TH MEETING

ADVISORY COMMITTEE ON REACTOR SAFEGUARD (ACRS)

+ + + + +

THURSDAY

OCTOBER 10, 1996

+ + + + +

ROCKVILLE, MARYLAND

+ + + + +

The Advisory Committee met at the Nuclear  
Regulatory Commission, Two White Flint North, Room T2B3,  
11545 Rockville Pike, at 8:30 a.m., Thomas S. Kress,  
Chairman, presiding.

COMMITTEE MEMBERS:

THOMAS S. KRESS, Chairman

ROBERT L. SEALE, Vice Chairman

GEORGE E. APOSTOLAKIS

JOHN J. BARTON

IVAN CATTON

MARIO H. FONTANA

DON W. MILLER

DANA A. POWERS

WILLIAM J. SHACK

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1 ACRS STAFF PRESENT:

2 JOHN T. LARKINS, Executive Director  
3 ROXANNE SUMMERS, Technical Secretary  
4 SAM DURAISWAMY  
5 CAROL A. HARRIS  
6 RICHARD P. SAVIO  
7 PAUL BOEHNER'  
8 NOEL DUDLEY  
9 MADHAT M. EL-ZEFTAWY  
10 MICHAEL MARKLEY  
11 AMARJIT SINGH  
12

13 ALSO PRESENT:

14 JIM MILHOAN  
15 JESSE FUNCHES  
16 JIM JOHNSON  
17 JOHN CRAIG  
18 MIKE CASE  
19 MIKE JOHNSON  
20 THEMIS SPEISS  
21 TOM HILTZ  
22 MAL KNAPP  
23 MATT CHIRAMAL  
24 BRUCE BOGER  
25 JARED WERMEIL

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1 ALSO PRESENT (continued):

2 GARY JOHNSON

3 JOHN GALLAGHER

4 AL CHAFEE

5 ROBERT DENNIG

6 NANCY TURLEY

7 JOHN HOLMES

8 FRANK GARRETT

9 RENALDO JENKINS

10 PHIL QUALLS

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## A-G-E-N-D-A

	<u>Agenda Item</u>	<u>Page</u>
1		
2		
3	Opening Remarks by the ACRS Chairman	288
4	Items of Current Interest	289
5	Status of NRC Strategic Assessment and	
6	Rebaselining Effort, Jim Milhoan	297
7	Digital Instrumentation and Control Systems	
8	Remarks by Subcommittee Chairman	393
9	Briefing and Discussion, M. Chiramal	395
10	Control Room Back Panel Fire at Palo Verde Unit 2	
11	Reamarks by Subcommittee Chairman	447
12	Briefing and Discussion, R. Denning	449
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		

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

(8:34 a.m.)

CHAIRMAN KRESS: Will the meeting please come to order? Today is the second day of the 435th Meeting of the Advisory Committee on Reactor Safeguards. During today's meeting, we plan to consider the following items:

(1) status of the NRC strategic assessment and rebaselining effort, (2) digital I&C systems (3) we're going to have a briefing on the control room back-panel fire at Palo Verde Unit 2.

Then we'll do the usual ACRS business of reconciliation, planning and procedures and future activities and preparation of the reports.

A portion of today's meeting may be closed to discuss organization and personnel matters that relate solely to the internal personnel rules and practices of this advisory committee and matters, the release of which, would constitute clearly unwarranted invasion of personal privacy.

This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Dr. John T. Larkins is the designated federal official for the initial portion of the meeting. We have received no written statements or requests for time to make oral statements from members of the public regarding today's

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1 sessions.

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

7 I have an item of interest. Flu shots for  
8 ACRS members will be available on the second floor of One  
9 White Flint North either today or at lunch or during the  
10 break this morning. If you go during lunch, they advise  
11 you to get your lunch first and bring it there with you,  
12 and you can eat it while you wait, if you want a flu shot.

13 Other items of current interest are in your  
14 package. Current interest items -- I don't care at this  
15 time to highlight any of them. You can read them when you  
16 get a chance. We do have at least three letters to get  
17 out, one of which is an A+. That's your's, Mario, and I  
18 think we're in good shape on it.

19 We would like to get maybe a first reading  
20 today of the thermal hydraulic research program plant. Do  
21 you have --

22 MEMBER CATTON: Tom, we can't get a first  
23 reading today?

24 CHAIRMAN KRESS: Can't we?

25 MEMBER CATTON: The staff's not going to be in

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1 until tomorrow morning.

2 CHAIRMAN KRESS: Oh, that's right. I was  
3 thinking of Don Miller's thing. We'll have a first  
4 reading on that.

5 MEMBER MILLER: We'll give it a shot, yeah.

6 CHAIRMAN KRESS: Okay. Sorry, Ivan, you're  
7 right.

8 MEMBER CATTON: I'm willing.

9 CHAIRMAN KRESS: No, that's all right.

10 VICE CHAIRMAN SEALE: It may be considered  
11 prejudgemental though.

12 CHAIRMAN KRESS: Yes. That's all I have.

13 Does --

14 VICE CHAIRMAN SEALE: I have a --

15 CHAIRMAN KRESS: Well, just a minute. Oh,  
16 yeah; I'm reminded we do have some candidates for ACRS  
17 membership to interview. This is tomorrow. You will be  
18 given -- each of you will be given the schedule, so please  
19 -- they have copies of it already? Okay, please note your  
20 time and behave accordingly.

21 VICE CHAIRMAN SEALE: I have a couple of  
22 things.

23 CHAIRMAN KRESS: Okay, please.

24 VICE CHAIRMAN SEALE: First of all, each of  
25 you have received a copy of the program agenda for the

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1 meeting next week in Boston. If you have any changes that  
2 you would like to suggest that we include on that, I would  
3 appreciate knowing about it today because we'd like to  
4 wrap that up.

5 I got some comments from George the other day,  
6 and I'd like to discuss those with you just a little bit,  
7 George, so we can make those adjustments. If anyone else  
8 has any, I'd appreciate hearing from you. One other  
9 matter. The last item on the program under the  
10 consideration of things having to do with research topics  
11 is a copy -- or is a discussion of a letter -- cryptic  
12 note of a discussion of a letter from Commissioner Rogers.

13 We have a copy of that letter. It was sent to  
14 Tom some time back, and you all should have a copy of that  
15 at your desk now. It turns out this is a letter that the  
16 Commissioner wrote which includes in it the suggestion of  
17 a rather significant change in the relationship between  
18 the research division and the rest of the Commission.

19 I don't think we could have done it real  
20 justice by trying to summarize it too tersely, and so  
21 we've given you a copy of the letter; and I would  
22 appreciate it if you would read that, because that's a  
23 suggestion we're going to want to discuss at that time a  
24 well.

25 I don't think it's necessary to change the

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1 outline of the program though in any way. Again, if you  
2 can give me any suggested changes in the agenda, I'd  
3 appreciate it.

4 MEMBER CATTON: Where is this letter?

5 VICE CHAIRMAN SEALE: It should be at your --  
6 it should be in front of you.

7 MEMBER SHACK: Organizational matters, I  
8 think.

9 CHAIRMAN KRESS: It looks like this, Ivan.  
10 That's it.

11 MEMBER CATTON: Oh, okay. Got it.

12 VICE CHAIRMAN SEALE: That's all I have, sir.

13 CHAIRMAN KRESS: Do other members have  
14 anything they wish to bring up at this time? Seeing  
15 nothing, I guess we'll move to the first item on our  
16 agenda. This is a discussion and a briefing on the status  
17 of the strategic assessment and rebaselining effort.

18 MEMBER APOSTOLAKIS: Maybe -- Tom?

19 CHAIRMAN KRESS: Yes.

20 MEMBER APOSTOLAKIS: Talk about the review of  
21 the PRA, SRP --

22 CHAIRMAN KRESS: You're changing schedule?

23 MEMBER APOSTOLAKIS: Yeah. We will have the  
24 PRA subcommittee meeting at the end of this month, October  
25 31st and 1st. And the staff promised to send us two

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1 documents. One is a NUREG report or a draft report, and  
2 the other is a rough draft of the regulatory guide. They  
3 promised to Federal Express them or to give them to the  
4 ACRS staff for sending them to us by Thursday of next  
5 week, or the latest, Friday.

6           So we will have them for -- I don't know, ten  
7 days or so. But then, they will hit us with a couple more  
8 documents, and they will -- they have a deadline from the  
9 Commission, which is the 31st of December, and they will  
10 do everything they can to honor that deadline. We are  
11 supposed to write a letter.

12           And the latest time is the December meeting.  
13 But otherwise, they will not have a letter when they send  
14 the staff to the commissioners. And we are not meeting in  
15 January as a full committee, so -- now in order to do  
16 that, they suggested that we have a second meeting which  
17 will be Thursday and Friday, November 21st and 22nd.

18           And they -- well, not they. But, I mean, we  
19 thought that to help things move along, it would be best  
20 if all the members came on the 21st and 22nd, not just the  
21 PRA subcommittee members. So -- because the documents,  
22 according to rumor, contain a lot of material. Some of  
23 them are not easy to read. So, if we are to write an  
24 intelligent letter in December, it would be very difficult  
25 with, you know, an hour, two hour presentation to really

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1 bring everybody up to speed.

2 So, I don't know. Ivan, can you come?

3 MEMBER CATTON: If it's Thursday/Friday, sure.

4 MEMBER APOSTOLAKIS: Thursday/Friday, 21st,  
5 22nd of November.

6 MEMBER CATTON: Yes.

7 MEMBER APOSTOLAKIS: Does anybody have a  
8 problem with that?

9 CHAIRMAN KRESS: Me.

10 MEMBER APOSTOLAKIS: You do?

11 CHAIRMAN KRESS: I won't be able to make the  
12 October --

13 MEMBER BARTON: I won't make October either.

14 MEMBER APOSTOLAKIS: Oh, but the October, we  
15 don't ask everyone to be there.

16 MEMBER BARTON: November's no problem.

17 CHAIRMAN KRESS: November's no problem.

18 MEMBER APOSTOLAKIS: November -- I think the  
19 November meeting will be much more critical. John?

20 MEMBER BARTON: Maybe. It's a surprise. I  
21 have to think about my schedule. I'm supposed to be some  
22 place else the first three days of that week.

23 MEMBER APOSTOLAKIS: That someplace else is  
24 where, in Korea or --

25 MEMBER BARTON: Argentina.

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1 MEMBER APOSTOLAKIS: Argentina.

2 VICE CHAIRMAN SEALE: Goodbye.

3 MEMBER MILLER: Well, it's a reason to short  
4 circuit that meeting a little bit maybe to be there.

5 MEMBER APOSTOLAKIS: Because, you know, the  
6 week after is Thanksgiving, and then we have the -- you  
7 know, shortly thereafter, we have the full committee  
8 meeting.

9 VICE CHAIRMAN SEALE: Yes.

10 MEMBER APOSTOLAKIS: And that's all.

11 VICE CHAIRMAN SEALE: Well, if we're waiting,  
12 along those similar lines, there's a meeting of the  
13 materials and metallurgy subcommittee and the severe  
14 accidents subcommittee that's going to be on the 5th and  
15 6th of November right before the ACRS meeting. And the  
16 topics will be the steam generator tube rupture problem.

17 And presumably, this meeting will be the --  
18 well, at least the wrap up on the current round of  
19 meetings on that subject. And so, we should expect to try  
20 to get a letter out on that then at the end of the week at  
21 that full committee meeting. So, --

22 MEMBER SHACK: This will be the full package.

23 VICE CHAIRMAN SEALE: Yes, this is the full  
24 package.

25 MEMBER SHACK: Not bits and pieces at this

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1 point; this is it.

2 VICE CHAIRMAN SEALE: And then actually,  
3 that's on Tuesday and a half a day Wednesday, and then the  
4 afternoon on Wednesday is a discussion of source terms, I  
5 believe. Isn't that correct, Mario?

6 MEMBER FONTANA: I don't have it here.

7 MR. DURAISWAMY: That's the schedule, Bob.

8 VICE CHAIRMAN SEALE: Yeah, that's the  
9 schedule, yes.

10 MEMBER FONTANA: Yeah, I have some written  
11 stuff, but I didn't know whether --

12 CHAIRMAN KRESS: That's the application of the  
13 source terms to new -- to operating reactors?

14 VICE CHAIRMAN SEALE: Yes, yes.

15 CHAIRMAN KRESS: And it will be during our P&P  
16 meeting?

17 VICE CHAIRMAN SEALE: Well, we're going to  
18 have to figure out when to have the P&P meeting. We may  
19 have to have it at lunch on, say, Tuesday.

20 CHAIRMAN KRESS: Something, yes.

21 VICE CHAIRMAN SEALE: Or something, yes.

22 CHAIRMAN KRESS: Okay.

23 VICE CHAIRMAN SEALE: We arrange your life for  
24 you that way, Tom, --

25 CHAIRMAN KRESS: I appreciate that.

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1 VICE CHAIRMAN SEALE: -- so you won't feel  
2 over burdened with planning.

3 CHAIRMAN KRESS: Are we now ready for the  
4 rebaselining --

5 MR. MILHOAN: Well, we can start. We still  
6 have one person coming over with our slides, but I think I  
7 can get started. And hopefully, he will arrive with the  
8 slides as we -- he's got the hard copy. But let me go  
9 ahead and get started. I'm Jim Milhoan, and I was co-  
10 chair of the Strategic Assessment and Rebaselining  
11 Steering Committee.

12 With me at the table today is Jim Johnson from  
13 the Chairman's Office who was also co-chair of the  
14 Strategic Assessment and Rebaselining Steering Committee.  
15 Jesse Funches is also at the table. Jesse was a member of  
16 the steering committee, and he is -- Jesse's leading up  
17 the Phase III effort, and I'll talk about the different  
18 phases in just a moment in production of the strategic  
19 plan.

20 And joining us shortly will be John Craig, who  
21 is the Task Manager for Phase II of our effort and has  
22 been the overall -- presently the overall coordinator for  
23 the steering committee. Also in the audience are members  
24 -- are many members of the steering committee, and also  
25 members -- some writers of the direction setting issue

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1 papers.

2 And today, in the presentation, we will be  
3 shifting back and forth because we understood that you  
4 particularly wanted to hear about three of the issue  
5 papers, and we will have the writers and one sponsor come  
6 up and discuss those papers as we go through the meeting  
7 process.

8 With respect to the agenda today, I would  
9 propose -- we understood you did want to hear specifically  
10 about three issue papers. But, on the agenda today, I  
11 will briefly go through for you the process that we've  
12 performed to date, discuss that, discuss sort of a process  
13 discussion. And I'll be -- I'll try to be very efficient  
14 and brief on that discussion.

15 Obviously I'll not rush; and if you have  
16 questions on the process, I will do that. But my  
17 understanding is also I wanted to allow enough time at the  
18 end to be able to go through the three issue papers of  
19 interest to you.

20 So that --

21 CHAIRMAN KRESS: Well, they're all of interest  
22 to us.

23 MR. MILHOAN: I understand that. The three  
24 that you had identified, and then others, obviously, that  
25 we have. Because the issue papers are very broad in

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1 nature and are really of a direction setting nature for  
2 the agency. So, let me start a little bit about the  
3 purpose of the strategic assessment itself in the  
4 beginning.

5           Against the backdrop of changes in our  
6 regulatory and physical environment, in August of 1995,  
7 the process was initiated by Chairman Jackson requesting a  
8 formation of a steering -- of a Strategic Assessment and  
9 Rebaselining Steering Committee in which she provided in  
10 her memo a number of objectives for us to accomplish.

11           But the intent was to better equip the agency  
12 to face the onslaught of challenges and changes in our  
13 internal and external environment. I think it goes  
14 without saying the reductions in our budget is a driving  
15 factor -- the factors of the high level waste situation,  
16 external regulation of DOE, the situation with our  
17 commercial reactors, no new orders coming through, life  
18 extension, potential early shut down of a number of plants  
19 and going into early decommissioning.

20           So, there's a large number of internal and  
21 external factors that are driving the agency. And the  
22 Chairman, in light of this, thought it would be very  
23 appropriate for us to go through a strategic assessment  
24 and rebaselining process. Jim Johnson and myself were  
25 chosen as the co-chairs of the steering committee.

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1           The steering committee was made up of deputy  
2 office directors and office directors of the major program  
3 offices. Karen Cyr, the General Counsel, was on the  
4 steering committee, along with Larry Chandler. Ed Jordan  
5 from AEOD, a member of the steering committee. Frank  
6 Moralia, then Deputy Director of NRR. Mal Knapp, Deputy  
7 Director of NMSS.

8           Jesse Funches, Deputy Director, Office of  
9 Controller. Ed Halman, Deputy Director of Office of  
10 Administration. Moe Levin, Deputy Director of IRM. Jim  
11 McDermott, Deputy Director of Office of Personnel. Themis  
12 Speis, Deputy Director of Office of Research. And  
13 representing the regions was Luis Riaz, the Deputy  
14 Regional Administrator in Region 2.

15           So, you can see the steering committee itself  
16 was made up of very broad senior management of the agency,  
17 along with representation from the regions. John Craig's  
18 arrived, and we'll go through -- and I'll have the benefit  
19 -- we'll have the benefit of the slides as we talk.

20           In addition, the steering committee was -- had  
21 the benefit of a support staff of NRC members on the  
22 support staff to assist us in our effort, along with a  
23 contractor public strategies group to provide us expert  
24 assistance in this particular process.

25           I think it would be best if we go to the first

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1 -- the slide which I'll discuss in the overview of the  
2 strategic assessment and rebaselining phases of discussing  
3 the four phase effort that we have undertaken. We have  
4 the benefit of the first slide. I'm on the four phases  
5 now, John.

6           We began and established basically a four  
7 phase process as a beginning in August of 1995. The first  
8 phase -- and there will be a flow chart that I will  
9 discuss on the next slide -- involved basically a bottoms  
10 up approach of a strategic assessment of the agency on a  
11 review of the activities of the agency, identification of  
12 strategic issues, and further identification of direction  
13 setting issues.

14           And I have a slide that will further explain  
15 that. The Phase II involved the rebaselining and  
16 development of the decision papers or the issue papers and  
17 which you have copies of those issue papers. And John  
18 will discuss Phase II in his part of the discussion, and  
19 it also involves the stakeholder process, the stakeholder  
20 involvement, that process that we're presently in. And  
21 John will discuss also that activity.

22           Phase III involves actually the production of  
23 the strategic plan. That strategic plan production will  
24 be based, to a large extent, a very large extent, on the  
25 Commission's decisions on the direction setting issues

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1 papers. In other words, the issue papers you have in  
2 front of you forms the foundation for development of the  
3 agency's strategic plan.

4 And Jesse will discuss, in his part of the  
5 presentation, the Phase III and the production of the  
6 strategic plan.

7 And finally, Phase IV would be the  
8 implementation of the Commission's decision, and also the  
9 budget process. And Jesse will mention a little bit about  
10 that in his presentation.

11 As I said, in Phase I, I would discuss a  
12 little bit of the flow chart. I will do this in an  
13 abbreviated fashion. But, if you have questions, I'll  
14 certainly stop and do that.

15 The initial thing that we approached in the  
16 bottoms up approach is to try to say what are the  
17 activities of the agency at the lowest -- what we call the  
18 functional level or lowest organizational level of the  
19 agency. Primarily, in most organizations, that's at the  
20 branch level of the agency, though there are other titles  
21 in other groups.

22 But if you take a look at the functional  
23 organization level and you go to that lowest functional  
24 level, that's where we attempted initially to define the  
25 activities of the agency. We asked the offices at that

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1 lowest organization level to provide the steering  
2 committee three items.

3           We asked them to describe the activities  
4 they're presenting doing. We asked them also to identify  
5 what is the basis -- what they think the basis is for  
6 their present activity. Is it because of a regulation?  
7 Is it because of a statute? Is it because they think it,  
8 in their own mind, is something that's beneficial to do,  
9 but not based on a regulation or statute?

10           We also asked for input on each of the  
11 activities what are the internal and external factors of  
12 present and in the future that affect the way you  
13 accomplish the activities. We received back from this  
14 input, this request. And when we looked at it, we  
15 identified approximately 4,500 individual activities the  
16 agency does.

17           We then attempted to then take those -- at the  
18 activity level, to take it and start working and produce a  
19 process where we could start analyzing the activities. As  
20 you're certainly aware, the three major groupings of the  
21 NRC and the way we accomplish our functions are the  
22 reactor area, the materials area, and the management and  
23 support area.

24           We took those three major groupings and did a  
25 matrix binring activity of looking at, within those three

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1 major groupings, what are the lines of business that the  
2 agency does in those three major groupings; and within a  
3 line of business, what are the functions that are  
4 performed in a line of business?

5 I'll give you an example of lines of business.  
6 It's -- in the materials area, for example, we consider a  
7 line of business high level waste, low level waste,  
8 decommissioning, materials and medical -- the major --  
9 what does the materials side of the organization do. And  
10 then, as part of the matrix, within the line of business,  
11 what are the major functions within a line of business.

12 For example, standards -- in materials area,  
13 standards development would be one; licensing would be  
14 another function; compliance would be another function.  
15 So we took -- within the line of business, we developed a  
16 matrix approach, and then took each of the 4,500  
17 activities and tried to bin them into each of the lines of  
18 business and the functions within a line of business.

19 What we're attempting to do on that is to  
20 reduce any organizational bias, but really take the agency  
21 and say never mind what Branch X or Branch Y is called,  
22 what are the activities and the lines of business and the  
23 functions of the agency.

24 Attempting to do this -- and we then developed  
25 narrative write ups with respect to each of these lines of

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1 business and function so that we could operate as a  
2 steering committee on these. And we carried within each  
3 narrative -- we said okay, here are the lines of business,  
4 here are the functions.

5           Within each function, what are the activities  
6 performed in those functions. What are the basis --  
7 again, what is the basis for why we're doing the  
8 functions, and what are the internal and external factors  
9 that affect the way we're doing it.

10           We found that we again had, within the  
11 narrative write ups, we had -- we turned out to have four  
12 major groups of narrative write ups. When we looked, we  
13 had the reactor area, the materials area, the management  
14 and support area; but when we started looking at some of  
15 the narrative write ups and some of the functions, they  
16 cross cut all of the three major groupings of reactors,  
17 materials, and management and support.

18           And I'll give you an example. The training  
19 area, for example, cross cuts all of those. So we  
20 separated those out into what we call cross cutting  
21 functions in our work. So we had narrative write ups for  
22 those type of things that crossed all of the programs of  
23 the agency.

24           We then -- as a steering committee, we  
25 developed this. And what we were trying to do is to have

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1 that description. But further, we were now trying to  
2 assess -- take that and do an assessment basically from a  
3 top down approach to say now that we have this, based on  
4 our own experience in the agency, what are the strategic  
5 issues that are facing the agency?

6 We identified approximately 170 individual  
7 strategic issues. We said that's a very, very large  
8 number. The nature of these issues -- the importance of  
9 these issues, as you would expect, would vary. Some of  
10 them more operational, some of them very high level. So,  
11 we took those 170 issues and we then went through a  
12 process of saying okay, what are the common  
13 characteristics of these issues?

14 And we did a bundling exercise of trying to  
15 take all of these issues and dividing them up into groups.  
16 We found about 25 common grouping of issues. We then took  
17 those common group of issues and then did a further  
18 analysis saying okay, once we took a look at the grouping  
19 of issues, what is -- out of those grouping of issues,  
20 what is really the direction setting issue that the agency  
21 is facing that the agency needs to address to establish a  
22 strategic direction for the future?

23 So we were able to develop -- out of this  
24 grouping, we found 22 direction setting issues. Three of  
25 the groupings we found were more of an operational nature

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1 of effectiveness and efficiency, issues -- very important  
2 issues, but they were not of direction setting issue  
3 nature. So we found 22 direction setting issues.

4 In our Phase I report to the Commission, we  
5 had identified this. The Commission, when they looked at  
6 our Phase I report, then further identified two other  
7 direction setting issues they desired the committee to  
8 address. And those were the area of regulatory excellence  
9 and reactor decommissioning. We had had a write up in  
10 reactor decommissioning, but because of the ongoing  
11 activities in that area, we did not -- the committee, in  
12 its first review, thought that there were present  
13 activities that were being addressed.

14 But in light of that, the Commission said no,  
15 we really want you to develop an issue paper on that  
16 topic. And so, we did that in our Phase II effort in the  
17 development of the issue papers.

18 CHAIRMAN KRESS: Was that the one on reactor  
19 decommissioning or the --

20 MR. MILHOAN: Reactor decommissioning.

21 CHAIRMAN KRESS: Okay.

22 MR. MILHOAN: That's the one that -- that was  
23 an additional one the Commission requested to develop.  
24 And the subject of regulatory excellence -- DSI 23 and 24  
25 were the two extra papers the Commission requested the

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1 steering committee to develop.

2 I will now turn it over to John Craig, who was  
3 our Task Manager for the Phase II and for the remaining  
4 phases, to let him discuss the status of where we are  
5 presently in Phase II. John?

6 MR. CRAIG: Thanks. Good morning. I  
7 apologize for being late.

8 CHAIRMAN KRESS: That's all right. We made  
9 good use of the time.

10 MR. CRAIG: These copies are hot off the  
11 presses. Phase II started right after the first of the  
12 year. And as Jim described, there were some 22 very broad  
13 direction setting issues. And we started with the help of  
14 PSG, Public Service Group Consultant, to put together a  
15 team of writers.

16 The steering committee members served as  
17 sponsors for the issue papers, and I'll cover those in  
18 just a second. And we held a series of think tanks for  
19 each issue paper. And we developed options, broad  
20 options, that were -- perhaps some people would consider  
21 them too extreme.

22 The thought was that if you consider an option  
23 that you would normally reject, discussing it and  
24 discussing issues related to that option could result in  
25 some creative thinking and new perspectives on, not only

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1 the issue, but other issues.

2 So some of the options in the issue papers go  
3 beyond the bounds of where we are today by design.

4 CHAIRMAN KRESS: How were these options  
5 developed, just by brainstorming?

6 MR. CRAIG: Yes. And we had a think tank, a  
7 brainstorming session, for each one of the DSI's. And  
8 there were charts on the walls, and anybody that had an  
9 option that related to a DSI, you just wrote it down  
10 without putting a value judgement on it and trying to  
11 stimulate more thought.

12 And some of the discussions were more  
13 enthusiastic than others, but they were all pretty  
14 enthusiastic. Some of the options were very creative.  
15 And so, you see a number of options in the issue papers  
16 that would require legislation, for example. So, by early  
17 spring, we prepared 24 papers; and each paper -- and I  
18 think you've seen them and we'll talk about three, ten, 11  
19 and 12, in a couple of minutes.

20 But it has a background section, a description  
21 of the direction setting issue, and some of the subtler  
22 issues. While the direction setting issue was very broad,  
23 there are a number of issues that range from not quite  
24 very broad -- just under it, all the way down to  
25 implementing details associated with the options.

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1           The papers are really kept at the high level,  
2 and they contain other questions called subsumed issues.  
3 And the thought is if you answer the direction setting  
4 issue, then the answer to these other questions will be  
5 inherent in the decisions made on the direction setting  
6 issue.

7           They contain a discussion of factors, internal  
8 and external factors, that should be considered related to  
9 each one of the issues. It's not necessarily a  
10 comprehensive discussion of all of the factors. Rather,  
11 it's the primary factors associated with each one of the  
12 issues.

13           There's a discussion of the options, there's a  
14 summary description of the options, and then a more  
15 complete discussion of the options, and a section that  
16 contains the Commission's preliminary views associated  
17 with that direction setting issue.

18           All of the issue papers are in the public  
19 document room. They're available on the Internet. We've  
20 made them available on AUTOS, the agency-wide LAN system.  
21 We have them hooked up to a high speed printer in White  
22 Flint One, and there's -- if you send an e-mail to Gene  
23 Wood, you can get copies very quickly.

24           Rather than having all the printers in White  
25 Flint One and Two actively printing them, we thought we'd

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1 take a more strategic approach and have them hooked up to  
2 a printer in White Flint One.

3 MR. MILHOAN: John, I want to correct one  
4 thing. You said all -- 16 of the issue papers, and I  
5 think you'll discuss -- yeah, I think you'll discuss that  
6 when you go through. But we have 16 of the issue --

7 MR. CRAIG: 16.

8 CHAIRMAN KRESS: How did you receive the  
9 preliminary views of the commissioners, or did you make  
10 presentations to them or --

11 MR. CRAIG: We had -- over the course of the  
12 development of the papers, there was a discussion with the  
13 commissioners to highlight the options that were being  
14 considered for a direction setting issue. We didn't go  
15 into great detail with the various options, but to give  
16 them a sense of the options that were being considered.

17 We had follow up discussions with the  
18 Commission's technical assistants in more depth to discuss  
19 the options and the issue papers. And then finally, the  
20 Commission's preliminary reviews were contained in staff  
21 requirements memoranda.

22 VICE CHAIRMAN SEALE: Could I ask -- just to  
23 get a flavor of this, I guess what you did is you sort of  
24 pushed people out of the box so they'd think out of the  
25 box with this approach; but then I would imagine that a

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1 lot of the issues that came up, you found really belonged  
2 in another issue paper in the final --

3 VOICE: May I have your attention, please?

4 May I have your attention? Our employees are invited to  
5 attend this morning's 1996 Combined Federal Campaign Kick  
6 Off scheduled for 9:30 a.m. in the One White Flint  
7 Commissioner's Conference Room on the 1st Floor.

8 The kick off will features remarks by Chairman  
9 Jackson, presentation of awards for last year's campaign,  
10 guest speaker Shonie Raddis representing the Mid Atlantic  
11 Burn Camp Fund, and performance of the "Macarena" dance  
12 from the White Flint Country Day Children's Dance Troup.

13 Thank you.

14 CHAIRMAN KRESS: Did you get all that on the  
15 transcription?

16 [Laughter.]

17 VICE CHAIRMAN SEALE: Well, anyway, getting  
18 back to the question you were going to answer.

19 MR. CRAIG: It's a question we wrestled with  
20 early on. We thought about trying to have a matrix for  
21 key issues that would cut across the DSI's. And what we  
22 found was that the matrix, even for a small number of  
23 papers, became unwieldy. Because the issues are very  
24 broad, that the decisions in one affect either directly or  
25 indirectly decisions in another.

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1 VICE CHAIRMAN SEALE: Yes.

2 MR. CRAIG: So it became difficult to do that.

3 MR. MILHOAN: I do think though when we do the  
4 preparation of strategic planning and framework document  
5 which you have access to in the strategic arenas, we tried  
6 to map each of the direction setting issues to a strategic  
7 arena.

8 VICE CHAIRMAN SEALE: You can't afford to have  
9 action plan elements buried in each strategic issue which  
10 are at conflict with action plans in other issues and so  
11 on.

12 MR. CRAIG: Exactly. And the next item, the  
13 strategic planning framework document, is a document that,  
14 as Jim noted, groups the issue papers into something  
15 called strategic arenas. And Jesse will cover those a  
16 little bit also. And, for example, all of the operating  
17 reactor -- or the power reactor DSI's are in one strategic  
18 arena.

19 So they're grouped together for just that  
20 reason, as well as some other considerations. So that the  
21 strategic planning framework document, while it's not the  
22 strategic plan, it does reflect the strategic arena  
23 concept and the issues that are going to be addressed  
24 within that arena, and the plan will be developed along  
25 the lines of strategic arenas.

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1           The process paper is the other key document  
2 for stakeholders because it provides directions on how to  
3 get copies of the documents, how to send comments in  
4 through SECY, the e-mail addresses there, those kind of  
5 things. And as I said, we've done -- covered a lot of  
6 bases to make them available both with -- for the internal  
7 staff and for the external stakeholders.

8           This slide lists the 16 DSI's that are  
9 currently included in the strategic initiative. And we  
10 didn't change the numbers. We had 24 originally, so one  
11 and three and eight and some of the other ones weren't  
12 there just because it's just too confusing. So DSI 1 and  
13 DSI 3 were combined with seven and 12.

14           And the Commission decided that the direction  
15 setting issues for those areas of little risk were more  
16 appropriately dealt with in DSI 12, risk informed  
17 performance based regulations. And some of the other  
18 DSI's that aren't listed there, the ones between 14 and  
19 20, the Commission made the determination that it was more  
20 appropriate to deal with things like staffing and  
21 organization after the decisions were made about the  
22 mission and these other DSI's.

23           So, with the ones that were deferred and the  
24 ones that were combined, we went from 24 to 16. Before I  
25 leave that slide -- I'm sorry, let me put it back up.

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1 I'll go back to the steering committee members so you know  
2 who the sponsors were, the senior managers for the  
3 development of these issue papers.

4           You'll meet three of the writers in just a few  
5 minutes. DSI's 2 through 9, the sponsor was Dr. Mel  
6 Knapp. DSI 10 and 11, as well as 24, the sponsor was  
7 Frank Moralia. DSI 12, the sponsor was Dr. Themis Speis,  
8 as well as DSI 22. DSI 13, role of industry and enhancing  
9 regulatory excellence, was Ed Jordan.

10           Public communications initiatives, DSI 14, was  
11 Karen Cyr. DSI 20, international, was Jim Shea. DSI 21  
12 is Jesse Funches. And that covers them all. And working  
13 with the sponsors, we had a number of staff writing the  
14 papers, and then they were reviewed by the steering  
15 committee as they were sent to the Commission.

16           MEMBER FONTANA: Did you say 23?

17           MR. CRAIG: 23 is Frank Moralia. I'm sorry,  
18 reg. excellence is Ed Jordan.

19           VICE CHAIRMAN SEALE: Ed Jordan.

20           MR. CRAIG: Now, we're holding a series of  
21 stakeholder meetings both for the staff and for external  
22 stakeholders. We've completed last week meetings with  
23 internal staff members. We held a meeting with senior  
24 managers in the White Flint complex. And we held meetings  
25 in each one of the regions.

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1                   And the presentations parallel the  
2 presentation you're receiving this morning. The meetings  
3 in the regional offices were open to all regional staff  
4 members. And we wanted them to understand not only the  
5 process, but the importance of their comments on the issue  
6 papers since they're going to be used as the foundation  
7 for the strategic plan.

8                   We have a number of external stakeholder  
9 meetings planned starting in late October, and both the  
10 information associated with the issue papers, as well as  
11 the meeting announcements, the agendas for these meetings,  
12 are also available on the Internet and FedWorld. And  
13 there's a Federal Register notice that's being published,  
14 and there's some press releases that have gone out  
15 associated with the meetings.

16                  CHAIRMAN KRESS: Who are considered external  
17 stakeholders? I know licensees would be and maybe owner's  
18 groups and vendors, but --

19                  MR. CRAIG: We'll start with the industry  
20 side. The obvious licensees, NEI groups, American Nuclear  
21 Society. Also IEEE, ASME, those kinds of organizations.  
22 Agreement states, public interest groups, organizations at  
23 the state level, the Illinois Department of Nuclear  
24 Safety, the Ohio Citizens For Safe Energy, I believe,  
25 Responsible and Safe Energy, those kind of groups also.

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1           So it's basically any group or member of the  
2 public without an NRC badge. Right, as well as our  
3 oversight committees, Congress and OMB. We've been --

4           CHAIRMAN KRESS: Of course.

5           MR. CRAIG: We've kept them well informed, and  
6 they have copies of the issue papers as well.

7           MR. MILHOAN: And Jesse and I have briefed OMB  
8 on our process last week, I believe.

9           MR. CRAIG: Very briefly, the conference  
10 format for the external meetings, we'll have a plenary  
11 session that will describe the process; and then we're  
12 going to break out by strategic arena and discuss each one  
13 of the DSI's.

14           We'll go over the issue, the background, the  
15 factors, the options, the preliminary views, and solicit  
16 comments from the public as to the options -- whether they  
17 agree with the options, if we missed something, if the  
18 factors were correctly characterized, or if there's  
19 another factor that may be equally important that may not  
20 be there.

21           So we're asking for those kind of comments  
22 from the public. And we've had contractor support in  
23 planning, and they're going to help us to conduct the  
24 meetings. The meetings will be transcribed. The comment  
25 period closes November the 15th.

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1 And between the middle of November and the  
2 beginning of December, we're going to review the comments.  
3 Actually, we're going to start reviewing them as soon as  
4 they come in and prepare something called a Stakeholder  
5 Interaction Report that will be available to the public.

6 We're going to put it up on FedWorld. It will  
7 be in the PDR. We're going to identify substantive  
8 comments that could have a direct bearing on the  
9 Commission's decision, and we're going to group those by  
10 issue paper and provide that to the Commission in early  
11 December.

12 The transcript of the meetings and all the  
13 comments will be appendices to that report so that all the  
14 comments that the staff gets will be available. SECY's  
15 maintaining a record of the comments that come in through  
16 them, as well as the ones that are going to come in  
17 through the Internet or written comments.

18 So that describes the preparation of the  
19 direction setting issue papers, and I'll turn it over to  
20 Jesse Funches to talk a little bit about Phase III. Then  
21 we'll go into the issue papers for DSI 10, 11 and 12.

22 MR. FUNCHES: One of the -- as Jim mentioned  
23 earlier, one of the major output, outcomes, of the  
24 strategic assessment and rebaselining initiative will be  
25 an agency strategic plan. The activities that have

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1 occurred so far in Phases I and Phases II will provide the  
2 foundation for that plan.

3 We'll be using the issue papers, the  
4 Commission preliminary decision, on those issue papers as  
5 key input. Also, the internal and external stakeholder  
6 comments will provide another important input to the  
7 development of the strategic plan.

8 The primary purpose for the strategic plan is  
9 to set the direction of the NRC for the next five to ten  
10 years. It will provide a guide for us in deciding  
11 resources, organization, and other -- making other  
12 decisions at all levels within the organization.

13 An additional reason for having the strategic  
14 plan is to meet the agency -- I mean meet the requirement  
15 of the Government Performance and Result Act. And what  
16 that act requires is that we have a strategic plan and for  
17 the same purpose that we just talked about. In addition,  
18 we will be required to produce an annual performance plan  
19 and an annual performance report.

20 The strategic plan and the annual performance  
21 plan is due to OMB in September of 1997 and would address  
22 the fiscal year 1999 budget. The performance report,  
23 which will report on the performance plan, is due to OMB  
24 in fiscal year 2000; and again, will report on the  
25 accomplishments in the 1999 budget.

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1 CHAIRMAN KRESS: Were all those required by  
2 this act?

3 MR. FUNCHES: Yes, sir; both -- for your  
4 strategic plan, performance plan and performance report.

5 CHAIRMAN KRESS: When was that passed? I'm  
6 not familiar with it.

7 MR. FUNCHES: I think it was 1994.

8 MR. MILHOAN: Three.

9 MR. FUNCHES: Right, 1993.

10 CHAIRMAN KRESS: Thank you.

11 MR. FUNCHES: The last phase of the strategic  
12 assessment and rebaselining is obviously implementation of  
13 the strategic plan and some of the results that would flow  
14 from the issue papers. One of the things we know that we  
15 will have to do is develop a budget. And we expect the  
16 fiscal year 1999 budget which we will begin to develop  
17 next spring will be driven by the strategic plan that we  
18 are now developing.

19 There will be additional implementation  
20 action, and those actions will be determined as the  
21 Commission makes its final decisions.

22 Before I talk about what we see being in the  
23 strategic plan, I'd like to just give you a short view of  
24 what we envision the strategic plan to be and not to be.  
25 We see the plan as being a relatively short document on

1 the order of 30 pages, and it will serve as a guide  
2 program development, resource decision.

3 We do not see it -- it will not specify what  
4 those resources levels are or programs are. We will,  
5 however, be providing the Commission some gross estimates  
6 of resource estimates as to -- for input to their final  
7 decisions on the strategic plan.

8 It will provide strategies for the agency,  
9 goes into objectives; and we will be updating the plan  
10 periodically to make sure that it is consistent with the  
11 environment that we are operating in.

12 What I'd like to do now is turn to our vision  
13 of the major components of the strategic plan. And what I  
14 will use is the chart that is included in the strategic  
15 plan framework document that has been provided to both  
16 internal and external stakeholders to talk to you about  
17 the components of the plan.

18 The plan will have a vision. It will be the  
19 Commission vision where we expect the NRC to be in the  
20 near future. It will be a graphic picture of what we want  
21 to be. There will be a mission statement, and that  
22 mission statement will state the basic purpose for NRC's  
23 existence.

24 If you look around the sides of the scroll, we  
25 will have advise -- set up principles that will undergird

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1 the guide agency stats and also be a statement of the  
2 beliefs that the NRC staff will follow in all of their  
3 work. And we'll be using for those our organization  
4 values, the safety philosophy statement, and the  
5 principles of good regulation.

6 Then we will have a set of goals, and those  
7 goals will define what the NRC would like to achieve.  
8 Those -- and the last element of the strategic plan will  
9 be what we call -- will be the strategies. And those  
10 strategies we have organized into three broad areas. The  
11 first area is what we call mission critical strategies.  
12 And the next one would be mission enabling strategies.  
13 And the last area would be core resource strategies.

14 MEMBER CATTON: Under mission enabling  
15 strategies, providing research expertise seems to be out  
16 of context with the rest. Can you explain that? I mean,  
17 trust and confidence, national objectives, internal  
18 support mechanisms, research expertise -- they don't --

19 MR. FUNCHES: I think in a sense they might be  
20 different activities. I think in all, what we see there  
21 is that research is an important component of enabling us  
22 to assure reactor safety, assure --

23 MEMBER CATTON: Well, I'm not disagreeing with  
24 that. I think you're right. It's just that when I read  
25 down those four elements, you know, it's sort of like

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1 talking about fruit and vegetables.

2 MR. FUNCHES: And that's correct. They are  
3 different types of activities, but the purpose of all four  
4 would be the same. Just like the support mechanism that  
5 we have, you know, the legal -- I mean, the building --  
6 they all have the same purpose of undergirding -- enabling  
7 us to carry out the three mission critical. They are  
8 different.

9 Obviously research is a technical one, and the  
10 others are more --

11 MEMBER CATTON: Yeah, but in the research  
12 expertise, you're talking about people within research;  
13 where the others are more of a top down view of the  
14 agency. Public trust in confidence, that's the agency.  
15 Supporting national objectives, that's the agency.  
16 Research expertise, that's people buried down inside it  
17 somewhere.

18 It's not important. It's just that it jumps  
19 out at you as being out of context.

20 MR. FUNCHES: Right. Yeah, and maybe we're  
21 looking for a different word. Expertise, we both were  
22 looking both at people and facility and infrastructure  
23 there also. It goes beyond just the --

24 MEMBER CATTON: I would have said something  
25 about the technical capabilities of the agency people or

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1 something like that rather than -- that's too specific  
2 considering the rest.

3 MR. FUNCHES: We'll take a look at that.  
4 Thank you.

5 MEMBER APOSTOLAKIS: On the same topic,  
6 mission enabling strategies, shouldn't you build those  
7 licensee trust and confidence? It seems that the people  
8 who are regulated are left out. You're trying to work  
9 with everybody else except them. Shouldn't there --  
10 unless you consider them part of the public.

11 MR. FUNCHES: Yeah, I think in this context  
12 we're looking at the public as the collective group out  
13 there which would include licensees.

14 MEMBER APOSTOLAKIS: It would be better to  
15 single them out though.

16 MR. MILHOAN: When you consider the mission  
17 enabling strategies in the mission critical areas,  
18 obviously the role of the industry is a factor in the  
19 mission enabling strategies. So when you look at the  
20 strategic plan and the strategies, that has to be  
21 addressed, the public and the licensees in the mission  
22 critical areas.

23 So it would be a very significant part of the  
24 strategic plan.

25 MR. MILHOAN: Yes, both in the mission

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1 MR. MILHOAN: As I said, when you look at the  
2 direction setting issues that undergird this, it is a  
3 large component of the -- I understand your comment with  
4 respect to this chart.

5 MEMBER APOSTOLAKIS: Perceptions also.

6 VICE CHAIRMAN SEALE: But I think that's --  
7 the other part of it is, though, that the public, the rest  
8 of the public, has to be reminded that you have a  
9 responsibility to the industry. And unless you delineate  
10 your recognition of that at a fairly high level, that  
11 message may get lost.

12 You know, they may not go much further than  
13 this, some of them, in looking at the global integration  
14 of this whole thing. They have to understand that your  
15 responsibilities to the industry are for regulating the  
16 industry; and the industry's responsibilities to you, as  
17 the servant of the public, are very different.

18 And you know, they're ongoing, continuous, and  
19 intimate.

20 MR. FUNCHES: Those are the arenas that we're  
21 working with. The last -- the next chart gives you how we  
22 plan to solicit the -- the questions we plan to pose to  
23 the stakeholders. And so, this is their input for us to  
24 use in developing the strategic plan. And the types of  
25 questions we will be posing or we have posed to them are

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1 critical and in the mission enabling.

2 MR. CRAIG: And indeed, in each one of these  
3 strategies also is a strategic arena. So that in the  
4 strategic arena for building public trust and confidence  
5 in the public meetings, we're going to discuss the issue  
6 paper for the role of industry.

7 VICE CHAIRMAN SEALE: The things that turn the  
8 industry on are not necessarily things that turn the rest  
9 of the public on.

10 MR. CRAIG: That's right.

11 VICE CHAIRMAN SEALE: So while the objectives  
12 have to be consistent with each other, the methods and  
13 some of the detail of the message has to be a little bit  
14 different. And that's the real issue.

15 MEMBER APOSTOLAKIS: It seems to me you can  
16 certainly interpret these lines the way these gentlemen  
17 just interpreted them. But I think this sends a little  
18 bit -- especially that box, the wrong message to the  
19 industry, that they are left out. You're talking about  
20 public trust. I mean, they don't consider themselves  
21 members of the public in this context, I don't think.

22 Public means other people. Research  
23 expertise, national objectives, and where are we? You  
24 know, I think it sends the wrong message. Again, it's not  
25 a major insight, but --

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1 the important considerations and they have been omitted.

2 Or the assumptions and projections for the  
3 internal and external factors are those that write the  
4 assumptions. Obviously we will be seeking comment on the  
5 preliminary decision. And the Commission posed in the --  
6 in some of their preliminary views specific questions on  
7 the individual issue papers that they wanted the  
8 stakeholders to provide us input on.

9 With that, that's all I have. And I think  
10 we'll turn it over to the --

11 MR. CRAIG: The next speaker will be Mike Case  
12 from NRR. He's going to talk about DSI 10.

13 MR. CASE: Good morning. As John said, my  
14 name's Mike Case. I'm the lead write for DSI 10, which is  
15 reactor licensing for future applicants. I guess I was  
16 doubly blessed in this strategic assessment process in  
17 that I was in on the first phase when we went through all  
18 the 5,000 or so activities and came up with the questions.

19 And then I also participated in this phase  
20 where I got to answer the same questions that I conjured  
21 up. So, the direction setting issue in this particular  
22 area is, given the current environment, what should the  
23 Commission's policy be on future reactors? And we'll talk  
24 a little bit more about the environment later on.

25 But I just wanted to review very quickly the

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1 box score on what the NRC has done in the advance reactor  
2 area over the maybe past ten years since Part 52 was  
3 issued. And the committee is probably very well aware of  
4 this activity because you were involved in virtually every  
5 step of the way.

6           Since Part 52 was issued, we've had about four  
7 designs that were proposed to us for review in a pre-  
8 application mode. We evaluated the EPRI requirements for  
9 every requirements document for evolutionary designs, and  
10 we issued a final safety evaluation report on that. We  
11 evaluated the EPRI requirements document for passive  
12 designs and also issued a final safety evaluation on that.

13           We had five designs that were proposed to us  
14 for design certification. And of those five, two have --  
15 we stopped reviewing at the vendor's request. Two we have  
16 issued final design approvals on, and we are at the very  
17 tail end of almost issuing design certification rules on  
18 those. And we currently have one application under active  
19 review, and that's the Westinghouse AP600.

20           And then Part 52 is really a three step  
21 process. Part of it is the design certification part --  
22 is early site permit; and part of it is the combined  
23 license portion. And during this time period, we had  
24 virtually no activity on early site permit. And of  
25 course, no combined license applications.

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1           And, you know, just summarizing the history,  
2 clearly from an historical perspective, we're on the down  
3 hill side of the design certification activity. And now  
4 I'm going to trick John. I'm going to skip that factor  
5 slide and come back to it. I just want to show you  
6 briefly the -- what are called the subsumed strategic  
7 issues.

8           And, as John said earlier, these are also  
9 Commission level issues that, once the direction setting  
10 issue is resolved, they are likely to be either resolved  
11 or influenced considerably by the direction setting issue.

12           Now we can move back to factors. Factors is  
13 one of the slides that, if I was the committee, I would  
14 focus on; because how one evaluates the factors in the  
15 area really determines the direction that you want to go.  
16 And the factors are discussed in the issue paper, and here  
17 are some of them.

18           With respect to the Commission's objectives in  
19 issuing Part 52, they had two objectives -- two general  
20 objectives in issuing it. One I term a safety objective  
21 in that they believe that if standardization -- if plants  
22 were standardized and a fleet of plants were built using  
23 the same design, that that would result in enhanced  
24 safety.

25           And then they also had what I characterize as

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1 a regulatory effectiveness objective. And there was  
2 complaints about the old licensing system that it was not  
3 predictable, it was not stable. Part 52 was implemented  
4 in part to address that to have a stable and predictable  
5 licensing process.

6 So that's a second objective of the advanced  
7 reactor activities is to have a stable and predictable  
8 licensing process. Of course, it's pretty well  
9 established that there's -- new orders for nuclear power  
10 plants won't be coming in the near term. This doesn't  
11 mean that there is no interest in licensing of future  
12 reactors.

13 Nuclear Energy Institute has a strategic plan  
14 for building new nuclear power plants. They update that  
15 annually. They certainly invest a lot of resources in  
16 making some of those things happen. There's not much to  
17 add on budgetary pressure. No one is immune to that  
18 nowadays -- both DOE, which had a rather large advanced  
19 light water reactor program in the past, the industry and  
20 NRC.

21 As far as foreign interest goes, while there's  
22 no domestic interest in new plants near term, there is a  
23 lot of foreign interest in American designs. And the NRC  
24 plays a sort of unofficial role in that one of the  
25 important factors for selling those designs in regulatory

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1 approval in the country of origin.

2           So that's another factor that one has to  
3 consider when addressing this issue. And finally, over  
4 the whole history of advanced reactor activity, there has  
5 been congressional interest. In 1992, they passed the  
6 Energy Policy Act of 1992, which confirmed the goals and  
7 objectives of Part 52; and also, they have been very  
8 active in pressing the NRC to meet established schedules  
9 on design certifications and other future reactor  
10 activities.

11           VICE CHAIRMAN SEALE: There's a point that  
12 ought to be somehow understood at this stage because I  
13 know -- I sense that the next thing you're going to say is  
14 going to begin with "but". And I guess there's a bullet  
15 I'd like to see or some recognition in here is that, as a  
16 result of the Part 52, for want of a better collective  
17 term, exercises of the last few years, the NRC is a more  
18 capable agency than it was when it started.

19           It's had a salutary effect on a rethinking of  
20 the whole integral process rather than the bandaid by  
21 bandaid approach that we tend to lapse into if we don't  
22 have that kind of incentive. So, you know, it's been  
23 worthwhile. It's been very helpful. And I would hate to  
24 see us lose that kind of flavor, if you will.

25           MR. CASE: Good factor. I agree. And that's

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1 -- I think that's -- when we go to these external  
2 stakeholder meetings, that's the kind of feedback that the  
3 Commission is interested in.

4 VICE CHAIRMAN SEALE: Yeah. Well, you just  
5 got some.

6 MR. CASE: Thank you for it. Options -- I  
7 don't want to speak too long on options because, as we  
8 discussed earlier, when we developed options, it was to  
9 give the Commission a range of things to consider. It was  
10 to show that we just didn't look at the factors from our  
11 traditional point of view; we tried to look at them from  
12 different points of view.

13 The only ones that I want to talk about in a  
14 little bit of detail because it helps you understand the  
15 Commission's point of review is the first two,  
16 reprioritize -- that option was postulated on now that  
17 we've done design certification, we've done that process,  
18 we've had a few designs that are almost through the  
19 wickets; maybe the remaining design certifications  
20 shouldn't be as high a priority as they had been in the  
21 past.

22 And so it just sort of laid out a priority  
23 system that says okay, to accomplish our objectives, we  
24 will be looking for things in the early site permit and  
25 combined license area as a top priority. Design

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1 certification activities would go to some sort of lower  
2 priority, and we would continue on with those.

3           And then other advanced reactor activities  
4 that we find ourselves getting into maybe at the request  
5 of industry or other groups would be some priority below  
6 that. And then the other option I want to mention briefly  
7 is the sustained responsiveness option. And that is  
8 pretty much -- the features of that is design  
9 certification will continue as a priority staff activity,  
10 and we will continue to encourage interactions with the  
11 industry and other people interested in future reactor  
12 activities.

13           Now finally, we'll get to --

14           VICE CHAIRMAN SEALE: What is the single  
15 solution? That has a chilling -- (laughter) -- suggestion  
16 to persons of my particular generation.

17           MR. CASE: Well, that was the one that I would  
18 probably least want to talk about because that was our  
19 attempt to think outside of the box. Here's the  
20 perspective on that one. The Commission's objective is to  
21 -- safety objective is to have standardized plants, not  
22 standardized designs. It doesn't help the safety --

23           VICE CHAIRMAN SEALE: You're right.

24           MR. CASE: -- of the fleet by having a  
25 standardized design because so many has to use them. So

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1 it would essentially say those people that have resources  
2 to build plants like DOE, like utilities, go over in that  
3 corner and see if you can combine all your resources to  
4 give us an order at this time.

5 And then the NRC's part of that process would  
6 be well, I will support that with my resources, and I also  
7 have the technical expertise to prosecute that option.

8 MEMBER FONTANA: That would freeze out all  
9 other vendors, right?

10 MR. CASE: Yeah, you're right. And we talk  
11 about that in the consequence analysis of that option.

12 VICE CHAIRMAN SEALE: Yes.

13 MR. CASE: Okay, on to the Commission's  
14 preliminary reviews. This is another slide that you  
15 ought to focus on because this is what the Commission  
16 thinks, obviously. And I don't want to particularly  
17 embellish this one because I don't have any special  
18 insight into what the Commission's thinking other than  
19 what they have provided us, and I don't want to start  
20 interpreting what they have said.

21 The only thing that I want to bring up on the  
22 second bullet, which is pretty much -- says to continue on  
23 -- they also, if you read the entire SRM, they essentially  
24 endorse the sustained responsiveness option with some  
25 variations from the other option. And I think we sort of

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1 get that -- the flavor of what they want to do as far as  
2 the short term in that third bullet where they tell the  
3 staff to go back and give us some implementation guidance.

4 And they sort of give us a sense of what some  
5 of the priority activities should be for this awkward  
6 period, maybe, between when we complete design  
7 certification and when we get an order.

8 MEMBER FONTANA: I have a question on the  
9 second sub-bullet of the third bullet. It's address  
10 orderly close out of all activities. Do you mean all  
11 other activities?

12 MR. CASE: They were referring to things like  
13 SBWR or MSTGR where we have invested a --

14 MEMBER FONTANA: Okay, so it's all other  
15 activities other than what you would do from sub-bullet  
16 number one? In other words, you read that -- this could  
17 be read three ways.

18 MR. CASE: Yes.

19 MEMBER FONTANA: One is that -- one of the  
20 options is drop everything, and that's not really what you  
21 want. It says drop the things like MSTGR and --

22 MR. CASE: Right, the things that -- like the  
23 vendor has withdrawn on document where you are on the  
24 review. So that if it revives itself later on, you can  
25 take that off the shelf and use it. It won't be a wasted

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1 effort.

2 MR. MILHOAN: I think they were focusing on as  
3 we close out some of these activities in orderly fashion.  
4 Let us go back and look at the lessons learned from what  
5 we have and capture those lessons learned so that new  
6 people will have had the benefit of those lessons learned  
7 in the future. And that, I think, was the intent of --

8 MEMBER FONTANA: That makes good sense. It  
9 could be read like one of three options. Three and two is  
10 drop everything. And that's certainly not what was  
11 intended.

12 VICE CHAIRMAN SEALE: In that regard, I would  
13 say the first bullet, maintenance of the utility  
14 requirements document, that's a very -- I think a very  
15 appropriate thing to do now. Because if you look in  
16 detail in that document, there are some numerical  
17 requirements (margins, things of that sort) that probably  
18 could profit by a reexamination now that people have gone  
19 through this first round of design certification  
20 activities based on that set of requirements and determine  
21 whether or not those requirements are robust enough and  
22 whether they should be modified.

23 And if so, in what direction. So -- and the  
24 people that are in the best position to do that are people  
25 who have really been involved in the process. So, it's a

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1 very timely thing to do, I would think, right now.

2 MR. MILHOAN: And if the Commission retains  
3 this in their final decision after receipt of comments,  
4 obviously then the staff would have to develop the  
5 implementation guidance --

6 VICE CHAIRMAN SEALE: Yes.

7 MR. MILHOAN: -- to make that carry out.  
8 There would be a follow on staff activity that would be  
9 necessary to make that happen.

10 VICE CHAIRMAN SEALE: Yes.

11 CHAIRMAN KRESS: One in a while, when you go  
12 to the Commission with a set of options, usually you  
13 identify which one you prefer. I take it you didn't do  
14 this in this case?

15 MR. MILHOAN: That was a -- and I failed to  
16 mention that in the process discussion. In the steering  
17 committee, one of the directions we received from the  
18 Commission was to go to the Commission with a rich set of  
19 options, but not to provide a preferred option to the  
20 Commission. They gave us the task of --

21 CHAIRMAN KRESS: That was part of --

22 MR. MILHOAN: -- of thinking outside the box  
23 and not trying to endorse any one position on this.

24 MEMBER FONTANA: So these are reviews from the  
25 Commission? These are not things that you fed them and

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1 said try to feed them back to us?

2 MR. MILHOAN: That is absolutely correct.

3 These are Commission preliminary reviews without the  
4 benefit of any of our recommendations. And in fact, in  
5 the stakeholder report, going back, it would be again our  
6 look at what comments we received without a recommendation  
7 on which options -- we are here to gather comments and  
8 perform a function for the Commission.

9 MR. CASE: And now, if there's no further  
10 questions, Mike Johnson will do DSI 11.

11 MR. JOHNSON: Thank you, Mike. Good morning.  
12 My name is Michael Johnson. And as Mike said, I want to  
13 talk about DSI 11, operating reactor oversight and the  
14 issue paper surrounding it. The primary issue -- the DSI  
15 that we looked at in DSI 11 was given the changes in the  
16 external and internal environment, what are the  
17 implications for current strategies for the operating  
18 reactor program?

19 And I'll talk a little bit about how the issue  
20 paper addresses that. We looked at several factors. And  
21 in fact, as I was sitting in the back of the room thinking  
22 about whether these were internal or external, I think  
23 really the break out of internal/external is a little  
24 unfortunate.

25 Let me just talk about the factors without

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1 regard to whether they're internal or external. First of  
2 all, the population of operating reactors is, as you know,  
3 relatively stable. There are no new operating licenses  
4 under review. And in addition, we really expect that  
5 three to five operating reactors will shut down  
6 prematurely in the next ten years.

7           Also, we have the feeling that the number of  
8 requirements -- new requirements is expected to remain  
9 relatively low. Those are sort of important factors. But  
10 in addition to those, there are some things that I think  
11 are more clearly external, and they have to do with  
12 changes in the regulatory environment.

13           We've already begun to see the impact of  
14 industry deregulation and increasing economic pressures.  
15 For example, these will result in greater use -- and to  
16 some extent, resulted in greater use of PRA to allow for  
17 cost savings. The industry has, for a number of years  
18 now, raised concerns about the cost of inspections,  
19 particularly team inspections and those impacts on their  
20 ability to be able to run their plant.

21           So, the industry is increasingly concerned  
22 about economic pressures and the impact of the NRC. We  
23 expect that operational events will continue to occur.  
24 And in addition, there will be future challenges, I think,  
25 such as component and system aging. And those issues will

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1 continue to roll out and we'll have to deal with them.

2 In addition, we have had some public concern.  
3 There have been, within the last two or three years, a  
4 number of significant instances where we've gotten  
5 feedback from the public citizen -- the report of public  
6 citizen comes to mind where the public is concerned --  
7 remains concerned about how well the NRC is doing -- is  
8 carrying out its regulatory mission.

9 And those concerns will continue, and we'll  
10 need to be able to respond to those.

11 VICE CHAIRMAN SEALE: If I may, I'd like to  
12 congratulate you because you have at least alluded to both  
13 sides of the coin in that list because I am sure that a  
14 lot of the people who have the public concerns that you  
15 evidence in your last bullet have considerable argument  
16 with the idea that the use of PRA's is going to help  
17 reduce cost.

18 A lot of the support for that is that it's --  
19 this is something that can be used to tie the licensees  
20 down even further. And I think it's very worthwhile that  
21 you have revealed both sides of that issue here, and I  
22 hope you continue to make that dichotomy apparent as you  
23 go through.

24 MEMBER APOSTOLAKIS: I would try to rephrase  
25 the greater use of PRA to allow for cost savings. I don't

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1 know. I can't think of a better term now, but I don't  
2 think that -- it doesn't sound too good.

3 MEMBER POWERS: Well, it does to the industry,  
4 and they're the ones that he's talking about. And I think  
5 that's their underlying interest in the use of PRA. If it  
6 was not going to result in cost savings, I think they  
7 would be disinterested.

8 MEMBER CATTON: There's a safety neutrality  
9 that you're going after.

10 MEMBER APOSTOLAKIS: Greater use of PRA to  
11 allow for cost savings by removing unnecessary  
12 conservatisms. I mean, this is the complete picture.

13 MEMBER MILLER: More effective use of the  
14 resources.

15 MEMBER FONTANA: I think that's a better way  
16 of saying it.

17 MEMBER APOSTOLAKIS: Where does safety come  
18 into the picture?

19 MEMBER FONTANA: Well, safety is a given.

20 MEMBER APOSTOLAKIS: I don't know that it's a  
21 given. It doesn't quite convey the message.

22 MR. MILHOAN: This is the type of feedback  
23 we're desiring. This is very useful.

24 MEMBER MILLER: Enhancing safety and better  
25 use of resources.

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1 MEMBER APOSTOLAKIS: But you're not  
2 necessarily enhancing it. But it's always there in your  
3 considerations.

4 VICE CHAIRMAN SEALE: But you have to be up  
5 front with the fact that there are some people who are  
6 going to be disappointed with the idea that you're  
7 spending resources on developing rational bases to reduce  
8 unnecessary regulatory burden.

9 MEMBER APOSTOLAKIS: They will be disappointed  
10 by it?

11 VICE CHAIRMAN SEALE: Yes, because they're not  
12 interested in reducing the burden.

13 MEMBER APOSTOLAKIS: Oh, well --

14 MR. JOHNSON: Okay, subsumed issues -- let me  
15 just talk briefly about the subsumed issues. The subsumed  
16 issues one and two, with expected reduction in the number  
17 of licensing actions and reduction in resources, what  
18 appropriate way -- what is the appropriate way to manage  
19 change in this area, and how will the NRC ensure that with  
20 reduced number of licensing actions reviewed by the staff,  
21 the current level of safety will be maintained?

22 You know, I think there was some thought early  
23 on when we developed these subsumed issues, or at least  
24 when we did research into developing options for these  
25 subsumed issues, that the tech spec improvement program

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1 would result in a decrease in the number of licensing  
2 actions. And in fact, the things that we've written about  
3 the tech spec improvement program talk in that direction.

4 It's -- we haven't yet seen that benefit. We  
5 haven't yet seen that reduction in the number of licensing  
6 actions. And so that's -- I think it's sort of important  
7 to keep that in mind. And that's all I would say about  
8 those two subsumed issues.

9 Number three is the operating reactor --

10 MEMBER APOSTOLAKIS: I'm having difficulty  
11 understanding what the second bullet is saying. How will  
12 the NRC ensure that, with the reduced number of licensing  
13 actions -- the current level of safety will be maintained?

14 MR. JOHNSON: Yeah, I think the thought behind  
15 that real question is with a reduced number of license  
16 amendments, with a reduced opportunity for the staff to  
17 get first hand insights into how the licensee therefore is  
18 making changes to requirements that have been relocated to  
19 licensee control documents -- for example, we have fewer  
20 opportunities to get real insights into licensee  
21 performance.

22 How do we -- do we need to do something in the  
23 way we measure safety to make sure --

24 MEMBER APOSTOLAKIS: Maybe we should say with  
25 the reduced opportunities to get involved in licensing

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1 actions.

2 MR. MILHOAN: As you remove things from the --

3 MEMBER APOSTOLAKIS: I know, yeah.

4 MR. MILHOAN: -- tech specs, then the  
5 opportunities for the licensees to the 50.59 reviews will  
6 increase. Does that mean -- for example, in our  
7 inspection area now, that we then need to look in our  
8 inspection area and say okay, in light of this, what does  
9 that mean with respect to whether we need to increase  
10 inspection resources to look at that from a safety  
11 perspective?

12 VICE CHAIRMAN SEALE: Fewer trip wires on  
13 behavior.

14 MR. MILHOAN: That's correct.

15 MR. JOHNSON: That's right. I guess I'll skip  
16 over the other ones. There is one -- what changes should  
17 be made to the resident N+1 policy? We've had some long  
18 going consideration about whether we ought to alter the  
19 N+1 policy. That's one of the subsumed issues.

20 MEMBER APOSTOLAKIS: What is that policy?

21 MR. JOHNSON: I'm sorry, the N+1 policy is the  
22 policy that we use to staff multiple unit reactor sites, N  
23 being the number of units at that site. So for example, a  
24 two unit site would, under the N+1 policy, have three  
25 resident inspectors.

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1 MEMBER BARTON: Michael, wouldn't you really  
2 base that based on performance of the site -- would  
3 dictate changes you would make to that policy?

4 MR. JOHNSON: In fact, --

5 MEMBER BARTON: Other than a single site, I'm  
6 sure you'd always have two because, you know, if one was  
7 absent for some reason, you'd have no coverage.

8 MR. MILHOAN: There would be no intent to  
9 reduce the coverage below two residents per site. But  
10 you're exactly right. The policy would be based upon --

11 MEMBER BARTON: Licensee performance.

12 MR. MILHOAN: -- licensee performance rather  
13 than another number beyond the minimum level. You're  
14 exactly right.

15 MR. JOHNSON: In fact, I'll talk about N+1 a  
16 little bit because -- a little bit later. Because, in  
17 fact, it fits into the options. It's one of the options,  
18 and it's one of the things that we got back in terms of  
19 the Commission's preliminary review. So we'll have some  
20 more discussions on that.

21 MEMBER FONTANA: A minor point. I don't think  
22 many of your stakeholders would know what N+1 is, so you  
23 need to write it out.

24 MR. JOHNSON: I understand.

25 MEMBER BARTON: Licensees will know what that

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1 is, right?

2 VICE CHAIRMAN SEALE: Yes, sir.

3 [Laughter.]

4 MR. JOHNSON: The related issues, just briefly  
5 -- if you look at related issue number one, how can we  
6 optimize processes for evaluating the performance of power  
7 reactors, the issue paper makes the point that the process  
8 -- the licensing process and the inspection process and  
9 then the performance assessment processes are so  
10 interrelated you can't possibly deal with the DSI and the  
11 subsumed issues without dealing with that issue.

12 So, it's in fact considered in the options.  
13 And in fact, as is the second related issue. And it's  
14 described in the Commission paper -- or in the issue  
15 paper.

16 Let me just talk about the options that were  
17 provided in the issue paper briefly. There were really  
18 three options. The first option assumes that the overall  
19 direction that the staff is taking and the overall  
20 structure of our processes is okay, but would provide for  
21 some changes to address, I guess, current vulnerabilities  
22 that we've seen in light of issues such as issues that  
23 came to light at Millstone and Maine Yankee and Haddam  
24 Neck.

25 Option number two then would go --

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1           MEMBER BARTON: Before you go off option one,  
2 my concern is -- if I understand option one correctly is  
3 you believe that the current process is not broken; it's  
4 kind of a fine tuning of the current process. And when I  
5 look it through and try and understand what that fine  
6 tuning consists of, I don't clearly see how you prevent  
7 future, you know, Millstones, Indian Points, and all those  
8 things which are an embarrassment to us all.

9           So, I don't get that from reading the paper  
10 how this fine tuning really gets to that. But when you  
11 get to option three, we'll talk a little bit more about  
12 that. But I had struggle with what you're going to do in  
13 option one, how it's going to preclude those kinds of  
14 issues in the future.

15           MR. JOHNSON: If I can -- if I can come back  
16 to your question. Because, in fact, in the Commission's  
17 preliminary reviews, I think they were coming from the  
18 same perspective. And so, they added something to what we  
19 proposed.

20           MEMBER BARTON: Okay.

21           MR. JOHNSON: Option two then would go beyond  
22 option one. I mean, we would certainly implement the  
23 lessons learned from option one or from the Millstone  
24 lessons learned activity and similar activities. But in  
25 addition to that, we would look for new approaches in the

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1 areas of inspection and licensing and performance  
2 assessment.

3 And then -- but within current structures.

4 Option three then would --

5 MEMBER BARTON: Before you get off that one, I  
6 have a question on option two. Option two -- you didn't  
7 mention it in your summary just now, but when you read  
8 through option two, there's also the increased public  
9 involvement. As a licensee, I look at that with some  
10 concern. I know there needs to be public involvement, and  
11 licensees understand the need for public involvement in  
12 their process for license amendments, etc.

13 But what do you -- how do you define increased  
14 public involvement? And I think when licensees hear that,  
15 there's going to be a little bit of, you know, concern.  
16 What does that really mean? Because more of that kind of  
17 activity usually means a prolonged action on the part of  
18 the Commission to, you know, grant changes to the  
19 licensee.

20 MR. JOHNSON: I think you're exactly right.  
21 The issue paper, in fact, talks about providing increased,  
22 diverse opportunities for public involvement. It  
23 recognizes and it lays out some of the concerns such as  
24 the concerns that you've just expressed. It could, in  
25 fact, delay or at least make it less easy for us to get to

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1 a conclusion or an action while we provide opportunity for  
2 public input.

3 We talk about increased public involvement in  
4 the area of performance assessment. Certainly the idea  
5 would be to provide them with opportunities to understand  
6 our assessment processes.

7 MEMBER BARTON: But isn't that done now by  
8 holding public meetings for SALP reviews with the licensee  
9 and region staff?

10 MR. JOHNSON: It is, to some extent. And this  
11 option just looks at seeing if we can go beyond what we  
12 currently do to provide a greater opportunity for the  
13 public to understand what it is we do and to have some  
14 input into it.

15 MEMBER FONTANA: So it's -- you really intend  
16 to go beyond -- I was thinking more like wording  
17 engineering like continue to protect the public rights of  
18 their involvement. So you're really talking going beyond  
19 where we are now?

20 MR. MILHOAN: Yes, that would be seeking  
21 approaches to go beyond that. For example, if in the  
22 license amendment process, if you take that one, if you  
23 look at a new approach, is there an opportunity there to  
24 provide for earlier public involvement. So it's not to  
25 delay the amendment process, but to increase the public

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1 understanding of what is going on.

2 We don't have the answers just yet.

3 CHAIRMAN KRESS: What I would recommend for  
4 the wording on that is provide more effective public  
5 involvement rather than increased.

6 MEMBER BARTON: Unless they really intend to  
7 increase it, and that's what I'm trying to differentiate,  
8 Tom.

9 CHAIRMAN KRESS: Well, it could be increased.  
10 I don't know what the optimum is. And certainly if we're  
11 doing our job right as regulators, we ought to welcome  
12 public involvement and get their input. And I don't know  
13 what the right level that is, but I would look for it to  
14 be effective public involvement.

15 MR. MILHOAN: But we were trying to provide  
16 again a wide range of options which would address this.

17 VICE CHAIRMAN SEALE: I think I've heard of a  
18 couple of cases where public involvement with the utility  
19 at the local level essentially -- before they ever get to  
20 the Commission, has turned out to be quite effective in a  
21 couple of cases. And I hesitate to mention, but I seem to  
22 recall someone said that at Comanche Peak, they had  
23 accomplished some very effective ways of bringing people  
24 who had been among their more severe critics into a better  
25 understanding of what they were trying to do.

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1                   And so -- but this was prior to anything that  
2 involved the Commission. And it seems to me that is, in a  
3 way, the kind of thing you'd really like to see. You  
4 don't want to get the Commission all excited about all  
5 these things. If you can do the same thing at the local  
6 level and develop a local confidence in the operations and  
7 so on and local input, then that's fine.

8                   MR. MILHOAN: I think there's a large -- I  
9 think you're right.

10                  VICE CHAIRMAN SEALE: And it's a wider arena  
11 than --

12                  MR. MILHOAN: Nobody on the part of the  
13 utility -- for example, you mentioned Chimanche Peak. One  
14 of the things, when I was RA in Region 4, was I held  
15 normally public meetings about a month or six week time  
16 frame to go over the status of where we were. And it was  
17 basically a status type progress meeting which the utility  
18 and the region met to discuss that, and it was open for  
19 public involvement.

20                  It was not related to a specific event, but it  
21 was just to provide the information. And that was  
22 effective also, I believe.

23                  MEMBER BARTON: I think that would be. I  
24 think the problem I'm having is understanding, you know,  
25 specifically what are the types of public involvement

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1 activities you're talking about.

2 MR. MILHOAN: And we don't -- as I say, this  
3 is the area of -- we would go -- if it was approved, we  
4 would have to go out and seek what are the new approaches.  
5 We'd have to come back -- in implementation of doing, it  
6 would be a sort of an implementation detail of laying it  
7 out, the pros and the cons, if that were the Commission  
8 selected --

9 VICE CHAIRMAN SEALE: So you would want to  
10 have an idea of what the effective ways of doing that are  
11 and suggest the issue in such a way that you don't raise a  
12 high level of anticipation with suggestions of things that  
13 are going to turn out to be completely unworkable, both in  
14 terms of -- well, in terms of Commission resources.

15 So you might want to have an idea of where  
16 you're going before you start down that road.

17 MR. MILHOAN: I think that point's well taken.  
18 And your last point on Commission resources, also, I think  
19 is a very important point, the standpoint of these  
20 preliminary decisions in the nature of resources to make  
21 sure that we don't again attempt more than what we can --

22 VICE CHAIRMAN SEALE: Overstep.

23 MR. MILHOAN: Yeah, that's correct.

24 MR. JOHNSON: I guess the last point, and then  
25 I'll leave that one, is to say that it is -- it really was

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1 written to say increased opportunities for public  
2 involvement, and we do try to lay out the consequences.  
3 So I would invite -- if you read the consequences and you  
4 think that we haven't accurately affected all of the  
5 potential consequences, I think that's a valuable area  
6 where we could receive some input.

7 MEMBER FONTANA: Well, the question is, is  
8 improved responsible public involvement -- because in the  
9 past, there's been a lot of opportunity for just  
10 sabotaging the system. You know, you're really talking  
11 about -- I think what he's saying -- he says very  
12 carefully what --

13 MR. JOHNSON: I understand, I understand. The  
14 third option is -- you know, I talked about option one and  
15 option two, process and structure, okay; option two,  
16 really the structure's okay, but look for opportunities  
17 around the fringe. Option three says let's do a business  
18 process reengineering of the area of operating reactor  
19 oversight.

20 Let's look at, from the ground up, if you  
21 will, licensing and inspection of performance assessment  
22 and figure out if there are alternative ways to do what it  
23 is we've been doing for the last number of years.

24 The Commission, in its preliminary reviews,  
25 chose elements of all three options. They in fact told us

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1 that they do want us to do option one. That is, to make  
2 sure that we do a comprehensive review of the lessons  
3 learned from Millstone and Maine Yankee and such and  
4 implement changes to our programs.

5 But in addition -- and this, I think, goes to  
6 your question -- the Commission in its preliminary review  
7 said they want us to establish some systematic  
8 reevaluation of our processes such that as we have  
9 changes, these continuing challenges, as we have these  
10 changes in our regulatory environment, that we detect  
11 failure or areas where we're not being as effective as we  
12 ought to be.

13 We detect them early and resolve them. So  
14 that's what the Commission came back with in their  
15 preliminary reviews.

16 MEMBER BARTON: And as painful as it may be,  
17 sometimes the only way to get to that is to do a green  
18 fields and reengineering approach of one of the processes  
19 that you may be struggling with. Is it the most effective  
20 to go do that type of reengineering on, say, performance  
21 assessment or inspection? And then you'd really get to  
22 the root cause of ineffectiveness and maybe could come out  
23 with an optimal process based on that.

24 But I know it's a lot of work. I've been  
25 involved in some reengineering efforts in the past, and it

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1 is painful; but it really gets, I think, the optimal --  
2 the results when you take the effort and go do it.

3 MR. MILHOAN: I think in the materials area,  
4 we have a business process reengineering going on in the  
5 materials area. Your point's well taken. It is resource  
6 intensive and it's very expensive, but the results -- and  
7 it's time consuming, but the results may be worth the  
8 effort.

9 MEMBER BARTON: And sometimes that's better in  
10 the long run than trying to tweak or fine tune existing  
11 processes. That was my only point.

12 MR. JOHNSON: Okay, they also said do elements  
13 of option two. The issue paper lays out a range of  
14 approaches in option two; and they said yeah, do a bunch  
15 of those. For example, in fact, one that they mentioned  
16 specifically was that we would increase the flexibility in  
17 staffing multiple-unit sites. That is, the  $n$  plus 1  
18 policy of going from a minimum, as Jim indicated, of two  
19 residents at multiple-unit sites or two residents at any  
20 site for a superior-performing plant to  $n$  plus 4 or  $n$  plus  
21 5 depending on the performance of the plant, let's say.  
22 So it's increased flexibility beyond the current  $n$  plus 1  
23 policy.

24 And then Option 3, they didn't take the full  
25 range of Option 3, but what they said was looked at the

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1 lessons that can be learned from the ongoing business  
2 process reengineering that we have; that is, in the  
3 materials licensing area. And if it is, in fact,  
4 successful, look for areas within operating reactor  
5 oversight where we can do, I think, more focused business  
6 process reengineering.

7           So we're looking at aspects of reactor  
8 operating oversight to do business process reengineering.  
9 We would propose areas to the Commission. And they would  
10 decide which ones to go on. Then we would go off and do  
11 these business process reengineering activities.

12           Any other questions on DSI 11?

13           MR. CRAIG: Okay. Now, the next is DSI 12.

14           (Slide.)

15           MR. CRAIG: Dr. Speiss and Tom Hiltz will talk  
16 about DSI 12. Go ahead.

17           MR. HILTZ: Good morning. My name is Tom  
18 Hiltz. I'm with the Office of Nuclear Reactor Regulation,  
19 and I was a principal author/editor of the issue paper,  
20 direction-setting issue paper, for risk-informed,  
21 performance-based regulation.

22           I would like to provide some context for the  
23 paper that may be useful. DSI 12 and the issue evolved  
24 substantially during the development of the paper.

25           We first had to wrestle with how we were going

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1 to address such a broad topic within a strategic issue  
2 paper. And through the think tanks and interaction with  
3 the steering committee, we determined that words like  
4 "criteria," "rulemaking," "licensing," "inspection," and  
5 "enforcement" may fall more or may lend more to an  
6 implementation-type discussion.

7 And through those interactions, we determined  
8 that the way to address the DSI would be to address it in  
9 terms of how fast and how far the agency should proceed  
10 towards risk-informed or performance-based regulatory  
11 approaches.

12 A second milestone I guess occurred in  
13 response to wording in the DSI. And the original wording  
14 of the issue was: What criteria should NRC use in  
15 establishing the scope and priority in applying a  
16 risk-informed, performance-based approach? Through  
17 feedback from the Commission and the steering committee,  
18 the DSI was reworded to what you see before you: What  
19 criteria should the NRC use in expanding the scope in  
20 applying a risk-informed, performance-based approach?

21 This really didn't do too much for us. We had  
22 already considered an option where we would essentially  
23 say, "Stop doing risk-informed, performance-based  
24 regulation" and considered that to be a nonviable option.  
25 I think the direction we got confirmed that and reinforced

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1 the current direction that the agency is heading.

2 This issue paper also contains a section which  
3 may be different from the other issue papers. And we  
4 tried to capture a discussion of three topics. One was a  
5 discussion of the differences between current regulations  
6 or deterministic regulations; what risk-informed  
7 regulatory approaches meant; what risk-informed,  
8 performance-based approaches were; and, finally, what  
9 performance-based were.

10 MEMBER APOSTOLAKIS: So that's an interesting  
11 point. I was just looking for it. I remembered you had  
12 something like that in the document.

13 MR. HILTZ: Sure.

14 MEMBER APOSTOLAKIS: Is your charge here to  
15 look at risk-informed and performance-based as a package?

16 MR. HILTZ: Yes. We addressed it as,  
17 risk-informed, performance-based as, a single direction.

18 MEMBER APOSTOLAKIS: Because you could  
19 consider only risk-informed; right, and so on? But the  
20 charge is to look at both as a package?

21 MR. HILTZ: That's correct.

22 MEMBER APOSTOLAKIS: Okay.

23 MR. HILTZ: And a couple other comments about  
24 the risk-informed, the breakout of the different types.  
25 That was added to provide some clarity, hopefully some

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1 clarity, and some background for the stakeholders who may  
2 not be familiar with those types of concepts.

3 And as far as risk-informed, performance-based  
4 and performance-based regulation, those concepts or  
5 definitions are still being worked on the staff level and  
6 may evolve differently than what you see in the paper.

7 We're also asked to address through some  
8 direction from the Commission regulatory coherence and  
9 uncertainties in a broad general sense. And those two are  
10 contained in the paper.

11 And, finally, when the Commission issued its  
12 preliminary decisions on DSI 1 and 3, as John mentioned  
13 previously, we were requested to incorporate DSI 1 and the  
14 aspect which dealt with regulating areas of little public  
15 risk and an aspect of Direction-Setting Issue 3 which  
16 dealt with dual regulation into DSI 12. So DSI 12 is a  
17 melting pot of issues and concepts.

18 Next slide.

19 (Slide.)

20 MR. HILTZ: There are several external factors  
21 that we considered and discussed in the paper. Executive  
22 Branch and Congress, there's a government reform bill.  
23 House Rule 9, Risk Assessment and Communications Act of  
24 1995 dealt with risk in the government agencies. The  
25 Clean Air Act also initiated a commission on risk

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1 assessment and risk management. And we recently had an  
2 opportunity to provide comments to that commission on  
3 their report.

4 Standard-setting organizations with the pilot  
5 applications, the ASME code consensus process is being  
6 considered in the development of approaches for in-service  
7 testing and in-service inspection. And on the material  
8 side, we also need to consider the role of the  
9 International Committee on Radiation Protection and the  
10 National Council on Radiation Protection, the ICRP and the  
11 NCRP, respectively.

12 Federal agencies. Two federal agencies which  
13 we highlighted in the paper concerning interaction are EPA  
14 and the role of dual regulation and risk harmonization and  
15 the Office of Management and Budget as how our  
16 implementation of risk-informed, performance-based  
17 regulation may affect some of its efforts in the paperwork  
18 reduction.

19 VICE CHAIRMAN SEALE: Could I ask you: In  
20 particular, in regard to the Executive Branch and Congress  
21 and the federal agencies, I can understand you want to  
22 read what the law says and what their versions are. Have  
23 you gotten any feedback at this stage on what you're  
24 proposing?

25 MR. HILTZ: On the strategic issue?

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1 VICE CHAIRMAN SEALE: Yes.

2 MR. HILTZ: My understanding was that the very  
3 first comment that came back was on Direction-Setting  
4 Issue 12, but it was not from a federal agency. It was  
5 from an individual stakeholder.

6 VICE CHAIRMAN SEALE: Yes.

7 MR. MILHOAN: To answer, we have not gotten  
8 any direct feedback. We briefed OMB, but there's been no  
9 direct feedback on this particular --

10 VICE CHAIRMAN SEALE: Do you expect to get  
11 feedback before you finally get down to the point where  
12 you hang it all out there and let them really take a swing  
13 at you?

14 MR. MILHOAN: I don't know. We've briefed  
15 them, and they've got the papers. I just can't answer --

16 VICE CHAIRMAN SEALE: So you don't know  
17 whether there's a bottom of the well you've thrown this  
18 stuff into or not, huh?

19 MR. MILHOAN: They have an active interest.  
20 They requested the briefing from us. So there is an  
21 active interest on the part of OMB.

22 VICE CHAIRMAN SEALE: Okay.

23 MR. HILTZ: And the last external factor that  
24 we discuss is the public and how risk-informed,  
25 performance-based regulation could either be perceived to

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1 build the public trust and confidence or if it could erode  
2 the public confidence if it's not done in a way that  
3 promotes understanding or promotes regulatory coherence.

4 MEMBER APOSTOLAKIS: How do you do that? How  
5 do you measure what the -- how do you know what the public  
6 thinks? Okay. Let's go on.

7 MR. HILTZ: Internally we have the  
8 Commission's PRA policy statement, which was probably a  
9 watershed event along with the companion PRA  
10 implementation plan, which helped focus the staff in  
11 enhancing the use of PRA methods and technology.

12 It is important to note, I think, that  
13 performance-based is not explicitly mentioned in the  
14 policy statement. And we have a policy issue which has  
15 been discussed with the ACRS which is going before the  
16 Commission which deals with implementing performance-based  
17 regulation in the context of the PRA implementation plan.

18 There are also potential legal and other  
19 policy issues that could surface as we progress towards  
20 more risk-informed, performance-based regulation.

21 (Slide.)

22 MR. HILTZ: With the additions of the issues  
23 from Direction-Setting Issue 1 and Direction-Setting Issue  
24 3, we have six total subsumed strategic issues. I think  
25 it's important to note that, arguably, none of these

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1 directly affect, none of the subsumed issues, directly  
2 affect reactor regulation.

3           DSI 1 was initially a materials issue, as was  
4 Direction-Setting Issue Number 3. So I think that the  
5 direction-setting issues kind of reflect the current  
6 emphasis that we have, the catalyst that we have by the  
7 industry in the reactor-related area and the differences  
8 between the reactors, the regulation of reactors,  
9 commercial power reactors, and nuclear materials.

10           MEMBER APOSTOLAKIS: Well, yes. I noticed in  
11 the write-up that this issue of nuclear materials keeps  
12 coming up. It seems to me that the issues there are  
13 really very different -- I mean, that's what you're  
14 saying, too -- very different from those in reactors. I'm  
15 not even sure it can be discussed in the same document.

16           For example, what kind of quantitative safety  
17 goals should one have for nuclear materials? I mean, it's  
18 a very different question than what we have now.

19           The PRA if you want to do one will be very,  
20 very different because you don't have -- I mean, the  
21 characteristic of the nuclear PRAs is that the source of  
22 hazard is really in one place. And, in fact, that's what  
23 the chemical guys are telling us, that that's why we can't  
24 use your methods. In our case, the hazard is all over the  
25 place. In the case of nuclear materials, it's even worse.

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1 It's scattered all over the place.

2 And we talked earlier about having regulatory  
3 coherence. And it seems to me that the questions should  
4 be asked at that level. How do we make sure that the  
5 risks or the requirements or the criteria that we have are  
6 coherent? And then everything will follow.

7 But I found it a little odd that the issue of  
8 risk-informed, performance-based regulation was discussed  
9 on the same page as "What do we do about it?" in the case  
10 of nuclear materials.

11 Maybe I don't understand the spirit of this.  
12 I mean, it's not the technical --

13 MR. HILTZ: Well, I think the context was to  
14 address --

15 MEMBER APOSTOLAKIS: Everything.

16 MR. HILTZ: -- risk-informed,  
17 performance-based regulation as an agency similar to the  
18 PRA policy statement, which talks about all nuclear --

19 MEMBER APOSTOLAKIS: Yes.

20 MR. HILTZ: -- regulatory activities. I think  
21 that what you see in the reactor area is based on that  
22 perhaps it might be fair to say that in the reactor area  
23 we've progressed farther in incorporating risk insights  
24 and that NMSS may have not or the materials area may not  
25 have gone that far.

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1 I think you see in the Commission's  
2 preliminary views, which follow in two slides, that the  
3 Commission also recognizes that and, at least in their  
4 preliminary view, has suggested that the materials folks  
5 develop some type of framework for proceeding towards  
6 risk-informed, performance-based.

7 MEMBER APOSTOLAKIS: Sure.

8 DR. SPEISS: We were sensitive to that,  
9 George. And we attempted to qualitatively describe the  
10 differences. And lack of a safety goal is an important  
11 consideration.

12 MEMBER APOSTOLAKIS: It's a major issue, yes.

13 Also, again, Number 3 there, I think it's too  
14 detailed. I mean, we're talking about strategic issues,  
15 and now we're talking about changing human factors. I  
16 mean, the real strategic issue here, as Themis just said,  
17 you have a safety goal.

18 How do you do that compared to what you have  
19 for reactors, what you have for nuclear waste  
20 repositories? As a matter of fact, I don't recall much  
21 discussion about repositories. I mean, that's part of the  
22 Yucca Mountain thing.

23 MR. HILTZ: There was very little discussion  
24 about that. We may have touched on performance  
25 assessment, but we --

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1 MEMBER APOSTOLAKIS: I don't know what  
2 performance assessment will mean.

3 DR. SPEISS: This is addressed in the  
4 high-level paper. Maybe Mal can --

5 MEMBER APOSTOLAKIS: The high-level paper?

6 DR. SPEISS: Yes.

7 MEMBER APOSTOLAKIS: High-level waste paper?

8 DR. SPEISS: High-level waste paper. I'm  
9 sorry.

10 MEMBER APOSTOLAKIS: High-level waste paper.  
11 Okay.

12 VICE CHAIRMAN SEALE: That's the stuff on top  
13 of the desk.

14 MEMBER APOSTOLAKIS: If you learn English from  
15 the books, you go by the book.

16 DR. KNAPP: For transcription purposes, I'm  
17 Malcolm Knapp, Deputy Director of NMSS.

18 One of the issue papers that is not being  
19 presented this morning is one that focuses entirely on  
20 high-level waste. And a portion of that paper does  
21 discuss what we call performance assessment, which in some  
22 ways is analogous to PRA.

23 It's an assessment of the performance of the  
24 Yucca Mountain repository pretending to predict many years  
25 into the future what the performance would be like. And

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1 the subject is addressed at some length in that issue  
2 paper.

3 MEMBER APOSTOLAKIS: Why do we have two very  
4 different issues, such as reactors and nuclear materials,  
5 discussed in the same issue, in the same strategic issue,  
6 and then we leave the waste out? Why don't we discuss  
7 everything there? I mean, am I missing something?

8 MR. HILTZ: Well, we tried not to get into too  
9 many implementation details.

10 MEMBER APOSTOLAKIS: This is considered  
11 implementation, nuclear waste?

12 MR. HILTZ: The direction-setting issue was  
13 how fast and how far essentially the agency should go in  
14 pursuing risk-informed, performance-based regulation. If  
15 the Commission decides, for example, that we need to go  
16 faster and farther in the material areas, then how that  
17 will get implemented will have to be addressed.

18 MEMBER APOSTOLAKIS: The Commission doesn't  
19 have the same problem with the high-level waste  
20 repositories and the performance assessments?

21 MR. HILTZ: I'm not sure.

22 MEMBER APOSTOLAKIS: Don't they have to decide  
23 the same thing there or that has been decided?

24 DR. KNAPP: My take on it with respect to  
25 materials, in fact, was broader than a high-level waste

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1 repository. The fact is if you consider risk-informed,  
2 performance-based, it's my understanding of the  
3 Commission's desire and the expectation of NMSS if we  
4 would consider applying that to a number of areas; for  
5 example, what we call an integrated safety assessment fuel  
6 cycle facilities, how we might take advantage of the  
7 insights that Reactors has developed. As was mentioned a  
8 little earlier, in their work on PRA, they are the head of  
9 the Materials Program. So this would be generally  
10 applied.

11           So my understanding is that the reason this  
12 makes sense to convey it here is that this deals with the  
13 general subject recognizing that Reactors has been a head  
14 of materials in the past but that as we look at the  
15 Materials Program, we will be looking at applying  
16 risk-informed, performance-based regulation in various  
17 depths across a variety of areas.

18           MEMBER APOSTOLAKIS: So if the Commission  
19 decides to go with Option 3, that would affect a  
20 high-level performance assessment --

21           DR. KNAPP: It would affect high-level. It  
22 would affect low-level, fuel cycle facilities, and what we  
23 call our materials licensees, such as hospitals and  
24 industry uses.

25           MR. MILHOAN: And when we go to the strategic

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1 plan in the strategic or high-level waste arena, this  
2 DSI 12 and the waste paper, high-level waste paper, would  
3 be molded together when we talk about the strategic arena  
4 and the strategies in the high-level waste area.

5 MEMBER APOSTOLAKIS: Now, maybe this doesn't  
6 belong here, but I'll mention it anyway. Is part of doing  
7 this study making sure that the various offices and  
8 branches in the agency are using a coherent set of methods  
9 to address a similar issue? Let me be specific.

10 The issue of using expert opinions has been  
11 addressed by the reactor guys for a number of years now.  
12 NUREG-1150, as we all know or most of us know, formalized  
13 this. And we had a lot of discussions and so on.

14 So on the high-level waste side, they, of  
15 course, have a major problem with expert opinion, too. I  
16 mean, you're talking about thousands of years. And I  
17 understand how you may even have to go to a million years.  
18 And it seems that this is a parallel effort. I don't know  
19 to what extent there is coordination of these activities.

20 There is a third place where expert opinion  
21 has been investigated. And that's in the seismic risk  
22 area also within the agency. There is a fourth place,  
23 which is what's going on now from Cunningham's group, the  
24 joint European-American effort for assessment, although  
25 that probably is much closer to the NUREG-1150 effort

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1 because the same people are behind it.

2 I'm wondering whether these strategic issues  
3 or one of them should address the question of coordination  
4 that there is a reasonably coherent approach to the same  
5 problem by different people, rather than having different  
6 groups follow their own approach. And I don't know  
7 whether that helps anybody.

8 Of course, it's not that they are completely  
9 independent of each other. I mean, they probably read the  
10 same papers and so on, but --

11 MR. J. JOHNSON: My name is Jim Johnson with  
12 Chairman Jackson's Office.

13 This same comment has come up at recent  
14 Commission meetings. And the Commission has given the  
15 staff instructions to coordinate their efforts. And the  
16 staff in NMSS and staff in Research have been working  
17 together on this area. In fact, they've used the same  
18 contractors in some cases in developing procedures for  
19 processing this information and how you analyze it and  
20 that type of thing.

21 MEMBER APOSTOLAKIS: Is there going to be a  
22 policy statement issued or there will be some sort of  
23 internal understanding how to do these things so that we  
24 don't reinvent the wheel every time?

25 MR. J. JOHNSON: I'm not sure it will be a

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1 policy issue, but I'm sure it will be addressed when the  
2 staff implements a lot of these risk-informed,  
3 performance-based approaches in the various areas.

4 MEMBER APOSTOLAKIS: See, even this Committee  
5 cannot be too helpful there because when you guys talk  
6 about expert opinion, you go before another committee. So  
7 we don't have the opportunity to say, "Hey, this has been  
8 done before." So that is the thing that the risk --

9 DR. SPEISS: George, that has been the thought  
10 when we wrote this section on regulatory coherence. The  
11 question is how --

12 MEMBER APOSTOLAKIS: And that's why I'm --

13 DR. SPEISS: And these issues that you're  
14 talking are discussed in those one or two pages. So how  
15 well we go forward and make sure that we ensure that those  
16 things happened are carried --

17 MEMBER APOSTOLAKIS: I just wanted to make  
18 sure that this specific concern was there.

19 MR. HILTZ: And I think the staff has already  
20 taken some steps to help ensure coherence. So we've  
21 established the PCC, which is the interoffice working  
22 group on the PRA-related issues. And they have discussed  
23 the differences between expert opinion and expert  
24 elicitation. And they did have discussions about the  
25 recent paper that went up.

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1 MEMBER APOSTOLAKIS: Incidentally, I'm not  
2 advocating that everybody should accept one group's  
3 approach, especially in areas like expert opinion or  
4 what's happening now with the human reliability and so on.  
5 Where we really don't know what to do, I think it's  
6 healthy to have different approaches for a while to see  
7 what people come up with and so on.

8 But at some point there should be some  
9 coordination. At least the other group should be aware of  
10 what everybody else is doing, that kind of thing.

11 MR. J. JOHNSON: I believe they are.

12 VICE CHAIRMAN SEALE: Could I ask a question  
13 about one of the subsumed issues we popped over in a hurry  
14 right quick? The fourth bullet down is: Should "the  
15 approach for licensing material uses with various levels"  
16 or "What should be the approach with various levels of  
17 inherent risk?"

18 Is that issue a part of what is going to be  
19 included in this final issue resolution?

20 MR. HILTZ: I suspect that it will be. And in  
21 the Commission's decision again, they have asked for the  
22 Office of Nuclear Material Safety and Safeguards to look  
23 at developing a framework for using risk insights and  
24 implementing risk-informed and performance-based  
25 regulation.

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1           What this subsumed issue specifically dealt  
2 with was the treatment of exempt --

3           VICE CHAIRMAN SEALE: Yes.

4           MR. HILTZ: -- specific or generally --

5           VICE CHAIRMAN SEALE: Yes.

6           MR. HILTZ: -- licensed material and whether  
7 there was some reason for how we do that or whether we  
8 could do it better.

9           VICE CHAIRMAN SEALE: There are a lot of small  
10 users who really don't have the resources and are not  
11 intellectually attuned to doing the kind of thing that  
12 would be in a full-blown risk assessment.

13           And that's probably something you can do on  
14 the basis of inherent risk in a blanket way; that is, the  
15 Commission can. And that ought to be an option, I would  
16 think. And there ought to be some direction on that.

17           MR. HILTZ: Thank you.

18           (Slide.)

19           MR. HILTZ: We identified four options.

20 Option 1 was continue the current process under the PRA  
21 implementation plan or continue the current process for  
22 implementing risk-informed, performance-based regulation,  
23 which is embodied in the PRA, at least in part, in the PRA  
24 implementation plan.

25           The second option would have provided a much

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1 more narrower focus, and that is before the staff would  
2 undertake any additional activities, it would provide some  
3 type of analysis as to what the direct relationship of  
4 that activity or those level of resources is to the public  
5 health and safety.

6 Third option is an aggressive approach which  
7 will perform an assessment of essentially all our  
8 regulatory processes and approaches and determine which  
9 ones may be amenable to a risk-informed, performance-based  
10 approach. That one is also out of the options of the most  
11 resource-intensive, potentially most resource-intensive,  
12 option.

13 And the fourth option could be considered more  
14 narrow, could also be used to implement the current  
15 process. And that is consider risk-informed,  
16 performance-based approaches primarily in response to all  
17 stakeholders' demands.

18 I guess Option 2 and Option 3 require staff  
19 initiative, in some cases a great deal of staff initiative  
20 and staff resources. Option 4 could be characterized to  
21 require an industry initiative. And we would be  
22 responding to the industry initiative in those areas.

23 The options are not mutually exclusive. And I  
24 think you'll see in the Commission's preliminary decision  
25 that they've picked elements of at least two of the

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1 options.

2 MEMBER APOSTOLAKIS: Is it fair to say that if  
3 you are an enemy of PRA, you would go with 2 and if you  
4 are a friend of PRA, you go with 3?

5 MR. HILTZ: You could probably be friendly in  
6 both of them, but --

7 MEMBER APOSTOLAKIS: Not in 2, not in 2. Two  
8 is the license to kill. It's 002.

9 (Laughter.)

10 MEMBER APOSTOLAKIS: Can we praise the  
11 Commission, Mr. Chairman, or it's out of place?

12 CHAIRMAN KRESS: You can always praise the  
13 Commission, yes.

14 MEMBER APOSTOLAKIS: I think this is a great  
15 recommendation. I think what they told you is really  
16 great.

17 CHAIRMAN KRESS: Except I was wondering what  
18 they said about Option 4, which doesn't seem to be up  
19 there anywhere.

20 MR. HILTZ: They didn't address specifically  
21 Option 4 in their preliminary view.

22 (Slide.)

23 MR. HILTZ: In summary, what their preliminary  
24 view indicated, the high-risk activities should be the  
25 primary focus of our efforts and resources, which is a

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1 reaffirmation, I believe, of probably the PRA policy  
2 statement.

3           We should continue our efforts that we're  
4 moving forward under the PRA implementation plan to review  
5 pilot programs; develop regulatory guides and standard  
6 review plans; and, where we can, to consider  
7 performance-based approaches or performance monitoring as  
8 part of that process.

9           We should look for enhancing the process where  
10 it's appropriate to do that. And that option will likely  
11 require us to look a little harder for new areas that we  
12 can go into for risk-informed, performance-based  
13 regulation.

14           They also indicated, as I mentioned before,  
15 with an increased emphasis on the materials area to look  
16 at that and figure out what can be done, what should be  
17 done in the materials world.

18           And wrestling with the dual agency, dual  
19 regulation, one of the specific questions that they  
20 requested that we seek stakeholder comment on was how  
21 risk-informed, performance-based regulation may help us  
22 resolve or deal with some of the regulatory concerns  
23 associated with dual regulation.

24           MEMBER APOSTOLAKIS: What's dual regulation  
25 again? I missed that.

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1 MR. MILHOAN: Dr. Knapp can --

2 MR. HILTZ: Okay. Dr. Knapp.

3 DR. KNAPP: Dual regulation is a shorthand for  
4 where we and EPA for example, have overlapping  
5 responsibilities. The work we've done on Subpart I over a  
6 couple of years is a good example. Is there any way that  
7 we can resolve some of these inconsistencies and  
8 frustrations by applying some of these principles  
9 discussed in these --

10 MEMBER APOSTOLAKIS: There is a report on risk  
11 harmonization?

12 DR. KNAPP: Yes, sir.

13 MEMBER APOSTOLAKIS: Is that available to us?  
14 Do we have it?

15 DR. KNAPP: It's available. We'll be happy to  
16 make it available.

17 MEMBER APOSTOLAKIS: Yes. I would like to see  
18 it.

19 VICE CHAIRMAN SEALE: With regard to Option 4,  
20 I think if you do 1 and 3, then 4 is just a question of  
21 moving the fence.

22 MEMBER APOSTOLAKIS: One and 3 are really the  
23 key ones.

24 VICE CHAIRMAN SEALE: Right, right.

25 MEMBER APOSTOLAKIS: And I think the

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1 Commission --

2 VICE CHAIRMAN SEALE: If you do 1 and 3, then  
3 4 is --

4 MEMBER APOSTOLAKIS: Everything else follows.

5 VICE CHAIRMAN SEALE: That's detail.

6 MEMBER APOSTOLAKIS: Yes. You've killed 2,  
7 and 4 is a detail.

8 MR. MILHOAN: This concludes our presentation.  
9 However, we understood that you also indicated an interest  
10 today in discussing the research paper. While we do not  
11 have slides, we can certainly discuss it at any length  
12 that you so desire.

13 CHAIRMAN KRESS: Yes. We understand since we  
14 didn't warn you ahead of time that we would have to do  
15 without slides, but we would appreciate at least some  
16 brief summary remarks on the options.

17 MR. MILHOAN: Certainly. We certainly can do  
18 that. Dr. Speiss will be glad to --

19 CHAIRMAN KRESS: Thank you very much, Dr.  
20 Speiss.

21 DR. SPEISS: Do it right now?

22 CHAIRMAN KRESS: Yes. Right now would be  
23 good.

24 DR. SPEISS: No break?

25 CHAIRMAN KRESS: No. There's a reason for

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1 that. I'm going to have to disappear in a few minutes,  
2 and I really would like to hear this.

3 DR. SPEISS: I'll try to summarize. I would  
4 like to make a comment on the previous paper. I think it  
5 would be important to give us --

6 CHAIRMAN KRESS: What is it? Can you all hear  
7 him?

8 DR. SPEISS: I have a comment on the -- my  
9 name is Themis Speiss from the Office of Research. I have  
10 a minor comment on the previous paper. And I'm addressing  
11 this to all of you, especially George.

12 CHAIRMAN KRESS: Okay.

13 DR. SPEISS: I have been at SERS meetings  
14 where there have been many arguments about the  
15 definitions. So we attempted to provide the definitions  
16 about risk-informed, performance-based; risk-informed,  
17 deterministic-based; performance-based;  
18 deterministic-based. So it would be very helpful if you  
19 people look at them and at least we all agree, at least 99  
20 percent or 95 percent of the --

21 MEMBER APOSTOLAKIS: Are these in the  
22 government we --

23 CHAIRMAN KRESS: I think they're in the issue  
24 paper.

25 DR. SPEISS: On the issue paper itself, yes.

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1 MEMBER APOSTOLAKIS: Yes. I've seen it  
2 somewhere.

3 DR. SPEISS: Okay.

4 MEMBER APOSTOLAKIS: I like  
5 deterministic-based. That's very interesting. Well,  
6 nothing else. I mean, it's just a --

7 DR. SPEISS: Okay. The research paper, this  
8 is DSI 22. As Mr. Milhoan said, I don't have slides, but  
9 I can walk you through the paper very briefly. There's a  
10 large section dealing with the history of research. I  
11 think all of you are familiar with that.

12 In the early days, the government did all of  
13 the research in support of the nuclear power development,  
14 even before NRC was formed. They built the large  
15 facilities to assess the Doppler, the void coefficient to  
16 make sure that those reactors are stable.

17 Later on, when AEC split into NRC, of course,  
18 NRC had a big budget. And the primary focus was on LOCA  
19 research in those days basically to verify that the ECCS  
20 criteria had an experimental basis.

21 And, again, later on after the TMI accident  
22 and especially with the impetus of the Chernobyl accident,  
23 substantial amounts of money were spent on severe  
24 accidents.

25 The research budget on thermal hydraulics kind

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1 of came down. And then later on we started addressing  
2 issues dealing with aging. The PRA gave us, the WASH-1400  
3 study gave us many ideas, how to pursue some areas that  
4 were not addressed before.

5 Then the advanced reactors came, and we  
6 started addressing issues relating to the performance of  
7 passive systems. Then we realized that we kind of had  
8 decimated the Thermal Hydraulics Program. So we kind of  
9 attempted to build that up. Also, in the paper we say  
10 something about the research in support of the high-level  
11 waste as well as low-level waste.

12 So with that brief background, we thought  
13 carefully of where we go from here on, taking into account  
14 the internal and external factors. And I think we came up  
15 with a rich number of options, about seven of them,  
16 starting with maybe we should discontinue the NRC's  
17 Research Program.

18 And the other options deal with whether we  
19 should be doing only confirmatory or exploratory research;  
20 whether we should continue to do both, as we presently are  
21 doing; or to some extent what role universities should  
22 play. That's Option 6. And Option 7 is whether we should  
23 continue to actively participate in international safety  
24 programs.

25 And I left out the most important option,

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1 Option 5, which is to establish and maintain core research  
2 capabilities. So these are the options. I guess they are  
3 discussed in the paper.

4           You know, the present Research Program is  
5 approximately 80/20 or maybe 75/25 percent  
6 confirmatory/exploratory. And what I mean by  
7 "confirmatory," we do work as prescribed by the user  
8 offices, by NMSS, by mainly NRR, AEOD. And 25 is looking  
9 forward and putting on our field glasses and trying to  
10 anticipate what the issues will be five years from now or  
11 ten years from now.

12           So, again, the research that is being done is  
13 done at the laboratories, at the universities. And we  
14 attempt to combine both exploratory and confirmatory in  
15 one place.

16           The needs based on the history, of course,  
17 change with time. New issues arise. Sometimes issues are  
18 resolved or understood. Therefore, we kind of terminate  
19 work in that area.

20           And, as I mentioned earlier, the example of  
21 thermal hydraulics, where we kind of -- I don't want to  
22 use the word "decimated," but very close with decimated  
23 thermal hydraulic program. And then we have to start up  
24 again.

25           So the question is: On the long term when

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1 some issues are not on the table, is there a need to  
2 maintain expertise in those areas? And that's Option 5.  
3 And the question is: What are the criteria that one wants  
4 to use that you want to maintain expertise, even though  
5 there are no immediate needs in front of us to do research  
6 or address questions?

7           So the Commission again in my judgment was  
8 very wise in its preliminary decisions. They decided to  
9 have the Research Program. And the program should be a  
10 mixture of confirmatory and exploratory, but, most  
11 important, they decided that we should in the next few  
12 months go forward and develop core research programs based  
13 on criteria that the Commission would approve a priori  
14 before we go ahead and develop these programs.

15           We give examples, example criteria, in the  
16 paper on Pages 23 and 24, but we would be working the next  
17 few months trying to add or subtract and be as erudite as  
18 possible and again present those criteria to the  
19 Commission before we undertake to develop kind of core  
20 research capabilities. And when I say "core research  
21 capabilities," I include both expertise as well as  
22 facilities.

23           And the issue of facilities is a very tricky  
24 one because most of these facilities are maintained at the  
25 national laboratories. And in many instances, we share

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1 the cost with the Department of Energy.

2 And as the budgets go down, we in some cases  
3 are left alone to put the overhead cost, pay for the  
4 overhead cost. Some very hard decisions will have to be  
5 made which facilities are critical to maintain as part of  
6 this core research expertise that we want to maintain.

7 The Commission also decided that we should be  
8 continuing to support the Grant Program. The universities  
9 contribute substantially, mostly in the exploratory area.

10 And also we should continue to participate in  
11 international activities as long as those international  
12 activities are integrated with our ongoing programs and  
13 appropriate criteria are used to assess what are the  
14 international activities that we should be involved in.

15 So, with that brief overview, I guess I -- the  
16 paper describes all of these things in great detail. So  
17 --

18 ACTING CHAIRMAN SHACK: Would we get  
19 additional --

20 MEMBER CATTON: What paper is this?

21 DR. SPEISS: DSI 22.

22 ACTING CHAIRMAN SHACK: Twenty-two, right.

23 MEMBER CATTON: Do we have it?

24 ACTING CHAIRMAN SHACK: Yes. It's in the big,  
25 thick packet.

1 DR. SPEISS: We will involve the ACRS in  
2 developing the criteria for developing the core research  
3 activities. Before we go to the Commission, we'll come to  
4 discuss these criteria with you very extensively. So  
5 hopefully you will be prepared to provide us all your  
6 wisdom and insights.

7 MEMBER FONTANA: I don't know about the  
8 wisdom, but we do get another shot at it. Wisdom not  
9 required.

10 You know, a little aside here that's kind of  
11 irrelevant, you used the word "decimate" several times.  
12 You know, the beginning of that, really, that word is a  
13 Roman army when they really screwed up. They would take  
14 --

15 DR. SPEISS: No.

16 MEMBER FONTANA: Yes, it is. They would take  
17 one out of every ten of their own people and execute them.  
18 Did you do this with thermal hydraulics?

19 (Laughter.)

20 MEMBER CATTON: Maybe not, but it was damn  
21 close.

22 MEMBER MILLER: Ivan is still here.

23 MEMBER POWERS: Dr. Speiss? You mentioned  
24 issues coming to a close. In the area of research, I  
25 don't believe I've ever seen a researcher admit that an

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1 area comes to a close. There are always more and more  
2 detailed questions.

3 In fact, I just saw a proposal to measure the  
4 speed of light because of a question at about the 15th  
5 decimal point or something like that. Is this a --

6 MEMBER APOSTOLAKIS: Not by this agency.

7 MEMBER POWERS: Not by this agency, no.

8 (Laughter.)

9 MEMBER POWERS: But my point is that in my  
10 exposure to the NRC's Research Program, I've never seen  
11 any of the issues close in the minds of everybody.  
12 There's always somebody that can say, "Yes, there are  
13 major questions" and whatnot.

14 And clearly the agency is called upon -- I  
15 mean, the skill of managing the Research Program that you  
16 and others have had to exercise is drawing those judgments  
17 on when an issue is known well enough for your purposes.

18 Have you in this issue paper wrestled with  
19 codifying that or are you going to leave that in the hands  
20 of the management? Because, I mean, it really is a  
21 management tool, and I don't know that you can codify it.

22 DR. SPEISS: That's a good question. In fact,  
23 I wasn't present yesterday, but our office briefed the  
24 Chairman on the program of research. And the Chairman  
25 asked us to come up with closure criteria on issues.

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1           We have done that, maybe not in a very  
2 rigorous and erudite way. And we have described it in a  
3 number of papers. But as part of this developing core  
4 research capabilities, we will address also what closure  
5 means, when does an issue end. All of us know that the  
6 ACRS is not the best contributor to this because --

7           MEMBER POWERS: Now you cause me to rise to  
8 the defense of my institution here. I would say that the  
9 ACRS was the motivating factor for coming up with closure  
10 criteria in melt-concrete interaction and we came up with  
11 very good ones in response to the ACRS.

12           MEMBER APOSTOLAKIS: I think the ACRS makes --

13           DR. SPEISS: I take my comment back.

14           MEMBER APOSTOLAKIS: We make sure that the  
15 number of issues remains constant.

16           DR. SPEISS: In fact, that's a good example  
17 that Dr. Powers mentioned. At least for dry situations,  
18 the issue of core concrete interactions is well at hand,  
19 but when you start mixing up concrete with water, you  
20 know, there are --

21           MEMBER POWERS: We're still a little bit  
22 uncertain about that, though.

23           MR. MILHOAN: I think in the age of declining  
24 resources, I think it's extremely important that we do  
25 have closure criteria, that we do have to make a lot of

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1 decisions especially with respect to the Research Program.  
2 And it's very important that we prioritize and have an  
3 understanding of where we're going.

4 MEMBER POWERS: But at the same time, you're  
5 absolutely correct. I know you've wrestled with this.  
6 I'm preaching to the choir here that there are certain  
7 classes of issues, that you may not have an issue at hand,  
8 but you want an expertise.

9 I know, for instance, the agency feels  
10 strongly in the area of thermal hydraulics. I myself  
11 believe that the mission of the agency is to regulate  
12 radionuclides and that you ought to have an expertise in  
13 radionuclides and whatnot, whether there's an issue on the  
14 burner or not.

15 MR. MILHOAN: And that's where you get into  
16 core research capabilities.

17 MEMBER POWERS: That's right. That's right.

18 DR. SPEISS: Yes. We are mindful of that. We  
19 think that we have a pretty good understanding of this  
20 area based on the separate effects test and analysis.  
21 But, you know, that's why we're following the PHEOBUS  
22 Program.

23 MEMBER POWERS: Oh, yes.

24 DR. SPEISS: You know, when you do an integral  
25 test, you could have surprises And, after all, all of us

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1 know that when it comes to risk and safety, it's when  
2 accidents progress beyond the design basis ones. And we  
3 have to have capability in this area.

4 MEMBER POWERS: You raise an interesting area  
5 that, again, I'm certain that you've thought about it and  
6 wrestled with it, but it's one that deserves mention. As  
7 we get involved in these foreign programs more and more  
8 and leveraged research -- and everybody wants to do that  
9 because around the world people's resources fall short of  
10 what it takes to research some of these areas.

11 We look at our history. And there are some  
12 programs of foreign research that have been very, very  
13 successful. And there are some that I think have been  
14 dismal failures as far as taking the information that  
15 those programs yielded and translating it into this body  
16 of knowledge that the NRC issues, whether it's an actual  
17 regulation or not, that knowledge that they use to decide  
18 whether there should be a -- some have been successes, and  
19 some have been failures.

20 I sometimes think I know what makes one a  
21 success and what makes one a failure, but it's an  
22 intuitive grasp. I haven't looked at all of them and come  
23 up with some way of saying, "How do we get involved so  
24 that these things are successful? And what has been our  
25 history? And what should we do better in the future on

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1 that?" because I think it's going to become a fairly big  
2 part of your Research Program.

3 MR. MILHOAN: I tend to agree with you. I  
4 think the Chairman's idea about an international  
5 regulators' forum, especially applied to the research  
6 area, is essential from the standpoint of describing up  
7 front: Do we have common objectives? Do we know where  
8 we're going in the Research Program?

9 Because I think if you have common objectives  
10 and you have a well-defined program up front about what  
11 the intent of that research is and what you're going to do  
12 with it, that that's going to be the more successful, I  
13 feel the more successful research effort.

14 MEMBER POWERS: I think that's an essential  
15 first step, but I think there's more because some of these  
16 programs sound good on paper. And, yet, the product we  
17 got out of them didn't help. I think in terms of --

18 DR. SPEISS: I think the last few years we  
19 have been more selective because -- and, of course, you  
20 know that even we in this country have performed programs  
21 the last ten years that a number of them didn't give us  
22 the results that we had hoped for. I am not surprised in  
23 terms of their excellence in developing them and designing  
24 them and in performing the experiment.

25 MEMBER CATTON: Is this because the product is

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1 not clearly defined?

2 DR. SPEISS: Well, sometimes in the old days  
3 we had --

4 MEMBER CATTON: Oh, I understand the old days.

5 DR. SPEISS: -- maybe more money than was  
6 necessary. And people would rush to do things without  
7 thinking carefully. I mean, you have been a proponent of  
8 scaling. And we agree with that. Many experiments in the  
9 past were not thought carefully from that viewpoint. And  
10 then the results were not the best. So we had to augment  
11 them with additional ones, with a different analysis.

12 But now we're forced to think ahead of time  
13 very carefully when we undertake something. The community  
14 is much more closed now than it was --

15 MEMBER CATTON: It's a lot fewer.

16 DR. SPEISS: -- 5-10 years ago.

17 MEMBER CATTON: It's a lot fewer. It seems to  
18 me that risk is the factor that ties all of these things  
19 together and that the product of your programs should fit  
20 into some sort of a PRA, a complete PRA. And if it  
21 doesn't, you've got to reevaluate the product. And that  
22 ought to take care of a lot of the difficulties.

23 DR. SPEISS: We agree with that, but sometimes  
24 there are different views about the uncertainties, about  
25 --

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1 MEMBER CATTON: Well, uncertainty needs to be  
2 a part of it as well. Without it, you can't guide the  
3 program.

4 DR. SPEISS: I don't disagree with that. Risk  
5 is an important criteria. I mean, pursuing. And that  
6 should be very important; in fact, a criterion in  
7 developing these core research capabilities. That is  
8 discussed in the paper itself.

9 They are all good comments, appreciate that.

10 MR. MILHOAN: I notice the time. I think  
11 we've extended beyond what --

12 ACTING CHAIRMAN SHACK: I was just waiting for  
13 a round number, but I think it's time to bring the  
14 discussion to a halt unless there's a burning question  
15 left.

16 Appreciate very much the discussion of the  
17 issues today. It certainly helped putting them in  
18 perspective.

19 MR. MILHOAN: We thank you for your feedback.  
20 We appreciate your feedback. It's very important that we  
21 do get the feedback so that the Commission can have the  
22 best information available to make their final decision.  
23 This is certainly one important aspect of trying to get  
24 that issue to their attention.

25 ACTING CHAIRMAN SHACK: Well, at the moment

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1 I'd like to just call for a break for 15 minutes. We're  
2 45 minutes behind schedule effectively. So get back by  
3 11:15 promptly.

4 (Whereupon, the foregoing matter went off the  
5 record at 11:02 a.m. and went back on the  
6 record at 11:21 a.m.)

7 ACTING CHAIRMAN SHACK: The next topic is  
8 "Digital Instrumentation and Control Systems." And Don  
9 Miller is the subcommittee chairman.

10 MEMBER MILLER: As we noted by the clock and I  
11 noted last night, I&C is last, of course. And we talked  
12 about shortening this. So we're going to try to make this  
13 quick review of where we've been.

14 We had a subcommittee meeting in March and  
15 May, in which we spent extensive time reviewing regulatory  
16 guides, which are now out for public comment. We also  
17 reviewed the Branch Technical Position 14, I believe is  
18 the number, on software and also reviewed Sections 7.0 and  
19 7.1 at that time, which provide in my view a good overview  
20 of the remainder of the standard review plan update.

21 Now, my view may not be consistent with the  
22 Committee's view. I did look at that again last night. I  
23 think it in most cases looks pretty good as far as  
24 guidance.

25 What we then did here on Tuesday was we had

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1 the remainder of the standard review plan with the  
2 exception of what is expected to be an SER on commercial  
3 off-the-shelf software.

4 Everything else I guess is in place. Right,  
5 Matt?

6 MR. CHIRAMAL: Yes.

7 MEMBER MILLER: And that includes Section 7.2  
8 through -- I don't remember the numbers now, but 9 I guess  
9 it is. And those are done by the staff. In addition, we  
10 had an example of how this could be applied as a way of I  
11 think better educating us on how this is applied. It was  
12 a decision based on time that the staff would go through  
13 the sections and plus the branch technical positions and  
14 not do the example. And that was a decision made partly  
15 by the subcommittee. They thought that was the best  
16 approach here.

17 Just one brief comment. We had then a brief  
18 overview of where we are on the external stressor  
19 lightning, which has been a start and stop issue since  
20 1978. And the staff has assured us we'll try to bring  
21 closure to that in one way or the other in the next year  
22 or so.

23 With that briefly, I'm going to turn it over  
24 to Bruce Boger. Is that -- oh, he's going to turn it --

25 MR. BOGER: Actually, I'm going to turn it

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1 over to Jerry right away. So --

2 MEMBER MILLER: I had a feeling. Matt's going  
3 to get to do all the work anyhow.

4 MR. BOGER: Matt's going to end up with it.

5 MEMBER MILLER: So all the high-level people  
6 have to do their work now. And it's now, Matt, to do your  
7 work. Is that right? So Jerry Wermeil.

8 MR. WERMEIL: Yes. I don't have anything to  
9 add to the overview, Dr. Miller. I'd just as soon we went  
10 straight to Matt's presentation.

11 MEMBER MILLER: Yes. We're about an hour  
12 behind time. So we all recognize that.

13 (Slide.)

14 MR. CHIRAMAL: My name is Matt Chiramal. I'm  
15 with the Instrumentation and Controls Branch. To my left  
16 is Gary Johnson from the Lawrence Livermore National Lab,  
17 who helped us in preparing this SRP update.

18 The update is of Chapter 7 of the SRP, and it  
19 deals with the instrumentation and control systems in  
20 general. That includes both digital and analog and  
21 anything else in between, too.

22 (Slide.)

23 MR. CHIRAMAL: The SRP consists of, Chapter 7  
24 of the SRP consists of, ten sections, of which Section 7.0  
25 is a new section compared to the existing SRP. And it's

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1 an introduction that provides guidance to the reviewer on  
2 how to use Chapter 7 in toto.

3           Section 7.1 is where the general acceptance  
4 criteria and review guidance are provided for all the  
5 systems that follow in Sections 7.2 through 7.9. And it  
6 contains the general design criteria and the 10 CFR  
7 requirements as well as the guidance provided reference in  
8 regulatory guides and branch technical positions and other  
9 standards and documents.

10           In 7.1, there was also advice to consider the  
11 new regulatory requirements of 10 CFR 52 and revisions to  
12 10 CFR 50 that occurred between 1981 and the present, like  
13 50.62, station blackout, and things like that.

14           Sections 7.2 through 7.7 are the existing  
15 sections that are revised to consider additional guidance  
16 for digital I&C systems. And Section 7.8 is a new section  
17 that provides guidance of the reviewer for diverse  
18 actuation systems, particularly the ones that are provided  
19 to mitigate adverse events. And Section 7.9 is primarily  
20 dealing with a data communication system, like multiplex  
21 systems.

22           And the Appendix 7-A is an existing appendix  
23 that contains the branch technical positions. And it has  
24 been revised to add new branch technical positions that  
25 were evolved since 1981 as well as those dealing with

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1 digital retrofits and digital I&C systems.

2 Now, one of the things that we've got to make  
3 sure is that the SRP is written for use by the staff  
4 reviewers for guidance of the review of I&C system design.

5 It is not a detailed procedure or a design  
6 document. It's really guidance to the reviewer. And the  
7 reviewer has got to be qualified and pretty knowledgeable  
8 of the I&C system. It contains references to regulatory  
9 guides and other documentations which are part of the SRP.

10 And so a reviewer has got to know something  
11 about those general criteria and the documents that are in  
12 the SRP. And when he does a review, he's got to go to  
13 those documents. And that's one of the reasons why we  
14 have got a lot of information in the SRP sections which  
15 will take him to other documents with detailed guidance.

16 The new BTPs, we added some additional  
17 references because it's a new one. And we wanted to  
18 provide some technical guidance as to why those  
19 requirements were put into the new branch technical  
20 positions. And that's why the new BTPs look a little  
21 different from the old BTPs in that we have added a  
22 section on the regulatory basis on which the BTPs were  
23 written.

24 (Slide.)

25 MR. CHIRAMAL: At the last meeting we did

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1 mention the basic background as to why we updated the SRP  
2 Chapter 7. It's to include all the lessons learned from  
3 the previous reviews of retrofits and lessons learned  
4 during the period between '81 and the present and the  
5 lessons learned from the review of the advanced lightwater  
6 reactor reviews as well as experiences of operational  
7 experience that occurred to plants during that time frame.

8           The Chapter 7 of the SRP will be used both for  
9 the review of updated -- I'm sorry. The update of the SRP  
10 will be used for the review of both design modifications  
11 that come into us for review as well as for advanced  
12 lightwater reactors. So it's a document that will be used  
13 in the near future as well as in the far future when we do  
14 see an advanced lightwater reactor design coming for a  
15 final design implementation.

16           (Slide.)

17           MR. CHIRAMAL: We made no fundamental changes  
18 to the basic architecture of Chapter 7. As we showed in  
19 the overview, it contains the old Sections 7.1 through  
20 7.7. We added Section 7.0 as an introduction and added 2  
21 new sections: 7.8 and 7.9. But other than that, the  
22 fundamental chapters, the fundamental architecture remain  
23 unchanged.

24           The revision is primarily focused on  
25 highlighting review areas and acceptance criteria for

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1 digital systems and then added discussions on the Part 52  
2 requirements. Similarly, in Sections 7.2 through 7.9,  
3 which are applicable to the systems part of the SRP  
4 Chapter 7, we've added reference to digital systems and  
5 the requirements of Part 52.

6 In general, these Sections 7.2 through 7.9,  
7 the SRP will guide the reviewer to come back to Chapter  
8 Section 7.1, where all the acceptance criteria and review  
9 guidance is provided.

10 (Slide.)

11 MR. CHIRAMAL: As I mentioned earlier, we have  
12 added these three new sections. And we have talked about  
13 it a little bit at the introduction part.

14 (Slide.)

15 MR. CHIRAMAL: We have also added two new  
16 appendices, one to Section 7.0, which is a new section.  
17 Appendix 7.0-A focuses on the digital review process. It  
18 tells the reviewer where to focus his attention during a  
19 review of digital retrofits and, of course, in the review  
20 of an advanced lightwater reactor design.

21 Also in the appendices, we have Appendix  
22 7.1-C, which provides guidance with respect to conformance  
23 to Regulatory Guide 1.153, which endorses IEEE 603 of  
24 1991.

25 The other three appendices, 7.1-A, which adds

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1 additional guidance, additional criteria and guidance, for  
2 the review of changes to Part 50 as well as the new Part  
3 52, and Appendix 7.1-B, where we have added additional  
4 guidance for review of digital sections of IEEE, digital  
5 sections into IEEE 279 review.

6 And Appendix 7-A is where the branch technical  
7 positions reside and where we have added the new BTPs.  
8 And when we get to that, I'll show you that we have  
9 renumbered the old BTPs and brought them up in a numerical  
10 order. Over the years many branch technical positions  
11 were deleted because it was subsumed by part of the SRP or  
12 by standards.

13 (Slide.)

14 MR. CHIRAMAL: When we embarked upon the  
15 review of digital systems, we identified several issues,  
16 which we talked to the ACRS before. And based on that, we  
17 found that we required additional guidance. And we had a  
18 branch technical position on several of these issues. And  
19 they are as shown in the slides.

20 Of primary importance is software reviews,  
21 which is provided now in BTP 14, which we discussed with  
22 the subcommittee as well as the full Committee back in  
23 March of this year.

24 Shown here are what we call other non-digital  
25 system topics. And these are primarily those topics which

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1 were operating experience reviews that were done between  
2 '81 and '96. And they concern things like Reg Guide 1.97  
3 reviews, which is the post-accident monitoring system  
4 reviews, setpoint methodology, as well as isolation  
5 devices qualification. And when I get back to the BTPs,  
6 we have a short discussion on that.

7 (Slide.)

8 MR. CHIRAMAL: Dr. Miller touched upon the  
9 regulatory guides that you reviewed. And these are the  
10 regulatory guides that are of importance in the review of  
11 digital systems. These are referenced in both the Section  
12 7.0-A, Section 7.1 in BTP 14 and some of the other -- in  
13 fact, in those two sections of the SRP.

14 (Slide.)

15 MR. CHIRAMAL: As we touched upon it earlier,  
16 the SRP itself has no new criteria or no new regulatory  
17 requirements. It is the codification of the practices  
18 that we have used in both the operating retrofit reviews,  
19 operating plant retrofit reviews, as well as the advanced  
20 lightwater reactor design reviews.

21 It is primarily used as the guide for the  
22 review by the staff, but it has a secondary purpose of  
23 providing information to the licensees and designers as to  
24 what the staff has been looking for when they look at a  
25 design in a nuclear plant as well as it provides licensees

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1 guidance in making the safety determination when they make  
2 a change to the plant under 10 CFR 50.59.

3 MEMBER SHACK: Matt, can I just ask a  
4 question? Environmental qualification of these systems is  
5 sort of handled separately. Environmental qualification  
6 is a separate section; right?

7 MR. CHIRAMAL: No. It's part of the  
8 requirements of IEEE 279. It should be qualified for the  
9 environment and a requirement of GDC 3?

10 MR. WERMEIL: GDC 2 and 4.

11 MR. CHIRAMAL: Two and 4.

12 MR. WERMEIL: GDC 2 and 4.

13 MR. CHIRAMAL: GDC 2 and 4. So conform to  
14 make sure that the system meets the requirements of GDC 2  
15 and 4, we go to the qualifications standards at IEEE 323.

16 MR. WERMEIL: Let me expand on that a little  
17 bit, Matt.

18 Because these systems that we're talking  
19 about, Dr. Shack, are located in mild environments, the  
20 review of their qualification is handled by the  
21 Instrumentation and Controls Branch as part of the review  
22 of the system.

23 If the system, for some reason, happens to be  
24 in a harsh environment and, therefore, would have to meet  
25 the requirements of 10 CFR 50.49, then the review is done

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1 in a different way by a different group of people. But  
2 that is not the case, at least up to now, with regard to  
3 the digital systems that we have reviewed to date.

4 The mild environment is a review that is done  
5 in the Instrumentation and Controls Branch.

6 MR. CHIRAMAL: Yes. And we have added  
7 additional guidance in the various sections of the SRP,  
8 but coordination with other branches in areas like EQ  
9 reactor systems accident analyses and things like that.

10 (Slide.)

11 MR. CHIRAMAL: As I mentioned earlier, we will  
12 be using the updated SRP Chapter 7 for the review of both  
13 the advanced lightwater reactor designs as well as  
14 retrofits for operating reactor plants.

15 The depth of review and the scope and the  
16 attention paid to details in the review of digital  
17 retrofits will depend on the system that is submitted for  
18 changes and the extent of the change and, of course, the  
19 safety significance of the change.

20 So in Section 7.0-A, we have provided some  
21 guidance to the reviewer to the extent as to the depth of  
22 the review that should be provided for that particular  
23 application.

24 One of the points that we wanted to make is  
25 that the defense-in-depth and diversity analysis are

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1 required only when there is a change to the reactor trip  
2 system and engineered safety features actuation system.

3           However, when you do a change to the ATWS  
4 mitigation system or the diverse actuation system that's  
5 in Section 7.9, there is a pointer that provides guidance  
6 to the reviewer telling him that he should make sure that  
7 the defense-in-depth analysis that is done for the ESFAS  
8 and the RTS is not affected by any changes that he makes  
9 to the diverse actuation or the ATWS mitigation system.

10           I think I'm going to skip Slides 11, 12, 13,  
11 and 14 because that is additional details of Section  
12 7.0-A. I'll go straight to Section 7.1, Slide Number 15.

13           MEMBER MILLER: Except you need to recognize  
14 that 7.0 and 7.1 have to be used for part of 7.2 through  
15 7.9. You have to use them.

16           MR. WERMEIL: That's correct.

17           MR. CHIRAMAL: Well, 7.0 is really a guidance  
18 to the reviewer. Yes, it tells them what to look for and  
19 where to go in 7.1.

20           MR. WERMEIL: That's right.

21           MR. CHIRAMAL: It tells the reviewer how to  
22 use Chapter 7 and shows him the pathway.

23           MEMBER MILLER: To me they're the two most  
24 important sections in a way. I just want to let the rest  
25 of the Committee know to don't skip over those when you

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1 try to figure out how to use this document.

2 MR. CHIRAMAL: Right. Well, I provided the  
3 full set to the Committee mainly so that when they want to  
4 review it, it's a full picture of the whole Chapter 7.  
5 Yesterday we did go through. And back in March we went  
6 through Section 7.0-A and 7.1 quite in depth.

7 (Slide.)

8 MR. CHIRAMAL: Actually, Section 7.1 is where  
9 the design criteria, general design criteria, and 10 CFR  
10 requirements reside. And that's where the additional  
11 guidance and regulatory guides and the BTPs are  
12 referenced. That's the place that when the reviewer goes  
13 through any review of a system, you will be tracked back  
14 to Section 7.1 for guidance as to what the sections of the  
15 requirements and guidance he should be focusing on when he  
16 looks at that particular system.

17 So the technical bases provided for all I&C is  
18 10 CFR 50.55a(h), which is the IEEE 279, which in the area  
19 of digital systems, it also provides additional guidance  
20 using IEEE Standard 7-4.3.2, which is endorsed by Reg  
21 Guide 1.152, Revision 1, and, of course, as I mentioned  
22 earlier, IEEE 603, which is the hardware requirements  
23 document that is equivalent to IEEE 279 and is endorsed by  
24 Reg Guide 1.153, Revision 1.

25 The other 10 CFR requirements are 10 CFR

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1 50.34(f), which lives with TMI action plans; 50.62 in  
2 ATWS; and Appendix A, "General Design Criteria"; and,  
3 although not mentioned here, will be Appendix B on quality  
4 assurance.

5 (Slide.)

6 MR. CHIRAMAL: Section 7.1 is laid out, as in  
7 the old SRP, with review responsibilities and the various  
8 subsections as shown. It includes Appendix A, which we  
9 talked about, which is where we have the acceptance  
10 criteria and guidance summarized in Table 7.1-1; and  
11 Appendix B, which provides guidance for evaluation of the  
12 design against IEEE 179, which is what most of the  
13 operating plants are designed -- I mean, the licensing  
14 basis is 279; and the advanced reactors are reviewed  
15 against Appendix C, which is the evaluation against IEEE  
16 603.

17 (Slide.)

18 MR. CHIRAMAL: Section 7.1 was revised to  
19 include the review of digital system issues. And it was  
20 based primarily on the IEEE 7-4.3.2, which is a standard  
21 on acceptance criteria on digital nuclear-based I&C  
22 systems.

23 And this mapping shows the additional details  
24 provided by the regulatory guides and BTPs, which provide  
25 more details to the reviewer for conforming to the

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1 guidance of IEEE 7-4.3.2.

2 And here this is where you see things like  
3 equipment qualification and then show guidance provided in  
4 IEEE 323. For example, in reliability and some of the  
5 software development requirements, we go back to BTP 14.

6 And although not shown on this figure,  
7 additional guidance is provided by the six regulatory  
8 guides that Mike showed earlier. And Dr. Miller touched  
9 upon this commercial-grade equipment, or COTS, which is  
10 where at present we have referenced it in the draft SRP  
11 Chapter 7 of the EPRI document. And we intend to -- when  
12 finally issued to us for review, we'll have a safety  
13 evaluation report on that report. And then it will be  
14 final included in here as a separate version of the COTS  
15 document.

16 Two items here, the last two on the leg, the  
17 defense-in-depth and the emerging software methodologies,  
18 are not in the IEEE 7-4.3.2, but these are positions taken  
19 by the staff and guidance provided by the SRM from the  
20 Commission on defense-in-depth and against common mode  
21 failure and additional details as provided in BTP 19.

22 In the section in 7.1, we have provided  
23 guidance or a note to the reviewer that there are emerging  
24 software methods that are coming up because this is  
25 evolving technology. And you would expect to see

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1 something that is not provided as additional utility to  
2 the SRP. And then we'll have to do it on a case by case  
3 basis.

4 One of the reasons why in all the sections of  
5 the SRP, the BTP, and the regulatory guides are in a sense  
6 not very specific is because we try not to be prescriptive  
7 in our guidance to the reviewer. We leave the option for  
8 the designers and the vendors and the utilities to come in  
9 with a design. And we review it against the guidance  
10 provided in the SRP.

11 (Slide.)

12 MR. CHIRAMAL: Slide 19 is showing the pathway  
13 in which the reviewer who goes through Sections 7.2  
14 through 7.9 will be referenced back to Section 7.1-A.  
15 From there, there will be pointers to take him to the  
16 general design criteria, 279 or 603, and the regulatory  
17 guides or the BTPs.

18 So in a sense the SRP is not a single  
19 document. It has underlying documents that lie beneath  
20 it. For example, the regulatory guides are referenced in  
21 the SRP, but it's not included as part of the SRP. The  
22 BTPs are in Appendix 7-A and are included in the SRP  
23 Chapter 7.

24 (Slide.)

25 MR. CHIRAMAL: Skipping to Page 21, Sections

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1 7.2 through 7.9 focus on the various systems that are  
2 reviewed as I&C systems. And these are: the reactor trip  
3 system, the engineered safety features actuation system;  
4 safe shutdown systems; information systems important to  
5 safety; interlock systems; and control systems; and the  
6 two new sections, the adverse mitigation and  
7 diverse actuation system and the communication system,  
8 which is Section 7.9.

9 In each of the sections, we have added  
10 additional guidance to the reviewers to emphasize that the  
11 review of systems should be coordinated with other  
12 branches. And depending on the system that you're  
13 reviewing, the focus could be primarily the Reactor  
14 Systems Branch of RTS and PS Branch, branch systems or  
15 safe shutdown systems, and EQ for seismic qualifications  
16 and that kind and so on down the line.

17 Additionally, for the Part 52 review, we point  
18 him to the ITAAC section, which is in Chapter 14 of the  
19 SRP, which is out for public comments, by the way.

20 (Slide.)

21 MR. CHIRAMAL: Sections 7.2 through 7.9 -- and  
22 what's shown here on the slide is Section 7.2, a reactor  
23 trip system -- are arranged in a similar manner. The  
24 sections go in a similar fashion.

25 It starts off at the scope of the review

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1 system; the acceptance criteria to which the system should  
2 conform; and in a review procedure section, --

3 (Slide.)

4 MR. CHIRAMAL: -- the emphasis for review,  
5 which in the case of reactor trip system will be the  
6 design basis, the single failure criteria, quality of  
7 components and modules, including software. When a  
8 reviewer gets to, for example, this qualification of  
9 components and modules, it will take him to both the BTP  
10 14, IEEE 323 for EQ environment, and pointers to those  
11 various standards and regulatory guides.

12 As I mentioned earlier, one of the items that  
13 will be looked for in reviewing RTS and ESFAS will be  
14 defense-in-depth and diversity and pointers to -- when the  
15 RTS is implemented in a digital system, it will be using  
16 the Reg Guide 1.152. And then you talk about setpoint  
17 determination. It takes him to BTP or setpoint  
18 methodology as well as the Regulatory Guide 1.105, which  
19 is an older reg guide.

20 (Slide.)

21 MR. CHIRAMAL: One of the subsections in  
22 Sections 7.2 through 7.9 is the evaluation finding.  
23 Basically, the reviewer's job is to find that all the  
24 acceptance criteria are met. And then that goes in the  
25 SRP.

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1           We have given a typical evaluation of SER  
2 language, which states how to write the section which  
3 states this, the reason why this particular GDC or the  
4 criteria is met is because of this. As I mentioned  
5 earlier, this is typical of Sections 7.2 through 7.9.

6           Since the rest of the sections are very  
7 similar, I'll skip to Slide 39, --

8           (Slide.)

9           MR. CHIRAMAL: -- which is a table showing the  
10 BTPs that are included in Appendix 7-A. It's not 7.1-A.  
11 It's 7-A.

12           The BTPs 1 through 9 are the BTPs that existed  
13 in the old, the 1984 version of the, SRP. BTPs 10, 11,  
14 12, and 13 are BTPs that were used by the staff between  
15 1984 and 1993. And the BTPs 14 through 21 are primarily  
16 dealing with digital technology issues. And that's what  
17 this next slide really tells you, --

18           (Slide.)

19           MR. CHIRAMAL: -- that BTP 1 through 9 are  
20 existing BTPs; BTPs 10 through 13 reflect, really, lessons  
21 learned from operating reactor reviews; and that BTPs 14,  
22 17, 18 deal with digital system; and 16 is really an issue  
23 for level of detail for the design certification  
24 applications only.

25           MEMBER SHACK: None of the BTPs or reg guides

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1 explicitly address the formal methods, do they?

2 MR. CHIRAMAL: No.

3 MR. WERMEIL: That's correct. They do not.

4 MEMBER SHACK: Is there any user request for a  
5 reg guide or to develop a reg guide or a BTP assessing the  
6 formal methods?

7 MR. WERMEIL: No, not at this time.

8 MR. CHIRAMAL: There are words in the BTP  
9 which --

10 MEMBER SHACK: Right. It's covered in  
11 general.

12 MR. CHIRAMAL: -- correct, should be faceable,  
13 which says that --

14 MEMBER SHACK: Nothing more specific?

15 MR. CHIRAMAL: Nothing more specific.

16 MR. WERMEIL: No. That's correct, Dr. Shack.

17 If a licensee would propose to go to a vendor who  
18 utilizes, quote, "formal" methods in the development of  
19 their software, we would feel comfortable that we could  
20 review that approach. But we're not endorsing that as  
21 something that we believe is necessary in the development  
22 of the software.

23 MEMBER SHACK: No. I didn't think it was  
24 necessary. I just wondered if you felt that your reviewer  
25 would need any guidance beyond a general statement on the

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1 formal methods.

2 MR. WERMEIL: It's conceivable that depending  
3 on what formal method was employed and how it was  
4 utilized, yes, we might have to go outside to get some  
5 contractor assistance in doing such a review. That is  
6 conceivable.

7 (Slide.)

8 MR. CHIRAMAL: The old BTPs, the 1 through 9,  
9 really, we didn't touch it all that much. It was just  
10 changed a little for format. And I think we added  
11 reference to IEEE 603.

12 All the others, the BTPs, follow a common  
13 outline, which is: a background section, which provided  
14 in the background section the regulatory basis, the  
15 applicable guidance, and in some instances the purpose of  
16 the BTP; then the BTP itself, which is the acceptance  
17 criteria and the review procedures and the references. So  
18 BTP 1 through 9 may not have all this, but BTPs following  
19 10 through 21 will have the same outline.

20 (Slide.)

21 MR. CHIRAMAL: As I mentioned earlier, BTPs 10  
22 through 13 address operating experience lessons learned.  
23 Ten deals with the lessons learned in the review of the  
24 implementation of Reg Guide 1.97. BTP 11 deals with  
25 qualification of electrical isolation devices between

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1 safety I&C systems and non-safety I&C systems. Twelve  
2 deals with setpoint methodology. And 13 is the one on  
3 cross-calibration of RTDs in reactor coolant system  
4 temperature measurements.

5 (Slide.)

6 MR. CHIRAMAL: BTP 14 and the rest deal with  
7 digital issues. And we discussed BTP 14 back in March. I  
8 think we discussed BTP 21 in May. The other two, BTP 18,  
9 is a discussion of programmable logic controllers, which  
10 are a subset of digital computer-based systems, which  
11 basically use lateral logic as their language for  
12 translation to safety into the software; and BTP 17  
13 discusses self-test and surveillance test features that  
14 are provided with a digital system included as part of the  
15 digital protection system.

16 And BTP 21 touches upon the particular aspect  
17 of digital system, which is the timing requirements in the  
18 digital systems and then some of the architectural  
19 features that are required to be met by digital I&C  
20 systems.

21 And that's all we had for the presentation  
22 this morning. Do you have any questions?

23 MEMBER MILLER: You've done a good job  
24 catching us up. My question would be: Has the Committee  
25 seen all the issues they want to have questions on? I

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1 know we skipped a lot of material you had planned to cover  
2 today.

3 Just as a reminder of the last letter, we did  
4 indicate we had continuing interest in the balance between  
5 or the level of detail and the balance between design  
6 process and the assessment of digital products. Those are  
7 issues we discussed last time.

8 I think, Ma. J., in the Committee meeting this  
9 week, we talked about the graded approach and how you've  
10 embedded it within the parts.

11 MR. CHIRAMAL: The graded approach in a sense  
12 is really the graded approach used by the reviewer in the  
13 details of review that he's doing. And that, as I  
14 mentioned earlier, depends on the modification package  
15 that he received for review and the safety significance of  
16 it, in a sense how complex it is, how many functions does  
17 it perform. Depending on that, the depth of review will  
18 vary. It's a call by the reviewer himself and --

19 MEMBER MILLER: It's a judgment of the  
20 reviewer; right?

21 MR. CHIRAMAL: A judgment call. It's put on  
22 by his section chief and branch chief.

23 MEMBER MILLER: And on Tuesday there was also  
24 some discussion on acceptance criteria?

25 MR. CHIRAMAL: Yes. It was felt by Dr.

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1 Apostolakis that we have not provided sufficient detail in  
2 some of the BTPs. And the main reason is we want it to be  
3 flexible enough to cover different types of application or  
4 design packages that we may see and still be comfortable  
5 enough to say that it is a quality product and that the  
6 verification and validation, the testing, the review of  
7 the process and the products that are provided along the  
8 stages are meeting exceptional quality.

9 MEMBER APOSTOLAKIS: Well, for the benefit of  
10 the members who were not here on Tuesday, I think I should  
11 summarize what I said then. There are two or three points  
12 that really are of concern to me. One is the issue of  
13 acceptance criteria, as Matt just said.

14 First of all, in preparation for this, I tried  
15 to understand what an SRP is supposed to do and a BTP and  
16 so on. So the way I see it in the documents, a BTP is  
17 supposed to provide solutions and approaches to the  
18 various issues that are acceptable to the staff. So, in  
19 other words, it's the way I understand it the most  
20 detailed guidance that the staff can give.

21 So we go now to the BTP 14. And under  
22 "Acceptance Criteria," for example, on Page 5, they would  
23 like to see a software management plan. So the software  
24 management plan should contain the elements listed below:  
25 one bullet, "A description of the project organization";

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1 second bullet, "A description of the process by which the  
2 project will be managed." This includes project  
3 priorities, project assumptions, and so on.

4 Now, this is not what one would expect to see  
5 under "Acceptance Criteria." In other words, what are the  
6 acceptance criteria? Just the existence of a description  
7 of the project organization is considered acceptable or  
8 should that project organization meet certain standards?  
9 And if it does, then it is acceptable?

10 Merely requiring a description of something  
11 cannot be an acceptance criterion in my opinion. And this  
12 is --

13 MR. CHIRAMAL: Dr. Apostolakis?

14 MEMBER APOSTOLAKIS: -- pervasive, is it not?

15 MR. CHIRAMAL: If you go back to Page 5, one  
16 of the first lines says, "An appropriate outline of this  
17 plan can be found in a particular standard."

18 MEMBER APOSTOLAKIS: Okay. I'm coming to  
19 that.

20 Now, an example that also endorses the  
21 standard is this V and V, I think.

22 By the way, another of my complaints is that  
23 there are too many references to other documents. So if  
24 we go to Page 9, it says, "The software V and V plan  
25 should contain the elements listed below. An appropriate

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1 organization for this plan is shown in Reg Guide 1.1 YY,  
2 which endorses ANSI/IEEE Standard 1012." And, again, we  
3 have the same thing, a description of the organization of  
4 the software V and V effort, without telling us how good  
5 that organization or how can we declare that organization  
6 has been good or bad.

7           So by going to the IEEE standard, one would  
8 expect more detail. But there also the kind of advice you  
9 get is that, for example, the reviewer or the designer  
10 should trace software requirements to system requirements  
11 and analyze the relationships between them for such  
12 qualities as correctness, consistency, and completeness,  
13 and accuracy.

14           It seems to me these are more like principles  
15 that one starts out with and says, "I would like to have  
16 correctness, consistency, completeness, and accuracy."  
17 But when it comes to the actual review, especially under  
18 the title "Acceptance Criteria," you just can't say, "Make  
19 sure that the thing is correct, consistent, complete, and  
20 accurate." You have to give some detailed advice as to  
21 what that means. And that's what's lacking.

22           I don't know if anybody else is --

23           MR. CHIRAMAL: I'll try and explain a little  
24 bit.

25           MEMBER APOSTOLAKIS: Sure.

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1 MR. CHIRAMAL: What you're looking at is just  
2 the front end of the process. The implementation of the  
3 plan along the way when they produce the products is also  
4 something that's embedded in the plan. The plan is just a  
5 way -- it's just the front end of the process, where we  
6 make sure that they have a plan and a structured process  
7 for producing a product.

8 So along the way when the plan is implemented  
9 and the design is implemented, we go in. And there are  
10 other acceptance criteria for these documentation and  
11 these activities.

12 So the plan is just the front end of it only.  
13 You cannot take it in --

14 MEMBER APOSTOLAKIS: So when are we going to  
15 see the acceptance criteria --

16 MR. CHIRAMAL: It's in here, in the -- as I  
17 showed back in March, the BTP 14 is broken up into three  
18 parts, basically. One is the planning stage, the  
19 implementation stage, and the review of the design  
20 outputs. And all three are in the BTP 14.

21 MEMBER APOSTOLAKIS: So they are in the  
22 document you have in front of you?

23 MR. CHIRAMAL: Yes.

24 MEMBER APOSTOLAKIS: Okay. Can you point me  
25 to where I can find this detailed guidance for V and V,

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1 for example?

2 MR. CHIRAMAL: Okay. Page 11, for example.

3 MEMBER APOSTOLAKIS: Okay.

4 MR. CHIRAMAL: See, that's Section 2.2.2,  
5 "Acceptance Criteria."

6 MEMBER APOSTOLAKIS: Right.

7 MR. CHIRAMAL: And, see, this section  
8 addresses the acceptance criteria for the implementation  
9 activities, which is these activities.

10 MEMBER APOSTOLAKIS: Okay. Again, it says,  
11 "The V and V documentation should confirm that the  
12 requirements, design elements, and code elements satisfy  
13 the appropriate functional characteristics of accuracy,  
14 functionality, reliability, robustness, safety, security,  
15 and timing." Is that an acceptance criterion or something  
16 that we would like to have? I mean --

17 MR. WERMEIL: In our mind it's an acceptance  
18 criterion, Dr. Apostolakis, because the designer would  
19 specify them. And I believe what that says and hope it's  
20 being interpreted by our reviewer to say that he or she  
21 would look to see that that has been incorporated both in  
22 the plan for establishing V and V and in the actual V and  
23 V that was conducted on the software that was developed.

24 Paul Loeser sort of went through that when he  
25 described how he did the audit of the documentation for

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1 the STAR system, where he traced the specification of the  
2 requirement, its implementation, and then its verification  
3 and validation.

4 That's the premise for the entire setup of  
5 BTP/HICB 14 in each of the aspects that Matt has been  
6 talking about: in the planning phase, in the development  
7 phase, and in the implementation phase.

8 MEMBER APOSTOLAKIS: Well, again, the V and V  
9 documentation should confirm that the requirements and so  
10 on satisfy the appropriate software development process  
11 characteristics of completeness.

12 MR. WERMEIL: Right.

13 MEMBER APOSTOLAKIS: And we leave it at that.

14 MR. WERMEIL: Yes.

15 MEMBER APOSTOLAKIS: Now, how do I know that  
16 completeness has been achieved?

17 MR. WERMEIL: Well, I'll tell you. Well, go  
18 ahead, Gary. Do you want to?

19 MR. G. JOHNSON: Yes. This is Gary Johnson of  
20 Lawrence Livermore Lab.

21 This is saying that the design elements and  
22 code, the design elements being, for example, the  
23 architecture, the systems requirements specifications, the  
24 system design descriptions, and the code itself should  
25 meet these characteristics.

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1           If we go back to the later section of the BTP  
2 14 which discusses the design output documents, those  
3 characteristics are more fully defined for those design  
4 elements.

5           What this is saying is that we would expect  
6 the developers themselves to have confirmed these things  
7 about their design outputs. And we would expect them to  
8 have done that in a more thorough manner than any NRC  
9 reviewer.

10           MR. WERMEIL: To say it a different way, the  
11 completeness of the software that's to be developed is  
12 established by the vendor based on the specification. We  
13 can't say or I can't think of words off the top of my head  
14 that would amplify on what completeness is for a reviewer.  
15 The reviewer would be expected to take what is the  
16 requirement specification, make sure that whatever is in  
17 it has been properly implemented throughout each phase.  
18 And I believe having done that he can then or she can then  
19 make a judgment that the product is likely complete in the  
20 sense that the required functions, the required  
21 performance of the software has been demonstrated  
22 throughout and that therefore I've got a product that does  
23 what it's supposed to do, based on the specification that  
24 was initially developed.

25           Those kind of words, I guess we can put those

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1 kind of words into an SRP.

2 MEMBER APOSTOLAKIS: No, no. I think what  
3 bothers me with all this is it's way too high level. It's  
4 way too high level and as I said maybe it's inappropriate  
5 to compare, but I found, I looked at a couple of other  
6 reg. guides and things that deal with more traditional  
7 engineering problems and the advice is much more specific.  
8 For example, reg. guide 1.52, design testing and  
9 maintenance criteria for post-accident engineer and safety  
10 feature atmosphere, clean-up system air filtration and so  
11 on. And I see things like the design of an engineered  
12 safety feature, atmosphere cleanup system should be based  
13 on the maximum pressure differential radiation dose rate,  
14 relative humidity, maximum and minimum temperature. I see  
15 things such as the volumetric air flow rate of a single  
16 cleanup range should be limited to approximately 30,000  
17 cubic feet per minute. It seems to me this --

18 MR. CHIRAMAL: I wish we had metrics to do  
19 that.

20 MEMBER APOSTOLAKIS: I understand. I  
21 understand, but the gap between this and what you guys are  
22 doing is so huge.

23 And then, what makes it worse for me is that I  
24 see the Canadians doing more.

25 MR. WERMEIL: I would disagree with that.

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1 MEMBER MILLER: I think we're disagreeing  
2 there, George.

3 MR. WERMEIL: I would disagree.

4 MEMBER APOSTOLAKIS: They go a little beyond  
5 in the sense that they say we recognize that a lot of the  
6 problems come from translating the system requirements to  
7 software.

8 MEMBER MILLER: That was clearly recognized in  
9 our reviews in March and May.

10 MEMBER APOSTOLAKIS: Recognized as what?

11 MEMBER MILLER: Recognized as that's an issue  
12 of functional specifications and --

13 MEMBER APOSTOLAKIS: But we're not giving any  
14 advice.

15 MEMBER MILLER: There's lots of advice.

16 MEMBER APOSTOLAKIS: See, the only -- what  
17 kind of advice? Make sure it's complete and consistent.  
18 Come on, that's not advice.

19 MR. CHIRAMAL: Well, the only the formal  
20 specification does for you is conform the unambiguity of  
21 the specific translations.

22 MEMBER APOSTOLAKIS: And it forces you to  
23 think in terms of --

24 MR. CHIRAMAL: And what's given here, it's  
25 most subjective.

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1 MEMBER APOSTOLAKIS: I think --

2 MR. CHIRAMAL: You can come up with a method  
3 and still be complete and unambiguous.

4 MEMBER APOSTOLAKIS: As I said last Tuesday,  
5 these are not -- we're not talking about physical laws  
6 here, where you're either right or wrong. We're talking  
7 about the exercise of judgment.

8 MR. CHIRAMAL: Right.

9 MEMBER APOSTOLAKIS: Okay. In the case of the  
10 guide that I just read from, we have evidently some  
11 mechanistic models behind all these things, so people  
12 could say it's really important for yo to look at pressure  
13 differentials to look at temperatures and so on. So you  
14 suppress as much as you can the judgment because now  
15 you're working with physical pointers. Since here the  
16 emphasis is on the process, and partly on the product too,  
17 but it's really the process that drives the whole thing.  
18 I mean there is testing too.

19 MR. CHIRAMAL: I mean we're doing as much for  
20 this system testing as we did for the analog systems.

21 MEMBER APOSTOLAKIS: Right. The question is  
22 now how formal do you want to be to at least structure the  
23 judgment to perhaps avoid inconsistencies, arbitrariness  
24 and so on.

25 MR. CHIRAMAL: And that's exactly --

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1 MEMBER APOSTOLAKIS: I understand. I  
2 understand. I am not saying that with what you put down  
3 on paper here you will have a bad product necessarily.  
4 What I'm saying is that if you try to be a little bit more  
5 specific, if you try to bring some of these methods that  
6 other people are using and maybe that comes back to some  
7 comment that was made some time ago whether we want to be  
8 at the forefront of the state of the art or do something  
9 else. Then it seems to me that the exercise of judgment  
10 will be a bit more disciplined if we brought whatever --  
11 like, the only place in fact that I found where you tried  
12 to do that is this page 11 where at least you're saying as  
13 part of the software V & V effort, the traceability matrix  
14 should be produced with the attributes listed below.

. You didn't have to say that. But you said it  
16 and now I think I know why because the guy who did the  
17 ASTAR review used something like that.

18 MR. WERMEIL: And the ones before him.

19 MEMBER APOSTOLAKIS: No, but this I think,  
20 goes a little beyond saying please trace software  
21 requirements to system requirements and analyze the  
22 relationships between them for such qualities as  
23 correctness consistency, completeness and accuracy.

24 Well, I don't know what that means.

25 MR. WERMEIL: George, the reason for the

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1 traceability matrix was not necessarily a requirement that  
2 we placed on the licensee for their benefit. That was for  
3 our benefit.

4 MEMBER APOSTOLAKIS: Right.

5 MR. WERMEIL: Something we wanted to see.

6 MEMBER APOSTOLAKIS: But at least you're  
7 forced now to become more structured, to give you, as that  
8 gentleman told us, it would have been nearly impossible  
9 for him to do his job if he didn't have that.

10 MR. WERMEIL: Look at it this way though,  
11 theoretically the vendor or the licensee could even  
12 develop that matrix after the fact. They may not have had  
13 it as part of the development process throughout. It may  
14 have taken a development process and then based on what  
15 they did, developed a traceability matrix just for the  
16 NRC's benefit. Believe me, that's been done too.

17 MEMBER APOSTOLAKIS: They should have --

18 MR. WERMEIL: It seems, in my mind, that it  
19 would have been better to have it throughout like Paul  
20 talked about yesterday, but you wouldn't necessarily have  
21 to to do it that way.

22 MR. JOHNSON: One of the things we did is  
23 part of the work leading up to the development of this  
24 revision was to go and look at organizations that had a  
25 reputation for developing high quality, high reliability

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1 software. Some of the most important features we found of  
2 those organizations were that they had qualified  
3 experienced personnel. They had processes that they were  
4 comfortable with. They had been through a -- had  
5 procedures in place for continuous process improvement.

6 Those were really where the commonalities lie.  
7 There are not great commonalities in terms of how do  
8 people do the design themselves. There are fairly wide  
9 range of differences amongst organizations that are  
10 successful in the actual details of how they implement  
11 these things.

12 One of the areas where there is commonality is  
13 -- and very mutual agreement amongst these organizations  
14 is the benefit of traceability and matrices as part of the  
15 process and that's the reason traceability matrices fall  
16 in here, to get more specific about some of the other  
17 attributes of processes, might mean that these  
18 organizations that have been successful, that have stable  
19 processes could not use their stable process because for  
20 some reason or another it doesn't comply with the NRC  
21 guidance and we think that would be counterproductive to  
22 lead them in that direction.

23 MEMBER MILLER: Gary, could you go on and  
24 maybe expand on the real value of having a very well  
25 defined process, some other values over and above the

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1 desire to have a good product?

2 MR. CHIRAMAL: I think we tried to depict that  
3 when we showed the differences between why we went into  
4 doing the process when we started implementing the digital  
5 technology. It's that the continuity of test results is  
6 not valid when you look at software. The discontinuities  
7 between points in the test input and output test space  
8 gives -- we need something more to give you that  
9 confidence that the products meet the specification. And  
10 that's why we emphasize the review process, the review of  
11 the process along the way as part of the confidence  
12 building in the product.

13 MEMBER MILLER: So each step you're testing  
14 and reviewing mainly to verify that you have the process  
15 right?

16 MR. CHIRAMAL: That's right. Repeatable  
17 process, the probability of having a good, a higher  
18 quality product.

19 MR. JOHNSON: Well, I would differ from that  
20 statement slightly, that at each depth the vendor is  
21 testing and reviewing to confirm that the products are  
22 right. And really there is an enormous, the process  
23 that's outlined here includes a considerable amount of  
24 product qualification activities in the form of  
25 verification inspections, verification testing, validation

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1 testing.

2 I don't think one could expect the staff  
3 members as part of their review to examine those things  
4 all in great detail. If you look at what the standard  
5 review plan outlines and what Appendix 7-0-A discusses  
6 from a qualification perspective, they look at some sample  
7 of the qualification activities that are performed by the  
8 vendor to confirm that the vendor has a good qualification  
9 program themselves.

10 This includes looking at the planning  
11 documents to confirm that they have a good idea of how to  
12 go about those qualification activities and it includes  
13 looking at samples of the inspection and test plans and  
14 inspection and test reports to confirm that they were well  
15 conducted and it includes and that the expected results  
16 were obtained, that anomalies were identified and  
17 appropriately dispositioned. And looking at some sample  
18 of the products themselves to confirm that these design  
19 outputs of this whole process are things that you would  
20 expect to have successfully made it through the vendors or  
21 the developers qualification activities.

22 Now once that's done though, they are still  
23 only looking at a sample of documents. They need a sample  
24 of products, a sample of design outputs. The staff then  
25 would need some basis to extrapolate what they've learned

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1 from the sampling to all the documents and products that  
2 they could not look at them directly. And the basis for  
3 that extrapolation is confirmation that the applicant has  
4 a -- or the developer has a uniform and stable process  
5 that one could reasonably expect would product the same  
6 quality for all the elements of the design as it did for  
7 the elements of the design that were actually directly  
8 inspected and reviewed.

9 MEMBER MILLER: Let me ask a question. This  
10 is a QA is not new to NRC. If we take QA on a product,  
11 it's not a software product, just a hardware product, are  
12 we advocating anything different here than we did in those  
13 --

14 MR. JOHNSON: Not really.

15 MR. WERMEIL: Not really.

16 MEMBER MILLER: Isn't the process -- you're  
17 advocating here exactly what you'd do to get an N stamp on  
18 a piece of hardware?

19 MR. WERMEIL: I was going to give an analogy  
20 to the fabrication of say an ASME Section 3 pressure  
21 vessel. Appendix B calls for a set of documentation to  
22 demonstrate that the product that was created satisfies  
23 certain prescriptive requirements in order to insure that  
24 it is qualified for use in the service intended. This is  
25 very much the same.

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1                   There's not much difference.

2                   MEMBER APOSTOLAKIS: But what prescriptive  
3 requirements do you have here? See, that's the difficulty  
4 --

5                   MR. WERMEIL: That the software performs its  
6 intended functions and that there be some verification of  
7 that through again a process and the same thing goes  
8 through the ASME Section 3 pressure vessel, that it  
9 somehow will be able to withstand the pressure and  
10 temperature limits that it will see and that there be some  
11 demonstration of that and that's what the paperwork shows.  
12 Same thing here. The paperwork would show that the  
13 instrumentation control system can do what it's intended  
14 to do based on the documentation presented.

15                  MR. CHIRAMAL: That's what we tried to depict  
16 here.

17                  MR. WERMEIL: Yes, that's exactly what we're  
18 doing.

19                  MEMBER BARTON: Were those the words you have  
20 as part of the acceptance criteria? What Jerry just  
21 described?

22                   I mean --

23                  MR. WERMEIL: I hope they're in there  
24 somewhere. I don't know if it's that succinct or that  
25 explicit, but that's the intent.

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1 MEMBER BARTON: I see where you're struggling  
2 with prescriptive acceptance criteria, but my concern  
3 would be how do you assure all your reviewers are doing an  
4 adequate job without some more guidance. I guess that's  
5 my concern.

6 MR. WERMEIL: And I appreciated that from the  
7 outset. The only way to do it is --

8 MR. JOHNSON: Let me take that, Jerry. One of  
9 the companions to this document and it's still a work in  
10 progress is a --

11 MR. WERMEIL: A check list.

12 MR. JOHNSON: Yes, essentially a review  
13 checklist that has a list of very detailed questions about  
14 each of the various products that we -- let me use  
15 products as a term, each of the different software  
16 engineering lifecycle products we would expect to see  
17 during each phase of the development process.

18 We have developed that checklist to cover, I  
19 think maybe about 30 percent of the activities described  
20 in BTP14 and that checklist was I think about 600 pages  
21 long. We didn't feel it was appropriate to put that level  
22 of detail in BTP14. As a matter of fact, we had some  
23 difficulty even managing a checklist of this size and have  
24 decided to go back and recast it in the form of the data  
25 base tool, that checklist tool is, I think, scheduled to

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1 come to the staff in draft for a final review November-  
2 December of this year.

3 MR. WERMEIL: Right.

4 MEMBER APOSTOLAKIS: So maybe we should write  
5 our letter then.

6 MR. CHIRAMAL: But it's not part of the SRP.

7 MR. WERMEIL: That's an internal document  
8 intended for use by my branch for -- again addressing just  
9 exactly what Mr. Barton said, to instill some kind of  
10 consistency in the review process, but I'll be the first  
11 to tell you that there is variability among reviewers and  
12 hopefully the section chief and I, the branch chief, in  
13 the course of reviewing an SER would ask questions and  
14 want to hear the right answers from the reviewers, so  
15 again we can do our job, the management function as  
16 another way of trying to instill some discipline and  
17 consistency in the process.

18 MEMBER BARTON: But it sounds like it is all -  
19 - if everybody does their job right, the thing may turn  
20 out right.

21 MEMBER APOSTOLAKIS: And I don't disagree with  
22 that. I don't disagree with that at all.

23 MR. WERMEIL: And if anybody thinks that  
24 simply because we've got some comfort that the job was  
25 done right that -- and the SER is written that there's not

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1 going to be necessarily a problem down the road in some  
2 nuclear plant because the INC system doesn't work right  
3 then they're sadly mistaken because operating history  
4 shows that that's not the case.

5 MEMBER MILLER: Jerry, you started using an  
6 analogy with the ASME -- how many checks would be in that  
7 QA program?

8 We still have problems with pressure vessels  
9 as I understand.

10 MR. WERMEIL: Oh yeah. Well, I hear of  
11 problems with NDE documentation and the radiography,  
12 radiographic examinations all the time.

13 The inspector there does use a checklist as I  
14 understand it.

15 MEMBER MILLER: How many checks to do that  
16 checklist?

17 MR. WERMEIL: I don't really know. It's  
18 probably quite a few.

19 MEMBER SHACK: The functional specification  
20 for a pressure vessel is much more unambiguous than the  
21 functional specification for a control system when you  
22 don't know really what it is at the moment. That's why  
23 you can have explicit acceptance criteria there. Here,  
24 because the functional specification is something to be  
25 defined as part of the process, it's hard to see --

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1 MEMBER MILLER: The basic function of a  
2 control system is pretty clearly defined.

3 MR. WERMEIL: Yes, that's another thing I  
4 wanted to say. Dr. Miller is right. So far and our  
5 anticipation is that we're not going to see much in the  
6 way of differences in the functional requirements of these  
7 systems. They're the same as what's currently in the  
8 plant from the standpoint of what the functions are, when  
9 they need to be accomplished and what is actually being  
10 accomplished. That isn't changing. And we do get a lot  
11 of comfort from that because we have quite a few years of  
12 experience in what it is these systems are supposed to do,  
13 when they're supposed to do it and how. So in that  
14 respect I don't know that we're all that concerned that  
15 what's being specified for functionality is going to cause  
16 us a lot of problem.

17 The licensee should know because they know  
18 what the plant has to do. It's defined in the licensing  
19 basis and it's been there for years.

20 MR. CHIRAMAL: Yes, it's the additional  
21 functionality like self-testing, some confirmation of  
22 quality of the input and that additional functionality  
23 that's possible --

24 MR. WERMEIL: that's where we focus a concern  
25 on.

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1 MR. CHIRAMAL: The safety functions themselves  
2 are unchanged. Two out of four trip on high level, low  
3 level --

4 MR. JOHNSON: Furthermore, the review of the  
5 functional requirements at a system level is not really  
6 part of the purview of the branch technical position we're  
7 discussing here, that the requirement for definition of  
8 system level functional requirements exists in IEEE 279  
9 where it talks about design basis requirements and a great  
10 deal, in fact, the bulk of the standard review plan  
11 focuses on the staff assurance that those fundamental  
12 system level functional requirements are appropriate, that  
13 we have guidance on review against the requirement,  
14 against the requirements of IEEE 279 which has a great  
15 deal of detail about the requirements that functional  
16 requirements that these systems should be met.

17 We've got each section which talks about the  
18 functional requirements for systems that are derived from  
19 the general design criteria and 10 CFR 50. BTP 1 through  
20 13 discusses various aspects of functional requirements  
21 for all systems and BTP, the BTPs other than 14 discuss  
22 15, excuse me, 16 through 21, discuss various aspects of  
23 functional requirements that need to be examined carefully  
24 in digital systems in particular.

25 MEMBER MILLER: That systems -- I think where

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1 Bill might have been coming from is the ambiguity, once  
2 you get the system specs, the ambiguity can develop  
3 between there and what the software --

4 MR. WERMEIL: And that's where I would  
5 anticipate that the traceability of the requirements  
6 through the development process would weed out such  
7 ambiguities and allow the staff to make a judgment that  
8 they have been accounted for at some point in the process.

9 MEMBER MILLER: We all know that likely  
10 weeding out all of them is not necessarily --

11 MR. WERMEIL: What we're looking for is  
12 confidence that if they did it the way they said, it's  
13 likely that there won't be those ambiguities. Not that  
14 they're all gone. They still may be there, which is  
15 another reason why with these important systems we look  
16 for a level of diversity, but --

17 MEMBER APOSTOLAKIS: It's exactly that  
18 problem, the level of confidence. I think we're inundated  
19 here by various IEEE standards and Gary just gave us a  
20 list of them and they discussed this, they discussed that.  
21 My impression from what I read is of the level of  
22 discussion is make sure that you're consistent. I mean it  
23 all comes down to that. Those standards don't really tell  
24 you much. They just tell you you have to worry about  
25 accuracy, completeness and so on.

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1           Now accuracy is the degree of freedom from  
2 error of sensor and operator input, the degree of  
3 exactness exhibited by an approximation or measurement and  
4 the degree of freedom from error of actuator output. I  
5 don't know what the hell that tells me. I don't know what  
6 it means, the degree of exactness.

7           So they tell me make sure they're accurate.

8           MR. WERMEIL: Right. We can't specify a level  
9 of accuracy. We would expect a vendor to do exactly that.

10          MEMBER BARTON: Then you would look at that --

11          MR. WERMEIL: Exactly. I can't tell you how  
12 accurate a system needs to be.

13          MEMBER APOSTOLAKIS: I know, but I'm not  
14 asking you to tell me that, but right now you're not  
15 telling me much either.

16          MR. WERMEIL: They should. The system spec  
17 should tell me that.

18          MEMBER MILLER: You're talking about accuracy  
19 of software.

20          MEMBER APOSTOLAKIS: I'm just reading the  
21 definition.

22          MR. WERMEIL: Well, I would expect that the  
23 accuracy of the system would be a function of what's  
24 required, what the function is that's required.

25                 If I need trip, for example, when level

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1 reaches 100.22 inches then I would expect there to be  
2 something in the software that does that.

3 MEMBER APOSTOLAKIS: but that's exactly,  
4 that's why I like that paper by Nuclear Safety --

5 MR. WERMEIL: By Parness.

6 MEMBER APOSTOLAKIS: Yes, because first of  
7 all, there are two papers because I've seen also the  
8 Ontario Hydro standards, but I guess they are not public  
9 documents. There are two papers in the public domain that  
10 get more -- he touched on the example you just -- he said  
11 for the benefit again of those who were not here last  
12 Tuesday, years of experience with documentation written in  
13 a broad variety of natural languages have shown natural  
14 language to be inadequate for the task of precise  
15 requirements specification.

16 For example, consider the simple statement,  
17 shut off the pumps if the water level remains above 100  
18 meters for more than 4 seconds. Very simple. He gives  
19 four different interpretations. Do you take the average  
20 of the water level over the last four seconds? Do you  
21 take the maximum? Do you take the median? And some other  
22 things.

23 Now according to this expert, just this  
24 statement in English, shut off the pumps can be  
25 interpreted in four different ways and then he goes on to

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1 argue that if you now ask to state these statements, the  
2 English statements in a formal way, then it becomes clear  
3 to everybody what the software designer is going to do.

4 MR. JOHNSON: I guess I would agree that there  
5 might be some benefits to using formal specification  
6 languages, that specification you just read is a  
7 specification that could be a specification for an analog  
8 system or a digital system and I would guess, I guess I  
9 would ask that if that sort of natural language  
10 specification is inadequate for building systems in which  
11 we have confidence, how have we built any of those up to  
12 this date?

13 MEMBER APOSTOLAKIS: Isn't it true thought  
14 that the behavior of analog systems tends to be more  
15 continuous than that of digital systems?

16 MR. WERMEIL: Ye, but it would still depend on  
17 the -- if I'm talking average, median, mean, it wouldn't  
18 make any difference in that case, whether it's continuous  
19 or not. If I did it on average and I meant mean, I'm not  
20 going to get what I want --

21 MEMBER APOSTOLAKIS: So if we have been  
22 ambiguous so far, we might as well continue being  
23 ambiguous?

24 MR. WERMEIL: No. I think just the opposite.

25 MEMBER SHACK: Resolve ambiguity.

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1 MR. WERMEIL: I think just the opposite with  
2 digital systems. I think we're providing guidance here  
3 that tends to weed out some of that ambiguity because  
4 you're going through what I consider to be a somewhat more  
5 rigorous and systematic process of the development of it  
6 with a number of steps along the way to weed out that kind  
7 of ambiguity and ways of doing it.

8 MEMBER APOSTOLAKIS: Let me ask another  
9 question. Why didn't you -- I mean I accept the argument  
10 that the state of the art does not allow you to specify  
11 one way of doing things. Why didn't you describe more  
12 than one?

13 Let me finish, when you say, for example, do  
14 whatever, V & V, throw in a few methods. Maybe you can do  
15 it this way. Or you can do it that way or another way of  
16 the same quality of the same -- right now, it says make  
17 sure they're correct, consistent and complete. I mean I  
18 don't know what --

19 MR. WERMEIL: Let me give you the pragmatic  
20 answer, that from the perspective of regulator of an  
21 industry that is not leading this technology.

22 We see from the interactions that we've had  
23 with our licensees and with EPRI from the three programs  
24 that I've mentioned, that they're faced with the extreme  
25 difficulty of trying to on the one hand replace obsolete

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1 equipment and on the other hand not go overboard with very  
2 elaborate, very dramatically different approaches that are  
3 going to be costly, controversial and difficult to  
4 demonstrate to the NRC that they work right, so that  
5 that's leading them to are development of generically  
6 applicable platforms throughout the industry likely built  
7 for other applications, likely never intended to be put  
8 into a nuclear power plant, so they somehow have to  
9 convince the regulator that a system that may have been  
10 developed for a computer game or for a wristwatch can  
11 somehow do the same thing in a nuclear power plant with  
12 the same degree of reliability and for that reason because  
13 they were built for these other applications where the  
14 level of documentation and the level of rigor may not have  
15 been asked for initially we're wrestling with how to take  
16 these methodologies within this broad framework because  
17 once again we're trying to maintain a broad structure that  
18 we think is rigorous enough to give us our confidence,  
19 trying to take these platforms, fit them in and still come  
20 up with an acceptable demonstration.

21 MEMBER APOSTOLAKIS: One last question because  
22 I think we're running out of time.

23 MR. WERMEIL: I know we are.

24 MEMBER APOSTOLAKIS: When you visited Boeing,  
25 right?

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1 MR. WERMEIL: Yes.

2 MEMBER APOSTOLAKIS: What other major  
3 manufacturer makes high consequence, has requirements of  
4 high reliable software?

5 MR. JOHNSON: About three, four years ago we  
6 had extensive discussions with IBM Federal Systems which  
7 the specific organization that builds space shuttle  
8 software, with CSC, with TRW.

9 MEMBER APOSTOLAKIS: Let's take one and the  
10 shuttle, whoever -- I don't remember the name.

11 Don't they have some formal tools, not formal  
12 methods, a matrix, a simple matrix, an arrow from here to  
13 there to help the hundreds of people perhaps who get  
14 involved in this process. Maybe these are empirically  
15 based, but they must have some tools that are used  
16 internally for designing these things and reviewing them.

17 Now, then if you go to another company maybe  
18 they have their own tools. Maybe you will see after a  
19 while that all these guys tend to be using this  
20 traceability matrix, for example, for some version of it.  
21 Maybe somebody else is using something else when it comes  
22 to confirming that the software specifications are correct  
23 and so on. So couldn't you just throw them in here and  
24 maybe with some discussion as examples of what one might  
25 do?

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1 MR. JOHNSON: Yes.

2 MR. GALLAGHER: This is John Gallagher. When  
3 we went out on the program that Gary talked about,  
4 visiting IBM and these other people, before we went out we  
5 invited what we thought were some international experts of  
6 -- who were highly respected in their industry, in the  
7 industry. We had Beverly Littlewood for his testing  
8 capabilities, reliabilities. He's probably the foremost  
9 person in that area. We had John Rushbie for formal  
10 methods. We had Nancy Levenson for her views. We asked  
11 Dave Parness, but he was working on his standard and  
12 wasn't allowed to leave Canada and we had Ricky Butler who  
13 has been heavily practicing in the area of formal methods.

14 One of the questions we asked them was the  
15 very one that you're asking about what should we say about  
16 tools. They told us the thing to say about tools is to go  
17 out and ask them what tools do you use, why do you use  
18 these tools and how do you train your people to the proper  
19 use of these tools and how do you factor in experience  
20 from the use of these tools to make sure they are  
21 achieving the goals that you want. And that's sort of the  
22 flavor we have tried to build into this to ask questions  
23 of that nature.

24 Now they are very general. If we go out and  
25 say we think you should use this tool, I think Gary's

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1 already said, they have a process. It should be a highly  
2 disciplined process. It should follow the principles, but  
3 when you think five years ago, when you went out and asked  
4 a man for his V & V program, he says I don't know what  
5 you're talking about.

6 We're working in an industry that is being  
7 sort of pulled into the kind of discipline that we say has  
8 to be met in order to get the kind of products that are  
9 fit for duty and safety systems. So I appreciate your  
10 frustration in saying we'd like to see something more  
11 adapted, but right now you have to think that some of  
12 these people when you go out and you ask for show me your  
13 configuration management program, a lot of people really  
14 haven't reached that level.

15 MEMBER APOSTOLAKIS: And I fully agree with  
16 you that this is a good contribution having a program like  
17 that.

18 I guess my next question is is it good enough  
19 for you to just show me the problem?

20 CHAIRMAN KRESS: I'm afraid we don't have time  
21 for an answer to that question, George. We're going to  
22 have to call a halt to this.

23 MEMBER APOSTOLAKIS: Okay.

24 CHAIRMAN KRESS: We've run out of time.

25 MEMBER APOSTOLAKIS: Okay.

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1 CHAIRMAN KRESS: I'm going to recess until  
2 1:15.

3 (Whereupon, at 12:45 p.m., the meeting was  
4 recessed, to reconvene at 1:15 p.m., Thursday, October 10,  
5 1996.)

6 CHAIRMAN KRESS: We'll get started again on  
7 the next agenda item which is the briefing on the control  
8 room back panel fire at Palo Verde Unit 2. I believe this  
9 is yours, John?

10 MEMBER BARTON: Yes.

11 CHAIRMAN KRESS: I'll turn it over to you,  
12 then.

13 MEMBER BARTON: Thank you, Mr. Chairman. The  
14 purpose of this session is to review the circumstances  
15 surrounding an alert which was declared at the Palo Verde  
16 Station Unit 2 due to two related fires in the back panel  
17 control room and the Bravo DC equipment room.

18 These rooms contain components associated with  
19 equipment that's relied upon to achieve safe shutdown in  
20 the event of a fire. This event is of interest to this  
21 committee because of its technical nature which was the  
22 improper grounding of an electrical equipment failure to  
23 comply with grounding requirements of IEEE 142 which was  
24 part of the licensee's basis.

25 The installation turned out to be different

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1 from that which was described in the station FSAR. This  
2 event may also have broader implications due to the fact  
3 that the designer of this particular installation has been  
4 involved in electrical design work at many nuclear  
5 stations.

6 This is an informational briefing. The ACRS  
7 does not plan to prepare a letter on this issue. At this  
8 time I'd like to turn it over to the NRC staff who will  
9 make the presentation. I turn it over to Mr. Al Chafee to  
10 introduce your people.

11 MR. CHAFEE: Okay. I'm Al Chafee. I'm the  
12 branch chief for the events assessment engineer branch.  
13 Bob Dennig will lead the briefing and he'll also introduce  
14 some of the people that are here. WE do have a variety of  
15 people from both NRR and from the region to try to answer  
16 your questions.

17 Bob?

18 MR. DENNIG: Thanks very much, Al. With me  
19 today we have Phil Qualls, a Region IV inspector. Phil is  
20 sitting at the table, who performed the special inspection  
21 and response to the event. We also have with us Pat  
22 Madden and Steve West from the NRR plant systems branch  
23 who are knowledgeable in areas of fire protection. With  
24 us from the NRR electrical engineering branch we have  
25 Renaldo Jenkins. Al has introduced himself. He is the

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1 branch chief of events assessment. We have Jim Clifford,  
2 project manager for Palo Verde and we also have  
3 representatives from the licensee. I'll turn it over to  
4 them to introduce themselves and perhaps say something  
5 about what they've done in relation to the event.

6 MS. TURLEY: I'm Nancy Turley, senior  
7 licensing engineer and have worked on fire protection  
8 issues for about four or five years now.

9 MR. HOLMES: I'm John Holmes. I was a section  
10 leader over the design engineering effort that went into  
11 the evaluation investigation after the fire event.

12 MR. GARRETT: Frank Garrett, fire protection  
13 program manager at Palo Verde.

14 MR. DENNIG: Okay, thank you very much. In  
15 addition to the licensee having representatives here, we  
16 want to thank them for the diagrams that we're going to  
17 use during the presentation and we have some color  
18 pictures later in the presentation that were also supplied  
19 by the licensee and we think that's going to add a lot to  
20 the informational content of briefing.

21 I'll go the second slide please. As noted,  
22 we're here to discuss an event at Palo Verde Unit 2 back  
23 in April 4 of 1996 wherein the problem was the  
24 simultaneous fires and control room in the control room  
25 back panel room area and in the DC equipment room B. The

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1 bottom line, very succinctly, as far as root cause is  
2 concerned, the simultaneous fires have been traced to an  
3 improper grounding scheme of electrical circuits. This  
4 particular configuration dates to original plant  
5 construction and it is a design that was installed per the  
6 designer's drawings.

7           Safety significance, there was no safety  
8 threat to the facility from the event itself. Some  
9 control room lighting was lost, but not all of it was  
10 lost. Some fire detectors were disabled. The assessment  
11 of licensee's response indicates that they did a fine job  
12 of coping with the situation they were presented with.

13           The broader significance lies in the fact that  
14 we did have a single fault that did result in fire in two  
15 different areas, one of those areas being a control room,  
16 the second area being the equipment room, DC equipment  
17 room B which contains equipment used for powering up safe  
18 shutdown capability outside the control room.

19           CHAIRMAN KRESS: Has this showed up on AEOD's  
20 accident sequence precursor list yet? It's a little soon,  
21 I guess, for that.

22           MR. DENNIG: I don't know. I can find out.  
23 John, if we can just put up the picture and we might as  
24 well eliminate the other one at this time.

25           MEMBER POWERS: You indicated that this

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1 particular event didn't have any safety significance.  
2 When you say that, you're referring to the fire itself or  
3 if you also looked at the collateral effects, smoke and  
4 things like that might have in the long term degradation  
5 of equipment, electrical equipment?

6 MR. DENNIG: Yes, I believe I'm correct in  
7 saying that my statement encompasses that whole set.

8 MEMBER POWERS: Everything.

9 MR. DENNIG: Yes. As I understand it, the  
10 smoke generation was not that significant and was handled  
11 by ventilation and didn't impair function of any of the  
12 staff in response to the fire.

13 MEMBER POWERS: And it won't cause corrosion  
14 of any electrical equipment or anything like that in the  
15 future? Some smoke is very corrosive.

16 MR. DENNIG: I don't have any personal  
17 knowledge of that particular aspect.

18 MR. CHAFEE: Maybe the licensee has some --  
19 could answer that.

20 MR. GARRETT: In the two rooms that were  
21 involved, the Bravo DC equipment room had very light  
22 smoke, almost not detectable visually. A smoke detector  
23 did operate in that area. In the control room, light  
24 smoke did occur. It never banked down to the tops of  
25 control cabinets. We did do an inspection and had an

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1 action item in our investigation, specifically for that  
2 and there was no evidence of any residues or anything that  
3 would cause a long term corrosive effect.

4 MR. DENNIG: Okay, going through the sequence  
5 of events, I'm just going to leave these pictures up while  
6 I talk through the slides and you can follow along with  
7 me, if you wish. At approximately 1700, licensee fire  
8 watch in particular it was a security officer performing  
9 an hourly fire watch detected smoke in the back panel area  
10 of the control room. That would be here.

11 Smoke was from the train B essential lighting  
12 uninterruptable power supply, ELUPS, panel and the  
13 essential lighting distribution panel. Again, those are  
14 these -- there is the essential lighting panel and there's  
15 the ELUPS.

16 Fire watch immediately notified the shift  
17 supervisor and security requesting emergency response from  
18 the on-site fire department. As discovered later in the  
19 fall out to the event, the breaker supplying the ELUPS,  
20 the interruptable power supply tripped when wiring in a  
21 conduit met and caused a short and over on this diagram  
22 we're talking about this breaker and a short in this  
23 conduit.

24 CHAIRMAN KRESS: I'm having trouble finding  
25 your light.



1 MR. DENNIG: It's awfully dim.

2 MR. DENNIG: We need to get a 100 watt laser  
3 or something. Over here we're talking about this conduit.  
4 So much for technology.

5 Okay, the tripping of that breaker caused loss  
6 of some control room lighting in several auxiliary  
7 building fire alarms. It also had the salutary effect of  
8 causing this relay to reposition which removed an  
9 electrical path involving this particular ground. Not to  
10 give too much away, but to get to the point, we're going  
11 to be talking about damage caused along this red neutral  
12 and involving this ground.

13 At approximately 1709, the control room fire  
14 was extinguished. My understanding from reading the fire  
15 report is that a control room staff initially knocked down  
16 whatever active fire there was with CO-2, a local CO-2  
17 extinguisher. As a result of the indeterminent status of  
18 fire detectors an auxiliary operator was sent to survey  
19 his duty area and discovered smoke and fire in the train B  
20 equipment, DC equipment room which goes down this  
21 elevation 100, DC equipment room, in this area. It turns  
22 out the fire was located in a 480/120 volt transformer,  
23 sometimes referred to as a regulating transformer and  
24 other times an isolation transformer, this particular  
25 piece of gear.

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1           At 1714 a four room staff classified the event  
2 as an alert, I believe, based on the criteria that the  
3 fire potentially affecting safety systems was involved.  
4 Later, operators, and in particular, an individual who  
5 designated the fire team advisor who is on the shift crew  
6 manually opened the supply breaker to the 480/120 volt  
7 transformer to terminate short circuit in the secondary  
8 side of the transformer, so we're talking about opening  
9 this circuit breaker, I believe, and terminating the feed  
10 to secondary side of the transformer where we had a short  
11 circuit in the form of a ground.

12           The fire in the DC equipment room was  
13 extinguished at approximately 1725 and the alert was  
14 terminated at approximately 1805.

15           By way of discussion of the root cause, the  
16 licensee found that the transformer core failed and  
17 shorted, the transformer coil station ground. I believe  
18 there's been an extensive root cause investigation that  
19 can go into the piece part aspects of that if anybody is  
20 interested in pursuing that.

21           MEMBER CATTON: What's that box with the N in  
22 it?

23           MR. DENNIG: I think that's just a label that  
24 indicates this is a neutral, it's referred to as a  
25 neutral.

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1 MEMBER CATTON: Is it common to connect a  
2 small wire to a big wire like that?

3 MR. DENNIG: Renaldo?

4 MR. JENKINS: The question is what?

5 MR. CHAFEE: The question was why through the  
6 neutral, a large wire going into the end, a small wire  
7 going out. Is that common?

8 MR. JENKINS: The thickness of that is not  
9 drawn to scale. It's just an indication of the wire going  
10 back to a terminal.

11 MEMBER CATTON: I just read down below it it  
12 says short circuited large conductors, short circuited  
13 small conductors. And I'm just wondering why you hook a  
14 small wire to a big wire?

15 MR. JENKINS: The neutral is typically a small  
16 wire going to the ground to facilitate a ground current.  
17 If, in fact, you have a ground current going to the  
18 terminals --

19 MEMBER CATTON: So N is a terminal?

20 MR. JENKINS: Yes.

21 MR. DENNIG: The short circuit in the  
22 transformer on the secondary side of the transformer was  
23 the source of the fire in the BDC equipment room. Now  
24 unfortunately, the way this was set up the fault current  
25 took a path through this neutral side at the time it was

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1 in service until the transformer relay opens after this  
2 breaker trips and caused damage along that circuit and was  
3 the source of the heat in the control room.

4 It turns out that the conductors in the  
5 circuit were perceived to be of insufficient size to  
6 handle full currents and ignited. As I mentioned earlier,  
7 the electrical design was in accordance with the original  
8 architect/engineer design and in follow-up the licensee  
9 discovered the same configuration was found at Palo Verde  
10 units 1 and 3.

11 With regard to corrective action, the  
12 licensee's perspective, transformer neutral leg is ground.  
13 The output of the transformer is here. It's been fused to  
14 prevent fault propagation. The ground was removed from  
15 the ELUPS panel and they did do a review of other  
16 potential situations where they might have a path for  
17 fault propagation similar to the one in this instance.  
18 And identified, I believe, 12 components in each unit  
19 regulating transformers battery supplies, inserters that  
20 required some modifications to prevent this kind of a  
21 situation from developing.

22 From the NRC's side, we did conduct a special  
23 inspection which resulted in a Level 4 violation against  
24 Appendix B design control and we are in the process of  
25 drafting an information notice.

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1           So that concludes the formal part of the  
2 presentation. If you'd like to open it up for questions.

3           MEMBER BARTON: Do any members have any  
4 questions?

5           MEMBER POWERS: I'm wondering if you could --  
6 I mean there are 13 examples in three units. I wonder how  
7 this particular design escaped detection earlier.

8           MR. CHAFEE: Let me take a shot at it and the  
9 utility/licensee can correct me if I'm wrong. As I  
10 understand it, although the licensee was committed to an  
11 IEEE standard that would have made this incorrect  
12 configuration, what Bob said earlier this was consistent  
13 with Bechtel's practices, I guess at the time, for the  
14 design of this. Correct?

15           So apparently people who built it didn't  
16 recognize it was a problem.

17           MR. HOLMES: Can I speak to that?

18           MR. CHAFEE: Yeah, go ahead.

19           MR. HOLMES: I'm John Holmes. The circuit  
20 that we're looking at here is kind of unique and then it  
21 has two sources of power, the uninterruptable power supply  
22 has an AC input which he's been discussing. It also has a  
23 DC input and I believe and we have no proof of that  
24 because it is a fairly old design. We're talking 1978,'79  
25 time frame when this was put together that the designer

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1 put the ground where he did in the UPS because he wanted a  
2 common point that would be service ground for both power  
3 sources.

4 And I guess in some ways that's unique because  
5 it's not -- there's several inserters in the unit that  
6 have dual sources and most of those are ungrounded power  
7 systems and with intentionally no ground present in the  
8 system. So I would say that this was a common practice  
9 for this system, although -- and I would also add to that  
10 that the other systems that we found deficiencies in were  
11 not similar to this.

12 Most of the changes that we made were simply  
13 adding the fuse in the secondary of the transformer and  
14 that was primarily because of the current limiting  
15 characteristics of the transformer and the fact that short  
16 circuits in the secondary of this transformer really don't  
17 produce fault currents in the primary that are sufficient  
18 to trip that primary breaker and therefore, and that is by  
19 design. It is an isolation transformer from Class 1A  
20 power sources to nonsafety related lighting systems in  
21 this case.

22 So given that the breaker on the primary would  
23 not open, we felt it was prudent to add some protection in  
24 the secondary to protect the large black cable that's  
25 shown on the diagram there and that was by and large most

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1 of the changes that were made.

2 We found one other instance of grounding, that  
3 the ground was not present at all, that should have been  
4 and we added that ground at the transformer. It did not  
5 have the second ground at the UPS like this one has and  
6 therefore I don't think it had the potential for doing  
7 what this one did because of the lack of the second ground  
8 or the remote ground, really.

9 VICE CHAIRMAN SEALE: Have all of those  
10 modifications been made on all three units?

11 MR. HOLMES: The modifications are complete  
12 for this set of equipment that we're talking about here,  
13 specifically. It is mostly complete. The only ones that  
14 are not complete at this point are mods that we cannot do  
15 while the units are on line and they are scheduled for  
16 outages when the next outage comes out.

17 MR. DENNIG: I'd like to, if I could just for  
18 a few minutes go through some of the pictures if we've got  
19 time. I'll have Phil Qualls narrate as we go here, what  
20 we're looking at.

21 This is a picture of an area, this is a  
22 regulating transformer that had the initial ground. It  
23 shows the general ground around and it shows that the  
24 regulating transformer is not near other equipment. It's  
25 somewhat, there are some distance between it and any

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1 safety related or any other equipment in the area.

2 Next slide. This is a picture of the core of  
3 the transformer where the ground occurred. I don't know  
4 specifically exactly which point grounded here, do you?  
5 Can you tell from this picture, John?

6 MR. HOLMES: Not really, no. This is just a  
7 picture of the transformer.

8 MR. QUALLS: Okay, this is just -- okay, next  
9 slide.

10 This is also a picture of the top small  
11 portion of the transformer. I think it's one of the  
12 harmonic, 5th harmonic coil or something they called it,  
13 3rd harmonic coil. Anyway, this is actually the fire  
14 damage that's visible. It was set at the top of the  
15 transformer cubicle and it actually caused a little bit of  
16 brown smoke area to be seen on the top of the transformer,  
17 but that's -- there was very little actual fire damage in  
18 this event.

19 Next slide.

20 MEMBER CATTON: What was the current?

21 MR. DENNIG: Magnitude.

22 MEMBER CATTON: Yes.

23 MR. HOLMES: The regulating transformer has a  
24 limiting characteristic and based on factory testing it  
25 was done on all of these transformers back when they were

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1 first manufactured. The highest current limiting current  
2 that could be produced by any of them was about 380 amps  
3 at 120. Actually, under faulted conditions the current on  
4 the primary goes down slightly.

5 MEMBER MILLER: Where was the fuse put in  
6 again? You now have put a fuse in there?

7 MR. HOLMES: You see where the large black  
8 line just starts? Right in there.

9 MEMBER MILLER: Does the standard specify that  
10 or is that just good practice to use there?

11 MR. HOLMES: It's good protection practice to  
12 have that there especially -- normally with a standard  
13 transformer you wouldn't have the current limiting  
14 characteristic and for a fault and a secondary you would  
15 have the primary breaker trip, so in this case given the  
16 current limiting feature of the transformer, it would be  
17 good practice to provide protection in the secondary,  
18 because the primary breaker basically is ineffective at  
19 protecting the secondary circuit.

20 MEMBER MILLER: That's what I was thinking.  
21 So whether it's a nuclear plant or any other plant, good  
22 practice of wiring up a circuit of this type would be to  
23 put a fuse in that location?

24 MR. HOLMES: That is correct.

25 MR. QUALLS: Okay, this is a picture of the

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1 emergency lighting uninterruptable power supply. It's in  
2 the foreground and the essential lighting panel which had  
3 a little minor fire damage.

4           Again, it shows how widely dispersed. There's  
5 an uninterruptable power supply, probably about four feet  
6 tall so it gives you an idea of the space considerations  
7 in the Palo Verde control room and that there was not in  
8 close proximity a lot of other equipment or a lot of  
9 cables for which fire could have spread.

10           Next slide. This is a picture of the interior  
11 of the uninterruptable power supply. It's the front view.  
12 We'll get pictures of the more detailed fire damage here,  
13 but the fire damage that will be visible will be minor  
14 fire damage to one cable in the upper left hand corner,  
15 right up in there.

16           As you can see the handle itself did not  
17 suffer a lot of damage on the interior. Next slide.

18           This a photograph of the transfer relay and  
19 you'll see minor fire damage to the cables at the very  
20 bottom and the middle. You can see where the insulation  
21 melted on the crimped plugs and just minor fire damage on  
22 one on the upper where you can see a little bit of melting  
23 on the plug crimped plastic. As I said, there's not major  
24 damage occurred.

25           Next slide. This is the picture of the -- let

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1 me get it right. This is the uninterruptable power supply  
2 front wire damage. This is a picture from the upper  
3 corner. You can see one wire suffered damage to the  
4 insulation.

5           Next picture. This is the rear view of the  
6 uninterruptable power supply. Again there's a little bit  
7 of damage you can see in the upper right hand corner on  
8 the place, connection terminal block, right in there.  
9 Minor smoke damage and a little bit of charring on the  
10 cables.

11           Next slide. This is a close up of the  
12 terminal block where you can see minor damage to the  
13 wires.

14           Next picture. This is a representative  
15 picture of the lighting panel. This is not the lighting  
16 panel in unit 2 where the fire occurred. This is the  
17 lighting panel from unit 1. This just gives you an idea  
18 of the configuration.

19           Next picture. This is a picture of the actual  
20 fire damage in the lighting panel. You can see one wire  
21 down in the lower -- it's actually in the left side of the  
22 picture, that copper colored wire where the insulation has  
23 melted off. That's it right there.

24           Next slide. Is that it? That's the extent of  
25 the fire damage. As the inspection report and everything

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1 kind of demonstrated, there was not significant damage  
2 resulting from this.

3 MEMBER BARTON: Who uncovered the fact that  
4 the installation was not in accordance with the standard  
5 that was committed to as part of construction of this  
6 facility? Was that the licensee or the NRC? Did the  
7 licensee pick it up as part of your FSAR upgrade review  
8 program or was this picked up as part of the inspection by  
9 the NRC as a result of the event?

10 MR. HOLMES: It was picked up during the post-  
11 fire reviews as to why, what we were committed to in this  
12 regard and the deficiency that we identified and how we  
13 compared to our licensing basis.

14 MEMBER BARTON: Was the thoroughness of your  
15 FSAR upgrade program be expected to find this? Would you  
16 expect to find this as part of your FSAR upgrade program?

17 MR. HOLMES: Honestly, I'd have to say  
18 probably not because the commitment in the FSCAR is a  
19 statement that says something like we're committed to IEEE  
20 142 and you know it's a fairly broad commitment. It's  
21 almost a one liner and to look at the level of detail that  
22 would have been had to look at to find this thing I really  
23 doubt that we ever got that deep.

24 MEMBER MILLER: Somebody asked about the  
25 current through that wire. 380 amperes, is that what I

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1 heard?

2 MR. HOLMES: Yes, that's correct.

3 MEMBER MILLER: Do you have a picture of the  
4 wire that was carrying 380 amperes?

5 MR. HOLMES: I'm sorry?

6 MEMBER MILLER: Do you have a picture of that  
7 wire? One of those wires?

8 MR. HOLMES: The wires that burned up in that  
9 picture are those wires that were carrying that current.

10 MEMBER MILLER: 380 amp -- those little wires?

11 MR. HOLMES: Actually, the current was  
12 probably slightly less than that because the current, if  
13 you had a bolted short circuit at the transformer, that  
14 would be the level of current that would be available. If  
15 you had in the circuit resistance of the smaller wire,  
16 particularly the number 10 wire up there at UPS, the  
17 resistance probably would have dropped it down slightly,  
18 but the nature of the current limiting device is that  
19 basically produces up to 120 volts, whatever current it  
20 takes or up to its ability, so I would say it was very  
21 close to 380 amps.

22 MEMBER MILLER: A number 10 wire would never  
23 carry 380 amps.

24 MR. HOLMES: No sir. That's why it ignited.

25 MEMBER MILLER: For a brief moment.

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1 MEMBER CATTON: I missed something here. Did  
2 you say that you wouldn't have expected to find this  
3 because IEEE whatever the number was was too vague and  
4 broad?

5 MR. HOLMES: No. Actually, if you look at the  
6 standards it's fairly clear. For a distribution system  
7 like this one, with single pull breakers and the lighting  
8 distributing panel, in other words, there's only a breaker  
9 in the hot side of the circuit. Normally, there would be  
10 a ground at the transformer and any short circuit to  
11 ground would flow through the hot side, through those  
12 breakers, through the load and back.

13 It's clear that we should have had a ground at  
14 the transformer and not one at the -- in a remote location  
15 like we had here.

16 MEMBER BARTON: This was a similar  
17 configuration of all three units?

18 MR. HOLMES: Yes, identical design. What  
19 makes me say that we probably wouldn't have found it is  
20 because we're talking about one wire in a panel in the  
21 unit that if we were going through a design, an FSAR  
22 verification it would have been probably chance that we  
23 would have looked at that particular piece of equipment,  
24 rather than going through the whole plant at a level of  
25 detail that would have absolutely confirmed that we would

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1 have found that we probably wouldn't have done that.

2 We would have spot checked or some sort of a  
3 sampling process or whatever it would have been. That's  
4 not to say though during the initial design phase, when  
5 somebody was specifically looking at this piece of  
6 equipment and designing the circuitry for it that they  
7 should not have addressed the licensing commitment, but  
8 for us to come back after the fact and try and find all of  
9 those cases would have been very difficult.

10 MEMBER BARTON: This probably would have  
11 gotten picked up, should have as part of design review of  
12 the Bechtel design, I would assume, because it was  
13 installed further Bechtel drawing.

14 MR. HOLMES: That's correct.

15 MEMBER BARTON: The design review would have  
16 been the place to catch it and apparently it wasn't, which  
17 raises the concern I think that Bechtel has probably  
18 designed similar installations at other facilities

19 MR. HOLMES: I think it would be safe to say  
20 so, yes.

21 MEMBER BARTON: When will the information  
22 notice be issued to the industry?

23 MR. DENNIG: I think we're on a track to get  
24 it out in 30 days or so.

25 VICE CHAIRMAN SEALE: I understand this

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1 happened while you were having some other excitement on  
2 the site?

3 MR. HOLMES: Yes sir. It actually occurred  
4 during the Unit 2 refueling outage last spring and the  
5 unit was obviously in a shutdown mode and in a stage of  
6 defueling when we had a stuck fuel rod assembly that we  
7 couldn't remove by normal means and we were basically  
8 assessing that and developing our approach to removing  
9 that fuel rod which we did end up doing successfully when  
10 this fire occurred.

11 VICE CHAIRMAN SEALE: And suddenly you smelled  
12 smoke.

13 MR. HOLMES: Yeah, we didn't need one more  
14 problem. That's for sure.

15 MEMBER BARTON: Any other questions from the  
16 committee?

17 MEMBER FONTANA: I'm just curious, how many  
18 other units provide uninterruptable power to lighting the  
19 same area? In other words, if this thing totally went  
20 out, all the lights wouldn't go out, would they?

21 MR. HOLMES: This particular UPS provides  
22 emergency lighting specifically in the control room  
23 horseshoe area and there's a redundant system just like  
24 this, the failure of this system resulting in a loss of  
25 half of the emergency lighting in the control room. At

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1 the time, it basically had no effect on normal lighting  
2 because that's a different system and normal power was  
3 available.

4 MEMBER BARTON: Hearing no other questions, I  
5 want to thank the NRC for their presentation and the  
6 licensees comments. I think this is an issue that we will  
7 continue to follow after the information notice comes out  
8 and see how big a problem this may be in the industry.  
9 With that, Tom, we'll turn it back --

10 CHAIRMAN KRESS: I particularly want to thank  
11 the plant licensees people for coming by. It was very  
12 helpful to us. Thank you.

13 VICE CHAIRMAN SEALE: I appreciate it.

14 CHAIRMAN KRESS: At this time we're going to  
15 depart slightly from our agenda which has us working on  
16 having our report on the planning and procedures  
17 subcommittee, the reason being that John has another  
18 appointment at the moment and so what I thought we could  
19 do is jump to item 14 on the agenda which is a  
20 reconciliation exercise we go through.

21 Yes, you're right. Do we normally have to  
22 have somebody here when we talk about the planning and the  
23 procedures? I'm trying to decide whether we're through  
24 with the transcription.

25 MEMBER CATTON: Do we continue without a

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1 designated federal employee?

2 CHAIRMAN KRESS: Yes. I designate you. We  
3 can discontinue with the transcription at this point for  
4 the rest of the day.

5 (Whereupon, at 1:55 p.m., the meeting was  
6 concluded.)

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C E R T I F I C A T E

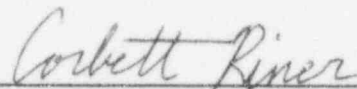
This is to certify that the attached  
proceedings before the United States Nuclear  
Regulatory Commission in the matter of:

Name of Proceeding: 435TH ACRS

Docket Number: N/A

Place of Proceeding: ROCKVILLE, MARYLAND

were held as herein appears, and that this is the original  
transcript thereof for the file of the United States Nuclear  
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reporting company, and that the transcript is a true and  
accurate record of the foregoing proceedings.



CORBETT RINER  
Official Reporter  
Neal R. Gross and Co., Inc.

#1  
INTRODUCTORY STATEMENT BY THE ACRS CHAIRMAN  
435TH ACRS MEETING, OCTOBER 9-12, 1996

THE MEETING WILL NOW COME TO ORDER. THIS IS THE SECOND DAY OF THE 435TH MEETING OF THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS. DURING TODAY'S MEETING, THE COMMITTEE WILL CONSIDER THE FOLLOWING:

- (1) STATUS OF THE NRC STRATEGIC ASSESSMENT AND REBASELINING EFFORT
- (2) DIGITAL INSTRUMENTATION AND CONTROL SYSTEMS
- (3) CONTROL ROOM BACK-PANEL FIRE AT PALO VERDE UNIT 2
- (4) REPORT OF THE PLANNING AND PROCEDURES SUBCOMMITTEE
- (5) FUTURE ACRS ACTIVITIES
- (6) RECONCILIATION OF ACRS COMMENTS AND RECOMMENDATIONS
- (7) PREPARATION OF REPORTS

A PORTION OF TODAY'S MEETING MAY BE CLOSED TO DISCUSS ORGANIZATIONAL AND PERSONNEL MATTERS THAT RELATE SOLELY TO THE INTERNAL PERSONNEL RULES AND PRACTICES OF THIS ADVISORY COMMITTEE, AND MATTERS THE RELEASE OF WHICH WOULD CONSTITUTE A CLEARLY UNWARRANTED INVASION OF PERSONAL PRIVACY.

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 NO WRITTEN STATEMENTS OR REQUESTS FOR TIME TO MAKE ORAL STATEMENTS FROM MEMBERS OF THE PUBLIC REGARDING TODAY'S SESSIONS. A TRANSCRIPT OF PORTIONS OF THE MEETING IS BEING KEPT, AND IT IS REQUESTED THAT THE SPEAKERS USE ONE OF THE MICROPHONES, IDENTIFY THEMSELVES AND SPEAK WITH SUFFICIENT CLARITY AND VOLUME SO THAT THEY CAN BE READILY HEARD.

I WILL BEGIN WITH SOME ITEMS OF CURRENT INTEREST.

2

# **STRATEGIC ASSESSMENT AND REBASELINING OVERVIEW AND STATUS BRIEFING**

Advisory Committee on Reactor Safeguards

October 10, 1996

John Craig, Task Manager  
Strategic Assessment Coordination Task Group

# **AGENDA**

---

**INTRODUCTION**

**OVERVIEW OF STRATEGIC ASSESSMENT AND REBASELINING PHASES**

**PHASE II STATUS**

**SUMMARY OF DIRECTION-SETTING ISSUES**

**STAKEHOLDER MEETINGS**

**FUTURE ACTIVITIES**

**STRATEGIC PLAN DEVELOPMENT (PHASE III)**

**NRC'S STRATEGIC PLAN**

**EXPECTATION FOR COMMENTS**

**DISCUSSION OF DSI's 10, 11, AND 12**

# **STRATEGIC ASSESSMENT AND REBASELINING**

## **INTRODUCTION**

- **Purpose of Strategic Assessment**
- **Organization**
  - **Steering Committee**
  - **Support Group**
  - **Contractor: Public Strategies Group, Inc.**

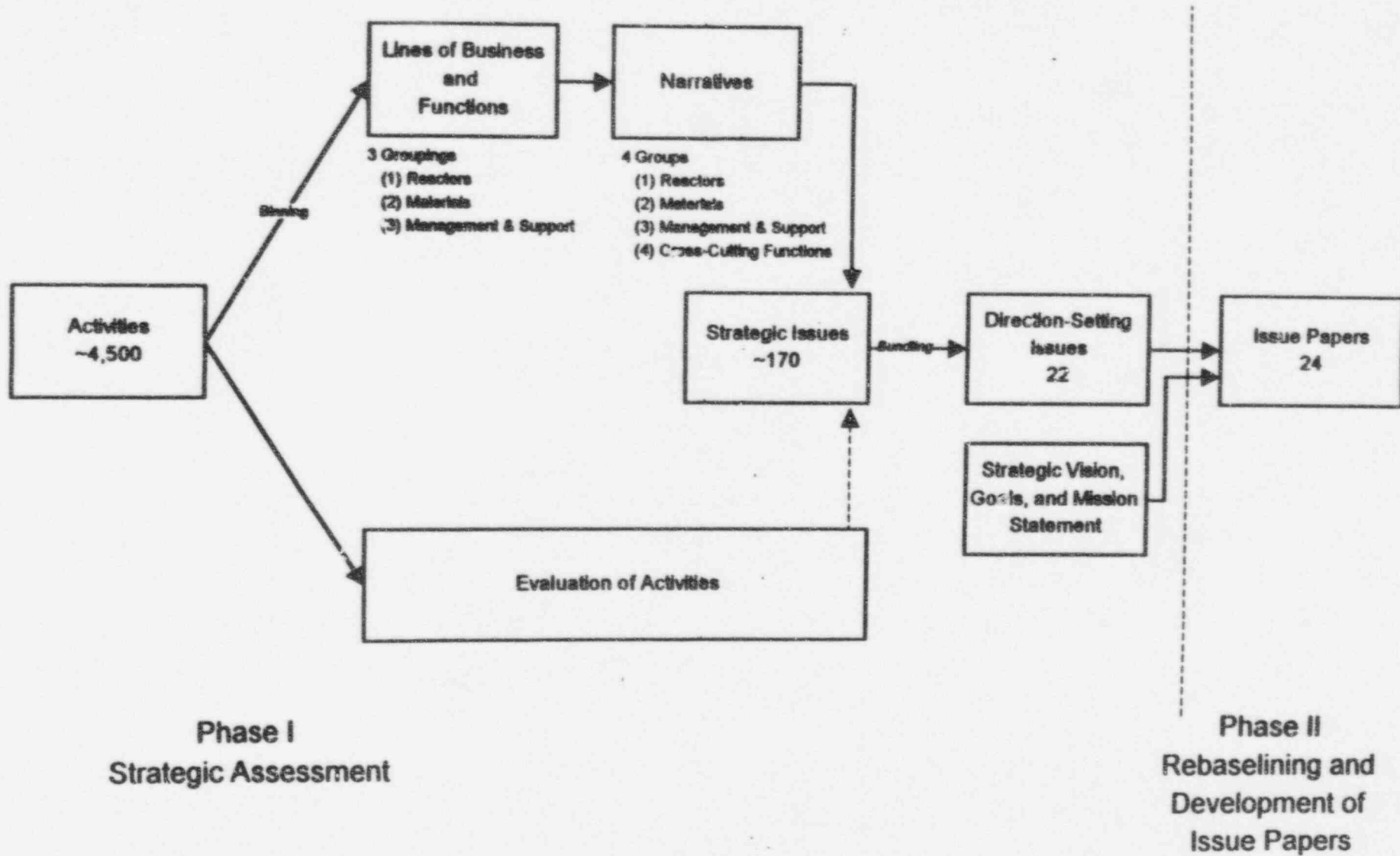
# STRATEGIC ASSESSMENT AND REBASELINING

## OVERVIEW OF STRATEGIC ASSESSMENT AND REBASELINING PHASES

- **Phase I - Strategic Assessment**
  - Review of Activities
  - Strategic Issues
  - Direction Setting Issues (DSIs)
- **Phase II - Rebaselining and Development of Decision Papers**
  - Issue Papers (DSIs)
  - Stakeholder Involvement
- **Phase III - Strategic Plan**
  - Commission Decisions on DSIs
  - Strategic Plan
- **Phase IV - Implementation and Budget**
  - Performance Plan/FY 1999 Budget
  - Outyear Plan FY 1999 +
  - Other Implementation Activities



## Phase I Terms and Process Flow



## **PHASE II STATUS**

---

- **Key Documents**
  - **Issue Papers (16)**
  - **Strategic Planning Framework Document**
  - **Stakeholder Involvement Process Paper**
  
- **Documents Available on AUTOS LAN, Internet, FedWorld, and Public Document Room**
  - **Hard copies available upon request to help minimize need for individual staff members to print their own copies**

# ISSUE PAPER SUMMARY

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<u>DSI</u>	<u>TITLE</u>
DSI 2	Oversight of the Department of Energy
DSI 4	NRC's Relationship with Agreement States
DSI 5	Low-Level Waste
DSI 6	High-Level Waste and Spent Fuel
DSI 7	Materials/Medical Oversight
DSI 9	Decommissioning - Non Reactor Facilities
DSI 10	Reactor Licensing for Future Applicants
DSI 11	Operating Reactor Program Oversight
DSI 12	Risk-Informed, Performanced-Based Regulation
DSI 13	Role of Industry
DSI 14	Public Communications Initiatives
DSI 20	International Activities
DSI 21	Fees
DSI 22	Research
DSI 23	Enhancing Regulatory Excellence
DSI 24	Power Reactor Decommissioning

# **STAKEHOLDER MEETINGS**

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## **INTERNAL STAKEHOLDER MEETINGS**

- **Will Summarize Strategic Assessment Process and Provide an Overview of the Issues--Seeking Comments From the Staff on the Issue Papers**
- **Meetings in Each Regional Office Scheduled for Week of September 30**

## **EXTERNAL STAKEHOLDER MEETINGS**

- **Meetings Scheduled To Discuss Issue Papers As Follows:**

**October 23 (Agreement States)  
October 24-25  
October 31-November 1  
November 7-8**

**Washington, DC--Washington Hilton  
Washington, DC--Washington Hilton  
Colorado Springs Sheraton  
Chicago, IL--Ramada O'Hare**

# **EXTERNAL STAKEHOLDER MEETINGS**

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## **CONFERENCE FORMAT**

- **Plenary Session**
  - **Summarize Strategic Assessment and Rebaselining Initiative**
  - **Describe Stakeholder Involvement Process**
  - **Conference Objectives**
- **Issue Paper Discussions by Strategic Arenas**
- **PSG Involvement in Planning and Conducting Conferences & Meetings**
- **Meetings Transcribed**

# **FUTURE ACTIVITIES**

---

## **REVIEW OF COMMENTS**

- **Written/Electronic Comment Period Closes November 15, 1996**
- **Sponsors/Lead Writers Collate and Review All Comments (Stakeholders Conferences, Written, and Electronic)**
- **Stakeholder Interactions Report**
  - **Brief Analysis of Comments By Individual Issue Paper**
  - **Identify Substantive Comments That Have Direct Bearing on Commission's Preliminary Decisions**
  - **Issue Paper Sponsors To Provide Summary of Substantive Comments For Commission Consideration**
  - **Stakeholder Interactions Report To Be Made Publicly Available**
- **SECY To Maintain Record of Comments Received**



# **STRATEGIC PLAN DEVELOPMENT (PHASE III)**

- o Phases I and II provide foundation for Strategic Plan.**
- o Strategic Plan**
  - Sets direction for Agency**
  - Meets requirements of Government Performance and Results Act**
- o Implementation (Phase IV)**
  - Budget and performance plan**
  - Other actions**

# **NRC'S STRATEGIC PLAN**

---

## **WHAT IS IT?**

- o Brief document to guide program and resource decisions at all levels
- o Delineates our important goals and objectives
- o Provides strategies for achieving our important goals
- o Living document subject to periodic change

## **WHAT IT IS NOT?**

- o A budget
- o A detail tactical operating plan
- o An exhaustive listing of Agency work

# NRC'S STRATEGIC PLAN



## NRC VISION

## NRC MISSION



To regulate the Nation's civilian use of byproduct, source, and special nuclear materials to ensure adequate protection of the public health and safety, to promote the common defense and security, and to protect the environment

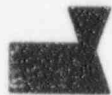
## NRC ORGANIZATIONAL VALUES



## NRC GOALS

## SAFETY PHILOSOPHY

## MISSION-CRITICAL STRATEGIES



Assuring safe operation of nuclear reactors



Assuring safe use and handling of nuclear materials



Assuring safe management of nuclear waste

## PRINCIPLES OF GOOD REGULATION

## MISSION-ENABLING STRATEGIES



Building public trust and confidence

•

Providing research expertise



Supporting National objectives in the international area



Developing internal support mechanisms that sustain safety activities

## CORE RESOURCE STRATEGIES



Managing NRC's human resources



Managing NRC's finances



Managing information

# **EXPECTATION FOR COMMENTS**

---

## **WHAT IS BEING REQUESTED FROM STAKEHOLDERS**

- **Soliciting Stakeholder's Views and Comments on:**
  - **Important Considerations That May Have Been Omitted**
  - **NRC's Assumptions and Projections For Internal and External Factors**
  - **Commission's Preliminary Decision**
  - **Specific Questions on Individual Issue Papers Per SRM Direction**
- **Comments May Be Provided by Mail, or Electronically--All Comments Docketed by SECY**
- **Comment Period Closes November 15, 1996**
- **Results Provided to Commission in Stakeholder Interactions Report on December 6, 1996**

**DSI 10: REACTOR LICENSING FOR FUTURE APPLICANTS  
DIRECTION-SETTING ISSUE**

---

**Given the current environment, what should the Commission's policy be on future reactors?**

## **SSI 10: REACTOR LICENSING FOR FUTURE APPLICANTS FACTORS**

---

- **Commission objectives in issuing Part 52**
- **New order for nuclear power plant unlikely in near term**
- **Budgetary pressure on the industry, Department of Energy, and NRC**
- **Foreign interest in U.S. approved designs**
- **Congressional interest in both Part 52 process and design certification progress**



## **DSI 10: REACTOR LICENSING FOR FUTURE APPLICANTS SUBSUMED STRATEGIC ISSUES**

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- **What is the need and priority for the staff to proceed with the passive design review?**
- **Have events overtaken the Commission's 1986 policy on advanced reactors?**

## **DSI 10: REACTOR LICENSING FOR FUTURE APPLICANTS OPTIONS**

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- **Reassess-Reprioritize**
- **Sustained Responsiveness**
- **Refocus Resources**
- **Single Solution**

## **DSI 10: REACTOR LICENSING FOR FUTURE APPLICANTS COMMISSION'S PRELIMINARY VIEWS**

---

- **Recognized that fundamental economic decisions by license applicants will determine level of necessary support**
- **NRC should continue to give priority for reviewing standard and advanced reactor designs, early site approvals, and licensing for new reactor license applicants**
- **Staff should develop implementation guidance for the following:**
  - **Address maintenance of the Utility Requirements Document and the certified designs through first-of-a-kind engineering**
  - **Address orderly closeout of all activities**
  - **Evaluate design certification process following completion of current applications for lessons learned**

**DSI 11: OPERATING REACTOR OVERSIGHT PROGRAM  
DIRECTION-SETTING ISSUE**

---

**Given the changes in the external/internal environment, what are the implications for the current strategies for the operating reactor program?**

## **DSI 11: OPERATING REACTOR OVERSIGHT PROGRAM FACTORS**

---

### **○ Internal**

- No new operating licenses under review**
- 3 - 5 reactors expected to shutdown prematurely**
- Number of new requirements expected to remain relatively low**

### **○ External**

- Industry deregulation and increasing economic pressures**
- Greater use of PRA to allow for cost savings**
- Industry concerns regarding the level of inspections**
- Component and system aging**
- Safety issues will continue to arise**
- Continued public concern regarding safety and interest in the regulatory process**

## **DSI 11: OPERATING REACTOR OVERSIGHT PROGRAM SUBSUMED STRATEGIC ISSUES**

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- **With the expected reduction in the number of licensing actions and reductions in resources, what is the appropriate way to manage change in this area?**
- **How will the NRC ensure that, with the reduced number of licensing actions reviewed by the staff, the current level of safety will be maintained? Will there be a need to increase resources in other areas such as inspection?**
- **Is the Operating Reactor Inspection Program staff optimally organized, and are the resources distributed in a manner to utilize them most efficiently?**
- **What changes should be made to the resident N + 1 policy?**
- **What changes should be made to the regional inspection program?**



## **DSI 11: OPERATING REACTOR OVERSIGHT PROGRAM RELATED ISSUES**

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- **How can we optimize the processes for evaluating the performance of power reactor licensees?**
- **How should the NRC modify its rules and approach regarding review of financial qualifications issues so as to focus its resources more sharply on assessing the impact of economic stress on safety performance?**

## **DSI 11: OPERATING REACTOR OVERSIGHT PROGRAM OPTIONS**

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- 1. Review the reactor oversight processes in the context of lessons learned from current issues and develop processes and mechanisms to provide for systematic reexamination of reactor oversight activities to ensure their continued effectiveness.**
- 2. Seek new approaches within the existing reactor oversight framework to improve effectiveness, work with the industry to foster an environment that is conducive to continued improvements in performance, and provide increased opportunities for public involvement in the regulatory process.**
- 3. Perform a Business Process Reengineering.**

## **DSI 11: OPERATING REACTOR OVERSIGHT PROGRAM COMMISSION'S PRELIMINARY VIEWS**

---

### **○ Option 1**

- **Continue ongoing comprehensive review**
- **Include systematic reexamination of the reactor oversight program**

### **○ Option 2**

- **Encourage industry to develop generic guidelines that can be endorsed by the NRC and carried out by the industry**
- **Provide increased opportunities for public involvement**
- **Expand use of technology to improve efficiency**
- **Increase flexibility in staffing multiple-unit sites**
- **Improve effectiveness and understanding of performance assessment process**

### **○ Option 3**

- **Consider work process re-engineering methods to improve various aspects of the reactor oversight program**
- **Identify for Commission review and approval areas that could benefit**
- **Consider "best-practices" from other regulatory agencies (foreign and domestic, nuclear and non-nuclear)**

**DSI 12: RISK-INFORMED, PERFORMANCE-BASED  
REGULATION  
DIRECTION-SETTING ISSUE**

---

**What criteria should NRC use in expanding the scope in applying a risk-informed, performance-based approach to rulemaking, licensing, inspection, and enforcement?**

## **DSI 12: RISK-INFORMED, PERFORMANCE-BASED REGULATION FACTORS**

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### **External**

- **Executive Branch and Congress**
- **Standards-Setting Organizations**
- **Federal Agencies**
- **Nuclear Industry**
- **Public**

### **Internal**

- **Nuclear Materials Initiatives**
- **Commission's PRA Policy Statement**
- **Defense-in-Depth**
- **Policy and Legal Issues**

## **DSI 12: RISK-INFORMED, PERFORMANCE-BASED REGULATION SUBSUMED STRATEGIC ISSUES**

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- What should be NRC's strategy and philosophy with respect to changing NRC's responsibilities and authority in areas of little public risk?
- What approach should NRC take in modifying the materials regulations to move toward risk-informed, performance-based regulation, recognizing the requirements will vary as a result of the range of products and the divergence of the licensees that use or possess byproduct nuclear material?
- Should NRC revise its regulations to address the uses of materials resulting from technological advances and changing human factors? If so, to what extent should NRC articulate objectives to prevent or limit the effects of equipment failures and human factors/human performance?
- What should be the approach for licensing material uses with various levels of inherent risk?
- Given the new Government-wide goals for reducing Federal information collections, how should the agency prepare for possible reductions in its budget ceiling for information collection without compromising public health and safety?
- How should a risk-informed, performance-based philosophy influence NRC's handling of dual regulation?



## **DSI 12: RISK-INFORMED, PERFORMANCE-BASED REGULATION OPTIONS**

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- 1. Continue current process**
- 2. More rigorously assess relationship to public health and safety**
- 3. Perform a comprehensive assessment of NRC regulatory approaches**
- 4. Consider risk-informed, performance-based approaches primarily in response to stakeholder initiatives**

## **DSI 12: RISK-INFORMED, PERFORMANCE-BASED REGULATION COMMISSION'S PRELIMINARY VIEWS**

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- Higher risk activities should be the primary focus of agency efforts and resources
- Staff should continue current efforts (Option 1) on pilot programs and continue to evaluate performance data as it becomes available
- Staff should proceed in the direction of enhancing the PRA Implementation Plan (some elements of Option 3)
- Staff should perform a thorough review of the basis for nuclear materials regulations and processes to identify and prioritize those areas that may be amenable to a risk-informed, performance-based approach. This assessment should lead to a framework for applying PRA to nuclear material uses
- The Commission is particularly interested in public comments on how NRC should deal with dual regulation when applying a risk-informed, performance-based regulatory philosophy

## DSI 2: OVERSIGHT OF THE DEPARTMENT OF ENERGY

Should the NRC seek to expand its regulatory authority and responsibilities to include DOE facilities?

### COMMISSION'S PRELIMINARY VIEWS

Staff actions regarding the various options should be held in abeyance pending the Commission's final decision on this issue paper. The Commission's preliminary views are:

The Commission preliminarily favors Option 4. This view would be consistent with the position the Commission has taken on this issue in the past; that is, the NRC has not actively pursued the added responsibilities that would result from regulating DOE activities but, given adequate resources and a reasonable time schedule to develop and initiate a regulatory program, the NRC could provide adequate regulatory oversight of DOE, if asked.

If NRC were to be given added regulatory oversight of DOE facilities, the Commission would prefer that the regulatory responsibilities be placed on the NRC on an incremental basis and that some type of prioritization methodology be used to determine the types of DOE facilities that, if subject to NRC oversight, would provide the greatest potential benefit to public health and safety.

Since the Commission is tentatively accepting the option that the NRC will not take a position on accepting broad responsibility for DOE facilities (Option 4), it would neither encourage nor oppose new legislation giving it broader authority over DOE nuclear facilities.

#### DSI 4: NRC'S RELATIONSHIP WITH AGREEMENT STATES

What should be NRC's strategy regarding States becoming and remaining Agreement States?

#### COMMISSION'S PRELIMINARY VIEWS

Staff actions regarding the various options should be held in abeyance pending the Commission's final decision on this issue paper. The Commission's preliminary views are:

The Commission preliminarily favors Option 3 (Continue the Current Agreement States Program, Including Adopting Current Initiatives). At the same time, the Commission is preliminarily in favor of encouraging more States to become Agreement States. However, the Commission believes this should be accomplished primarily through intangible incentives to States as opposed to tangible incentives. While tangible incentives (i.e., funding) would be an effective mechanism for encouraging more States to become Agreement States, the Commission is concerned that the funding constraints imposed by the Omnibus Budget Reconciliation Act of 1990 (OBRA-90) would have an inequitable impact on NRC licensees in States that decide not to become Agreement States. However, the Commission believes that the staff should explore the feasibility and desirability of providing "seed money" and/or financial grants, within the funding constraints of OBRA-90, to encourage States to apply for Agreement State status.

While the Commission has not made a final decision on this matter, a majority of the Commission is preliminarily in favor of a compromise position in which the NRC would provide training to Agreement States without charge on a "space available" basis. Funding for travel and technical assistance would be borne by the Agreement States.

The NRC particularly solicits comments on whether NRC should fund Agreement State training, travel, and technical assistance. Comments are especially sought from Agreement States, non-Agreement States, fee-paying NRC licensees and Agreement State licensees.

## DSI 5: LOW-LEVEL WASTE

What should be the role and scope of the NRC's low-level radioactive waste program?

### COMMISSION'S PRELIMINARY VIEWS

Staff actions regarding the various options should be held in abeyance pending the Commission's final decision on this issue paper.

The Commission's preliminary view on this issue is that the preferred option is Option 2 (Assume a Strong Regulatory Role in the National Program). This option would encompass all of the activities that were performed before the recent reductions in the low-level waste program.

In addition, the Commission seeks public comment on whether NRC should involve itself to a greater degree in implementing this option in such a way as to encourage an integrated approach to the regulation of LLW handling, processing, recycle, and disposal. For example, should NRC actively participate in the development of new technologies for waste compaction and better waste forms for on-site storage for licensees, to maximize safety and efficiency across the entire waste management and disposal process? Further, how should NRC address unauthorized disposal? Adopting such an approach would, of course, require that the NRC have a strong presence in the National low-level waste program and maintain an appropriate set of core capabilities.

#### DSI 6: HIGH-LEVEL WASTE AND SPENT FUEL

In recognition of current uncertainties, how should NRC approach the present high-level waste situation?

#### COMMISSION'S PRELIMINARY VIEWS

Staff actions regarding the various options should be held in abeyance pending the Commission's final decision on this issue paper.

The Commission's preliminary view on this issue is to proceed with Option 3 (Maintain NRC's existing HLW Program). This approach would enable NRC to continue to support the national HLW program at whatever level is appropriate to keep pace with the national program. However, the Commission intends to revisit this issue if, and when, the Congress provides further legislation on this issue.

In addition, the Commission would like to explore taking a more active role in resolving issues in the national HLW program, consistent with NRC's mission. The Commission particularly seeks public comment on what additional activities the NRC might reasonably undertake.



## DSI 7: MATERIALS/MEDICAL OVERSIGHT

What should be the role and scope of the NRC's nuclear materials program, and in particular, NRC's regulation of the medical use of nuclear material?

### COMMISSION'S PRELIMINARY VIEWS

Staff actions regarding the various options should be held in abeyance pending the Commission's final decision on this issue paper.

The Commission preliminarily favors a combination of Option 2 (Continue the Ongoing Program with Improvements) and Option 3 (Decrease Oversight of Low-Risk Activities with Continued Emphasis of High-Risk Activities). In implementing Option 3, the NRC would utilize the risk-informed performance based approach, as discussed in DSI 12, to determine which activities in the materials area, and specifically in the medical area, are low-risk activities. The general approach described in Option 3 of this DSI appears to be a reasonable starting point for identifying the types of activities that can be affected by this process.

In implementing these options with regard to the NRC's medical program, the NRC would consult with its Advisory Committee on the Medical Uses of Radioisotopes (ACMUJ) for guidance on low-risk medical activities, revisions to 10 CFR 35, and possible implementation methods. The NRC would also evaluate the feasibility of using professional medical organizations and societies as a potential source for developing professional standards and guidance that would be adhered to by NRC medical licensees and could be adopted by the NRC as regulatory requirements.

In the public comments on this issue, the NRC particularly solicits the views of other affected organizations such as the Organization of Agreement States and the CRCPD on applying a risk-informed performance based approach to NRC's oversight of medical activities. The NRC also solicits the public's views on the feasibility and desirability of NRC's striving to have the remaining non-Agreement States acquire Agreement State authority for medical-use only. In addition, the Commission solicits the public's views on whether a single agency should regulate radiation safety. Finally, the NRC specifically seeks comments on the Attachment to this issue paper titled "Regulation of Radiation in Medicine - IOM Issues."

## DSI 9: DECOMMISSIONING - NON-REACTOR FACILITIES

What should be NRC's strategy to take advantage of new and different approaches to optimize site remediation of the Site Decommissioning Management Plan and other problem sites?

### COMMISSION'S PRELIMINARY VIEWS

Staff actions regarding the various options should be held in abeyance pending the Commission's final decision on this issue paper. The Commission's preliminary views are:

The Commission's initial preference on this DSI is a combination of options, subject to the modifications specified below, including Option 2 (Change the Decommissioning Review Process), Option 6 (Focus on Decommissioning Cases in which Progress can be made; Transfer Stalled Sites to EPA), Option 7 (Take an Aggressive Position to Develop Regulatory Frameworks for Lower Cost Decommissioning Waste Disposal Options), and Option 8 (Develop a Strong Litigation Strategy). In combination, these options would place appropriate responsibility on licensees to remediate their sites while giving NRC appropriate tools to deal with problem sites and licensees.

With regard to Option 2, the Commission believes that the option should be tested on a pilot scale for a few selected materials licensees to determine the potential success and effectiveness of this option if it were to be adopted on a broader scale. The pilot program participants should be volunteers that are found to be suitable for participating in the pilot program by the NRC. Based on the results of the pilot program, the NRC could consider, at a later date, whether this option should be adopted on a broader basis.

Full implementation of Option 2 could significantly affect the way NRC licensees carry out their responsibilities for decommissioning and remediating sites. Some licensees might be in a poor position to hire and effectively use the contractors they would need to carry out these responsibilities. Accordingly, the NRC specifically seeks comment on whether NRC should hold seminars or workshops for licensees to make sure that they understand what NRC expects of them and what they, in turn, should expect of their contractors. Such training could help to assure that limited cleanup resources would be effectively applied.

With regard to Option 6, the Commission believes that rather than focussing only on the progress being made on the site review, the staff should also, consistent with DSI 12, examine the level of risk associated with each site. The NRC could focus on both progress and risk in making determinations on the disposition of sites. The NRC could focus on the higher risk sites where progress is being made and place lesser emphasis on the lower risk sites. Staff should consider the feasibility of transferring the low risk, stalled sites to the EPA's Superfund Program. Determinations on whether to send to EPA's Superfund Program a stalled, high-risk site or a low risk site where progress is being made, should be made on a case-by-case basis.

The implementation process for Option 6 should not preclude the Commission from reviewing a low risk, stalled site if conditions warrant, nor should the process automatically send the site to EPA's Superfund Program.

## DSI 10: REACTOR LICENSING FOR FUTURE APPLICANTS

Given the current environment, what should the Commission's policy be on future reactors?

### PRELIMINARY COMMISSION VIEWS

Staff actions regarding the various options should be held in abeyance pending the Commission's final decision on this issue paper. The Commission's preliminary views are:

The NRC recognizes that fundamental economic decisions by license applicants will determine the level of necessary support. The NRC should continue to give priority for reviewing standard and advanced reactor designs, early site approvals, and licensing for new reactor license applicants (Option 2 with elements of Option 1).

The staff should develop implementation guidance for the following:

- 1) Address maintenance of the Utility Requirements Document and the certified designs through first-of-a-kind engineering. Provide a plan for support of this process to the extent that, as a minimum, significant issues are addressed and resolution paths are provided in order to continue adequate support of the certified designs.
- 2) Address orderly closeout of all activities. Document to the greatest extent practicable the work performed such that its value for future technical and regulatory activities is not lost (e.g. SBWR, MHTGR, etc.).
- 3) Evaluate the design certification process following completion of current applications for lesson learned.

## DSI 11: OPERATING REACTOR OVERSIGHT PROGRAM

Given the changes in the external/internal environment, what are the implications for the current strategies for the operating reactor program?

### COMMISSION'S PRELIMINARY VIEWS

Staff actions regarding the various options should be held in abeyance pending the Commission's final decision on this issue paper. The Commission's preliminary views are:

The NRC should continue with its ongoing comprehensive review of the areas of licensing, inspection, and performance assessment to identify any areas of needed improvement. This would include development of mechanisms to provide for systematic reexamination of the reactor oversight program to ensure its continued effectiveness and to maximize agency learning in response to emerging issues (Option 1). The thoroughness of ongoing lessons-learned reviews will be key to improvement. The lessons-learned from these reviews must be applied across the industry, where appropriate, and must be verified for effectiveness. The staff should be proactive in ensuring continuing effectiveness of the reactor oversight program by considering in a systematic way how the changes in the regulatory environment might affect future reactor oversight. Currently, the changes in the regulatory environment involve such issues as industry deregulation and component and system aging.

The NRC should pursue several aspects of Option 2. These include encouraging the industry to develop generic guidelines that can be endorsed by the NRC and carried out by the industry, providing increased opportunities for public involvement, expanding the use of technology to improve the efficiency of the licensing and inspection processes where feasible and appropriate, increasing flexibility in staffing multiple-unit sites to enable improved distribution of NRC inspection resources on the basis of licensee performance, and improving the effectiveness and understanding of the performance assessment process.

With regard to performance of a Business Process Redesign of the reactor oversight program (Option 3), the staff should consider lessons learned from the ongoing use of work process re-engineering to establish more efficient and automation-assisted processing of materials license and amendment requests. If successful, the NRC should consider similar methods to improve various aspects of the reactor oversight program. As an initial step, after the consideration of lessons learned, the staff should identify for Commission review and approval which areas, if any, of the reactor oversight program could benefit from work process re-engineering. This could include a review of the consideration of "best-practices" from regulatory agencies (foreign and domestic, nuclear and non-nuclear).



## DSI 12: RISK-INFORMED, PERFORMANCE-BASED REGULATION

What criteria should NRC use in expanding the scope in applying a risk-informed, performance-based approach to rulemaking, licensing, inspection, and enforcement?

### COMMISSION'S PRELIMINARY VIEWS

Staff actions regarding the various options should be held in abeyance pending the Commission's final decision on this issue paper. The Commission's preliminary views are:

The Commission recognizes that, in order to accomplish the principal mission of the NRC in an efficient and cost effective manner, it will in the future have to focus on those regulatory activities that pose the greatest risk to the public. This can be accomplished by building upon probabilistic risk assessment concepts, where applicable, or other approaches that would allow a risk-graded approach for determining high and low risk activities. In general, those activities that are of a higher risk should be the primary focus of the agency's efforts and resources. The level of staff activity associated with lower risk activities should be determined based on a consideration of the cumulative impacts on safety, stakeholder initiatives and burden reduction, and the effect on agency and licensee efficiency.

The staff should continue with the current efforts, in cooperation with the industry (Option 1), including pilot programs. The objective of this initiative is to obtain additional information regarding the appropriateness of a risk-informed, performance-based approach for the subject activities. These activities and their schedule, are presently captured in the agency's PRA Implementation Plan. As data from performance monitoring of structures, systems and components are accumulated, the staff should evaluate the performance data to determine the effectiveness of the approach on the subject activity.

The staff should proceed in the direction of enhancing the PRA Implementation Plan (i.e., moving towards implementation of elements of Option 3) by building on the Regulatory Review Group's (RRG) results, which were initially focused on reducing the regulatory burden, with a more focused assessment of those regulations which are amenable to a risk-informed, performance-based approach. In determining the priority and scope of regulatory activities to be included in moving in the direction of partial implementation of option 3, the staff should consider the cumulative impacts on safety, stakeholder initiatives and burden reduction, and the effect on NRC and licensee efficiency. This approach should result in a further focusing of resources, on the various areas that the Commission regulates, that is commensurate with its risk significance, potential burden reduction and effect on efficiency.

The staff should evaluate and clarify any technical and/or administrative issues associated with performance-based approaches to regulation (e.g., inspection activities, enforcement, etc.). The staff should also perform a thorough review of the basis for nuclear materials regulations and process, and should identify and prioritize those areas that are either now, or can be made with minimal additional effort/resources, amenable to a risk-informed, performance-based approach. This assessment should eventually lead to the development of a framework for applying PRA to nuclear material uses, similar to the one developed for reactor regulation (SECY-95-280), where appropriate.

In the public comments on this issue, the NRC particularly solicits how NRC should deal with dual regulation when applying a risk-informed, performance-based regulatory philosophy.



## DSI 13: THE ROLE OF INDUSTRY

In performing its regulatory responsibilities, what consideration should NRC give to industry activities?

### COMMISSION'S PRELIMINARY VIEWS

Staff actions regarding the various options should be held in abeyance pending the Commission's final decision on this issue paper. The Commission's preliminary views are:

The NRC should move as expeditiously as possible, within budget constraints, to evaluate on a case-by-case basis, initiatives proposing further NRC reliance on industry activities as an alternative for NRC regulatory activities. Staff guidance should be developed to describe the process and the general decision criteria NRC would use for evaluating proposals. (Option 1) In addition, the NRC should increase its focus and emphasis on interacting with both industry groups and professional societies and technical institutes to develop new codes, standards, and guides needed to support efficient, effective, and consistent performance of industry activities important to safety. These codes, standards and guides would then be endorsed by the NRC. (Option 4) The NRC's initial activities in pursuing option 4 should focus on standards development in probabilistic risk assessment and the medical use area. Should the final Commission decision include Option 4, it is envisioned that the NRC staff would be requested to identify for the Commission where there are needs for new codes, standards, and guides and provide recommendations for additional areas of emphasis.

Although not a preferred option at this time, the Commission believes that use of a "Designated Industry Representative" (Option 5) may have some potential use in regard to large broad scope materials licensees where NRC oversight through inspection is not frequent. This would, in essence, be a potential method of increasing oversight rather than relying on industry initiatives to reduce NRC oversight.

## DSI 14: PUBLIC COMMUNICATION INITIATIVES

What approach should NRC take to optimize its communication with the public?

### COMMISSION'S PRELIMINARY VIEWS

Staff actions regarding the various options should be held in abeyance pending the Commission's final decision on this issue paper. The Commission's preliminary views are:

The NRC should place a priority on early identification of public concerns and methods for public interaction in making regulatory decisions that are likely to generate substantial public interest or concern (Option 2). This approach is consistent with NRC's Principles of Good Regulation. The NRC should interpret the term "public" in its broadest sense, understand who our various publics are, and focus on what they need in order to facilitate interaction and dissemination of information. For this purpose, the public includes private citizens, interest groups, licensees, states, media, congress, the executive branch, and the international community. Recognition should be given to both bilateral formal and informal communication, and particular attention should be given to review and improvement of formal communication. The appropriate role of technology as a facilitating/enabling device should be carefully examined within this context (e.g. particular care should be given to considering the forms of information dissemination such that the NRC does not eliminate paper in favor of electronic communication without full consideration of the public's ability to access information electronically). Although there should be centralized planning and coordination of a methodology for anticipating and involving the public in regulatory matters and decisionmaking, responsibility for implementing the methodology should reside with the program offices. The roles of the line organization and the Office of Public Affairs in facilitating public responsiveness should be clearly understood.

In addition, the NRC should focus on maximizing effectiveness and economy in its existing program for public communication (Option 1a), and in anticipating and involving the public (Option 2). As initial steps, the NRC should develop a consistent methodology, and coordinated planning for implementation of this approach, focus on examining the effectiveness and efficiency of activities that are of highest cost, and perform better assessments of proposed improvements to the existing approach. The NRC will consider the effectiveness and efficiency of certain formal forms of communication such as Freedom of Information Act requests in a manner consistent with the law. The Commission would envision establishment of a coordinating group and development of a plan to implement this philosophy.

## DSI 20: INTERNATIONAL ACTIVITIES

What is the appropriate role of NRC in the development and implementation of policies on international nuclear matters?

### COMMISSION'S PRELIMINARY VIEWS

Staff actions regarding the various options should be held in abeyance pending the Commission's final decision on this issue paper. The Commission's preliminary views are:

The Commission agrees that option 4, which fundamentally allows the Commission to conduct international activities of importance and benefit to NRC's domestic mission or U.S. national interests, is a desirable goal. However, modifications are expected to be required because of expected continued reductions in NRC budgets. Therefore, we need to examine individual international activities with respect to budget and priority to provide the basis for an orderly reduction and/or sunseting of certain activities to meet expected future constraints on the program.

Option 4 reaffirms NRC's current policy basis for participation in international activities. Under option 4, NRC would continue to perform its current statutory role in matters related to export-import licensing and its current and prospective role in treaty implementation and would, in addition, actively participate in international activities that support and benefit NRC domestic safety and security responsibilities or U.S. national interests. Also the NRC would participate in exchange activities of benefit to its domestic responsibilities or U.S. national interests and would provide a wide but carefully selected range of safety and safeguards assistance.

The Commission believes that international activities performed in support of U.S. national interests actually undergird our domestic mission. For example, NRC's nuclear safety cooperative research agreements with other countries allow NRC to obtain valuable information, often at a comparatively small cost, to support our own programmatic needs. Furthermore, NRC's own research program allows it to play a leadership role in such international organizations as the Nuclear Energy Agency and the International Atomic Energy agency, thus providing substantial benefit to the U.S. In addition, NRC's role in export licensing has direct impact on overall U.S. commercial interest.

Recognizing that we must also address the issue of future constraints on the NRC's international program, staff should develop a plan to include criteria which would address the basis for prioritizing NRC's international activities, including research. This will assist the Commission in determining where appropriate programmatic expansion or reductions may be made, depending on future budget constraints. In particular, since NRC is licensee fee based, careful consideration of international programs and their primacy to NRC's mission are important considerations. The plan should also identify areas where efficiencies can be considered and develop criteria for sunseting certain activities.

## DSI 21: FEES

In making decisions about what activities the NRC should perform in support of its mission, to what extent should fees be considered?

### COMMISSION'S PRELIMINARY VIEWS

Staff actions regarding the various options should be held in abeyance pending the Commission's final decision on this issue paper. The Commission's preliminary views are:

The Commission believes that the NRC's public health and safety mission must be the foundation in making decisions about what activities the agency should perform. In making decisions on the work which the NRC will perform, the Commission does, and will continue to, consider the cost of its activities and consistently examine ways to accomplish its mission within a responsible budget. Whether the NRC's budget is funded by the public through taxes paid to the treasury or by licensees through fees paid to the treasury, the NRC's decisions about its programs should be the same. The Commission believes that fees should not be a primary factor in determining the work to be performed in response to NRC health and safety mission. It is the Commission's position that programmatic decisions should not be fee driven and should be based on their contribution to public health and safety.

The Commission does not believe that it was Congress's intent to limit the NRC's activities to those which are directly attributable to a specific regulatory action for a specific licensee or class of licensees.

In the Omnibus Budget Reconciliation Act of 1990 (PL 101-508), Congress stated that any licensee of the Commission may be required to pay, in addition to the fees for services or thing of value, an annual charge. Congressional history and language in the Conference Report which accompanied PL 101-508 takes notice and allows that 'increasing the amount of recovery to 100 percent of the NRC's budget authority will result in the imposition of fees upon certain licensees for cost that cannot be attributed to those licensees or classes of licensees.'

After review of the policy options, it is the Commission's preliminary view to approve Option 2.

Programmatic decisions in response to NRC mandates will not be driven by fees. Specific activities conducted by the NRC will be evaluated for efficiency and effectiveness.

The NRC performs two primary types of activities. These types of activities are defined as mandated and non-mandated. Mandated activities include statutes, Executive Orders, treaties, Commission decision, etc. Non-mandated activities include those activities which are not required to respond to mandates, but are performed as a 'service' to another organization. This policy option (option 2) approved by the Commission provides for a responsible decision-making process for mandated activities while allowing the NRC to assist other organizations on a reimbursable basis.

In selecting option 2 the Commission will establish a process for making its programmatic decisions based on public health and safety considerations for mandated activities. When the Commission is requested to perform non-mandated activities the requestor will reimburse the NRC for the cost of performing the



requested activities.

In order to implement option 2 the staff will develop, for Commission review and approval, a set of criteria for defining mandated and non-mandated activities. These criteria will allow for a clear framework within which to consistently determine funding of NRC activities.

Two issues raised in SECY 96-019 to the Commission, in addition to the Direction-Setting Issue are also addressed. These two issues address funding mechanisms and personnel full time equivalent (FTE) ceilings.

#### FUNDING MECHANISM:

It is the Commission's preliminary view to support Funding Mechanism 2 which continues the agency's current approach.

Although the Commission believes that its decisions on activities the NRC should perform in support of its mission and its total budget authority should be independent of fee considerations, the Commission does believe that NRC fees should be assessed in as fair and equitable a manner as practicable.

The Omnibus Budget Reconciliation Act of 1990 (OBRA-90) requires that NRC collect fees equal to approximately 100% of the NRC's budget. The OBRA-90 further states that these fees should be collected from NRC's licensees and applicants. The Commission has sought to comply with OBRA-90 and to distribute fees as fairly and equitably among its licensees and applicants. The NRC has reexamined its fee policy each year, issued draft fee rules for public comment, and made changes to the process to respond to those comments whenever possible within the limits of existing statute. The Commission has also addressed those concerns raised by the public and licensees about the limitations of applying fees within OBRA-90 in its Report to Congress on the U.S. Nuclear Regulatory Commission's Licensee Fee Policy Review issued in February, 1994.

The Commission believes that carrying out the intent of Congress by implementing fee policy within existing law is the most effective and efficient option. The Commission will, however, consider comments and recommendations on specific proposals if they present new approaches to improve the process or to accomplish a more equitable distribution of fees.

#### FTE CONSIDERATION:

It is the Commission's preliminary view to support the NRC's identification of FTEs associated with reimbursable work as business-like activities.

When the NRC receives a request to conduct an activity which is not necessary for the NRC to meet its mandates, but will provide a "service" to another organization, the NRC must consider the cost of providing the service. This cost consideration includes both dollars and FTE. The requesting organization can enter into a reimbursable agreement with the NRC and reimburse the agency for the dollars expended on providing the assistance. The requesting organization does not, however, provide FTE to the NRC.

The current FTE ceiling constraints may make it difficult, if not impossible, for the NRC to provide assistance for non-mandated activities in response to specific requests. The approach to remove those FTEs used for business-like activities from the NRC ceiling would allow the NRC to provide assistance to other government agencies and organizations which might otherwise be turned down.

## DSI 22: RESEARCH

What should be the future role and scope of NRC's research program?

### COMMISSION'S PRELIMINARY VIEWS

Staff actions regarding the various options should be held in abeyance pending the Commission's final decision on this issue paper. The Commission's preliminary views are:

The staff should continue with the research program which should include elements of both confirmatory and exploratory research (option 4), balanced in such a way that both current as well as potentially emerging issues are being addressed. This option permits response to programmatic needs as well as anticipation of future needs.

In order to develop the scope of these technical capabilities the Office of Research should develop criteria for determining core research capabilities for Commission approval prior to going forward. Therefore, the Commission also approves option 5 in conjunction with option 4. It is recommended that RES be tasked with developing a set of core research capabilities for the NRC in consultation with the other program offices.

The staff should continue to support the Educational Grant Program (option 6). Universities have and continue to serve the Commission as a significant component of its overall research program. However, this program should be re-evaluated at least every two years to ensure that it continues to meet the Commission's policies and goals.

The staff should continue to support active participation in International Safety Programs (option 7). The staff should ensure that these international activities and the related programs are prioritized and appropriately integrated with other NRC research efforts (option 4), and are also properly considered in the establishment and maintenance of core research capabilities (option 5).

There are many key questions raised in the paper, note in particular pages 12 and 16, that require much thought to resolve, but whose answers will have a strong bearing on how the agency will operate in the future. Implementation of option 4 would include development of an integrated set of recommendations to be provided for Commission consideration.



## DSI 23: ENHANCING REGULATORY EXCELLENCE

How can NRC enhance regulatory excellence through maintenance of regulatory standards, rules, and requirements?

### COMMISSION PRELIMINARY VIEWS

Staff actions regarding the various options should be held in abeyance pending the Commission's final decision on this issue paper. The Commission's preliminary views are:

The Commission believes that striving for regulatory excellence in all NRC functions is both desirable and necessary to maintain an effective and efficient regulatory framework in today's changing environment. Recent events have shown that we could be more proactive in identifying potential problem areas and responding appropriately. Other DSIs have focused on critical areas that involve how the regulatory process can be improved. This DSI should emphasize how the NRC can implement strategies designed to improve its own internal performance, that is, for the NRC to be proactive in making our own people and processes function with a goal of excellence. Therefore, while the Commission supports taking a proactive approach as described under option 2, including the establishment of an agency-wide senior management review group, it does not support the limited focus of the approach which emphasized making improvements in the regulatory framework such as the SRP and the license amendment process.

The Commission would support an approach under option 2 in which the focus of the effort would be broadened to include addressing how to improve the way the NRC does its job. The Commission envisions development of an implementation plan that includes, but is not necessarily limited to, the following: 1) Identified goals with milestones and clear criteria for judging success; 2) Measures to engage the work force at the grassroots level and to stimulate management and employee communications in problem solving; 3) Improvements that address elements involving all NRC regulatory areas; and 4) Improvements to the NRC's processes and management and support functions so as to enhance the efficiency and performance of the NRC staff.

## DSI 24: DECOMMISSIONING - POWER REACTORS

What should be NRC's strategy for regulating decommissioning activities at power reactor sites?

### COMMISSION'S PRELIMINARY VIEWS

Staff actions regarding the various options should be held in abeyance pending the Commission's final decision on this issue paper. The Commission's preliminary views are:

From the options presented, Option 1: Continue the current direction and approach, is the recommended option. Implementation guidance in pursuing this option should be expanded to explore more innovative approaches in line with the current Commission strategy in this area.

The paper does provide a good discussion of rulemakings currently underway that outline the current Commission strategy in the power reactor decommissioning area: 1) that there should be assurance that decommissioning will be conducted in a safe and timely manner, 2) that adequate licensee funds will be available for this purpose, and 3) recognition that risks associated with decommissioning reactor facilities are not the same as for operating reactor facilities.

In pursuing the current pace of rulemaking, the staff, as stated above, should consider new and innovative regulatory approaches. Examples of possible approaches that might be considered are:

1. Transfer of nuclear power plants to Agreement State control after fuel has been put into dry storage or has been removed from the Part 50 site.
2. Placing a resident site inspector during all phases of decommissioning, only during specific phases of decommissioning, or not at all.
3. Having NRC take an enhanced performance-oriented approach by reducing oversight and performing a radiological assessment of the site when it is ready to be released.

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# **Update of Chapter 7 Standard Review Plan**

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**Presented to:**

**Advisory Committee on Reactor Safeguards  
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**Section 7.0 (new)**  
**Introduction**

**Section 7.1 (revised)**  
**General Criteria**

**Basic Requirements — Operating and Advanced Plants (existing)**

- GDCs
- 10 CFR 50.55a(h), IEEE 279
- 10 CFR 50, Appendix B

**Guidelines**

- R.G. 1.152, IEEE 7-4.3.2, Computer Sys. Design (revised)
  - R.G. IEEE 1012 & 1028, V&V Plans, Reviews, and Audits (new)
    - » BTP Software Reviews (new)
  - R.G. IEEE 828 & 1042, Config. Mgt. Plan and Guidance (new)
    - » BTP Software Reviews (new)
  - R.G. IEEE 829, Test Documents (new)
    - » BTP Software Reviews (new)
  - R.G. IEEE 830, Requirements Spec. (new)
    - » BTP Software Reviews (new)
    - » BTP Real-Time Performance (new)
  - R.G. IEEE 1008, Unit Testing (new)
  - R.G. IEEE 1074, Life Cycle Process (new)
    - » BTP Software Reviews (new)
  - BTP Defense-in-Depth and Diversity (new)
  - BTP PLCs (new)
  - BTP Self Test and Surv. Test (new)

**Other Guidance**

- GL 95-02 (existing)
- EPRI EMI/RFI Document (existing)
- Non-digital guidance, e.g., R.G. 1.105, ISA 67.04 (revised), R.G. 1.153, IEEE 603 (revised)
- EPRI COTS Document (in progress)

**Basic Requirements — Advanced Plants (existing)**

- 10 CFR 52

**Guidelines**

- BTP Level of Detail (new)

**Section 7.2–7.7 (revised)**  
**I&C Systems**

- RPS
- ESFAS
- Safe Shutdown
- Information
- Interlocks
- Controls

**Section 7.8 (new)**  
**Diverse I&C Systems**

**Section 7.9 (new)**  
**Data Communication Systems**

**Appendix 7-A (revised)**  
**BTPs (existing and new)**



## **We updated the SRP, we did not rewrite it**

- **Ground rules**
  - **Maintain existing regulatory bases**
  - **Incorporate lessons learned from ALWR reviews**
  - **Incorporate lessons learned from digital retrofits**
  - **Incorporate operating experience lessons learned**
  - **The update will describe I&C system criteria for both operating plants (modifications) and proposed future advanced reactor designs**
  - **If a topic is already covered, the topic is adequately covered (unless something is clearly wrong)**

# **We made no fundamental changes to the basic architecture of Chapter 7**

---



- **General requirements and guidance in 7.1**
  - Add references to new regulatory guides and branch technical positions (BTPs) on special digital system issues
  - Highlight review areas, acceptance criteria, and review process for digital systems
  - Add discussion of standard plant reviews
- **Remaining sections (7.2–7.9) focus on systems**
  - Add references to digital system guidance in Section 7.1





## **Three new sections were added**

- **7.0 — Introduction**
  - **How to use Chapter 7**
- **7.8 — Diverse Actuation**
  - **ATWS**
  - **Diverse actuation**
    - » **Manual system-level initiation**
    - » **Dedicated displays**
    - » **Automatic systems that are distinct from traditional protection and control**
- **7.9 —Data Communication Systems**



## **Two appendices were added and three revised**

---

- **New Appendix 7.0-A describes the overall review process for digital systems**
- **New Appendix 7.1-C provides guidance with respect to review according to IEEE 603 (Reg. Guide 1.153)**
- **Revised Appendix 7.1-A addresses rule changes (Part 52 and revisions to Part 50), and new regulatory guides**
- **Revised Appendix 7.1-B incorporates digital topics into the review of compliance with IEEE 279**
- **Revised Appendix 7-A includes new BTPs discussed below**



# **A new set of branch technical positions was developed**

---

- **Software Reviews**
- **Defense-in-Depth and Diversity**
- **Real-Time Performance**
- **On-Line and Periodic Testing**
- **Level of Detail for Design Certification Applications**
- **Programmable Logic Controllers**
- **Other non-digital system topics**



# **NRC Research developed new regulatory guides**

---

- **DG-1054 Verification, Validation, Reviews and Audits (IEEE 1012 and 1028)**
- **DG-1055 Software Configuration Management (IEEE 828 and 1042)**
- **DG-1058 Software Requirements Specifications (IEEE 830)**
- **DG-1056 Software Test Documentation (IEEE 829)**
- **DG-1059 Software Life Cycle Processes (IEEE 1074)**
- **DG-1057 Software Unit Testing (IEEE 1008)**



## **The revised SRP and new regulatory guides will aid in future reviews**

- **There is no impact on existing systems**
  - **Neither the SRP nor the new regulatory guides are proposed for backfit**
- **The SRP and regulatory guides are guidance only**
- **New system developers will benefit from identification of acceptable approaches to designing digital systems**
  - **Licensees have a clear path to acceptance of modifications**
  - **Utilities making 10 CFR 50.59 evaluations have more information upon which to base unreviewed safety question determination**



## **Reviewers of license amendment applications will use the revised SRP**

- **Reviewers will use selected portions of the SRP depending upon the scope of the change**
- **Depth of review will be determined by the reviewer and will depend upon safety significance and complexity of the change**
- **For previously approved designs, only the differences identified in the subsequent application and plant-specific issues will be reviewed**
- **Defense-in-depth and diversity analysis is only applicable to applications involving Reactor Trip Systems or Engineered Safety Features Actuation Systems**



# **Section 7.0 describes the overall review process**

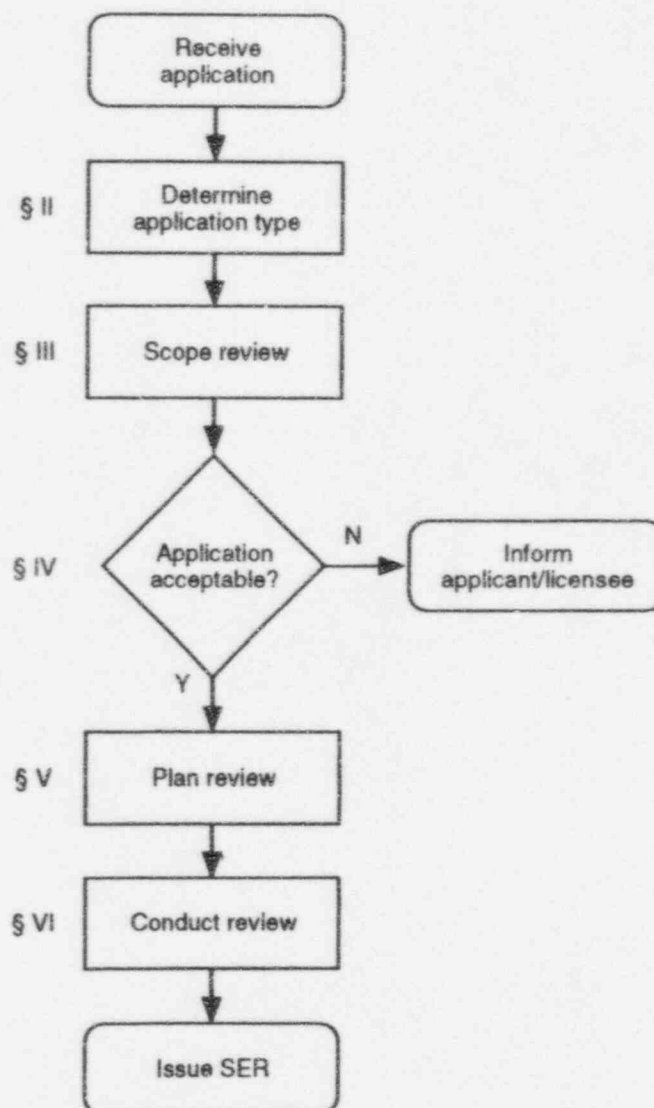
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- **Purpose**
  - **Describes the overall HICB review process**
    - » **License applications (including amendments)**
    - » **Topical reports**
- **Technical basis**
  - **Documents existing practice**



# Summary of Section 7.0





## **Appendix 7.0-A describes the unique aspects of digital system reviews**

---

- **Purpose**

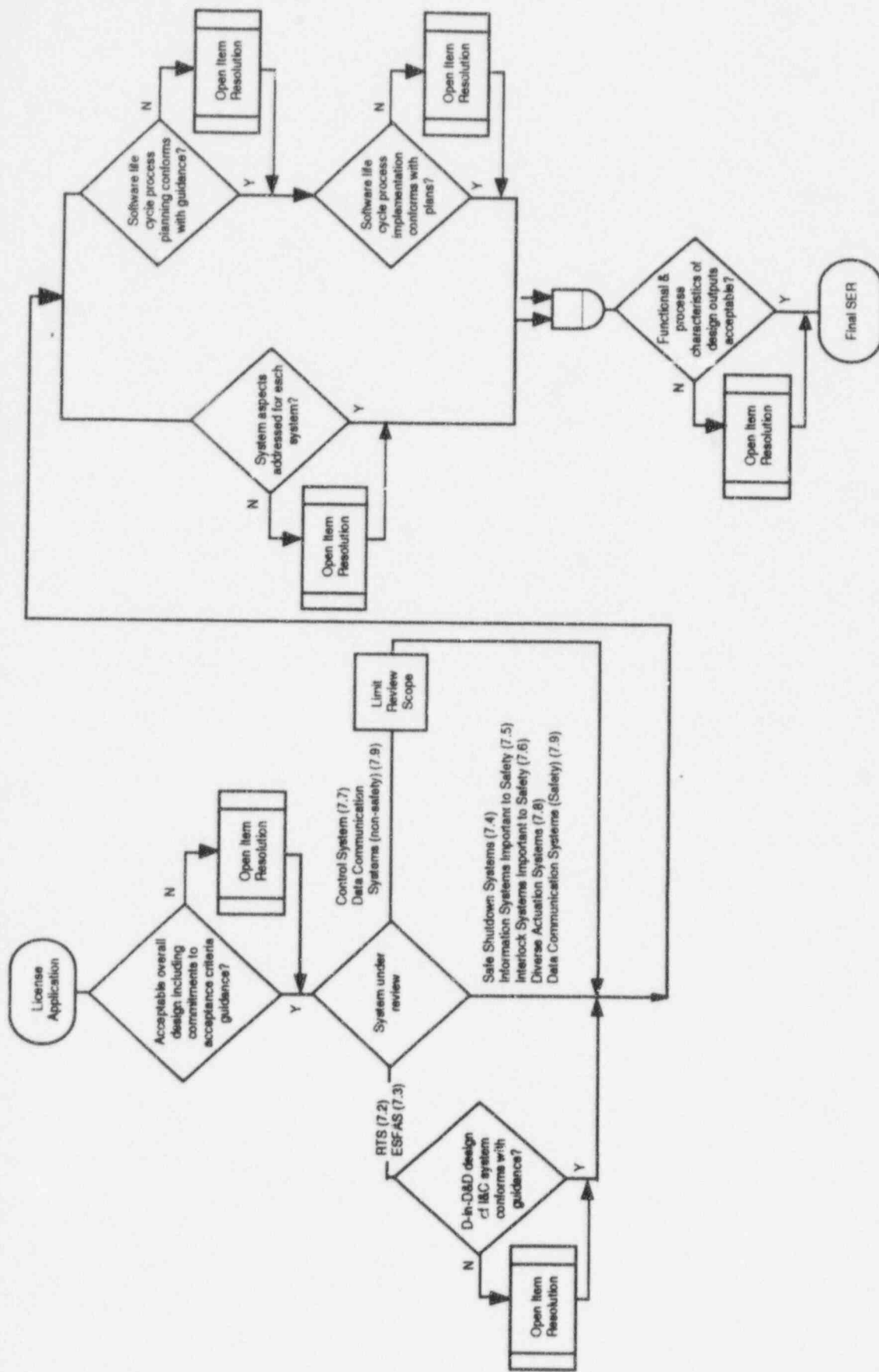
- **Overview of the process for reviewing the unique aspects of digital I&C**

- » **Supplements the description of the process for review of**

- **The overall I&C system design described in Section 7.0,**
      - **Design criteria and commitments described in Section 7.1, and**
      - **The individual systems described in Sections 7.2 through 7.9.**

- » **Illustrates how the review activities interact with each other and with the overall I&C review process**

# Appendix 7.0-A outlines an overall process for digital system reviews





## **Section 7.1 describes the basic acceptance criteria and guidance for I&C systems**

- **Purpose**
  - Identify systems that should be covered by SAR
  - Identify acceptance criteria applicable to multiple systems
  - Identify regulatory guides and standards for compliance
  - Guide reviewers in evaluating applicant commitments
- **Technical basis**
  - 10 CFR 50.55a(h) — IEEE Std 279
    - » IEEE Std 603 and IEEE Std 7-4.3.2
  - 10 CFR 50.34(f) — TMI Action Plan
  - 10 CFR 50.62 — ATWS
  - 10 CFR 50 Appendix A — GDC



# **Structure of Section 7.1**

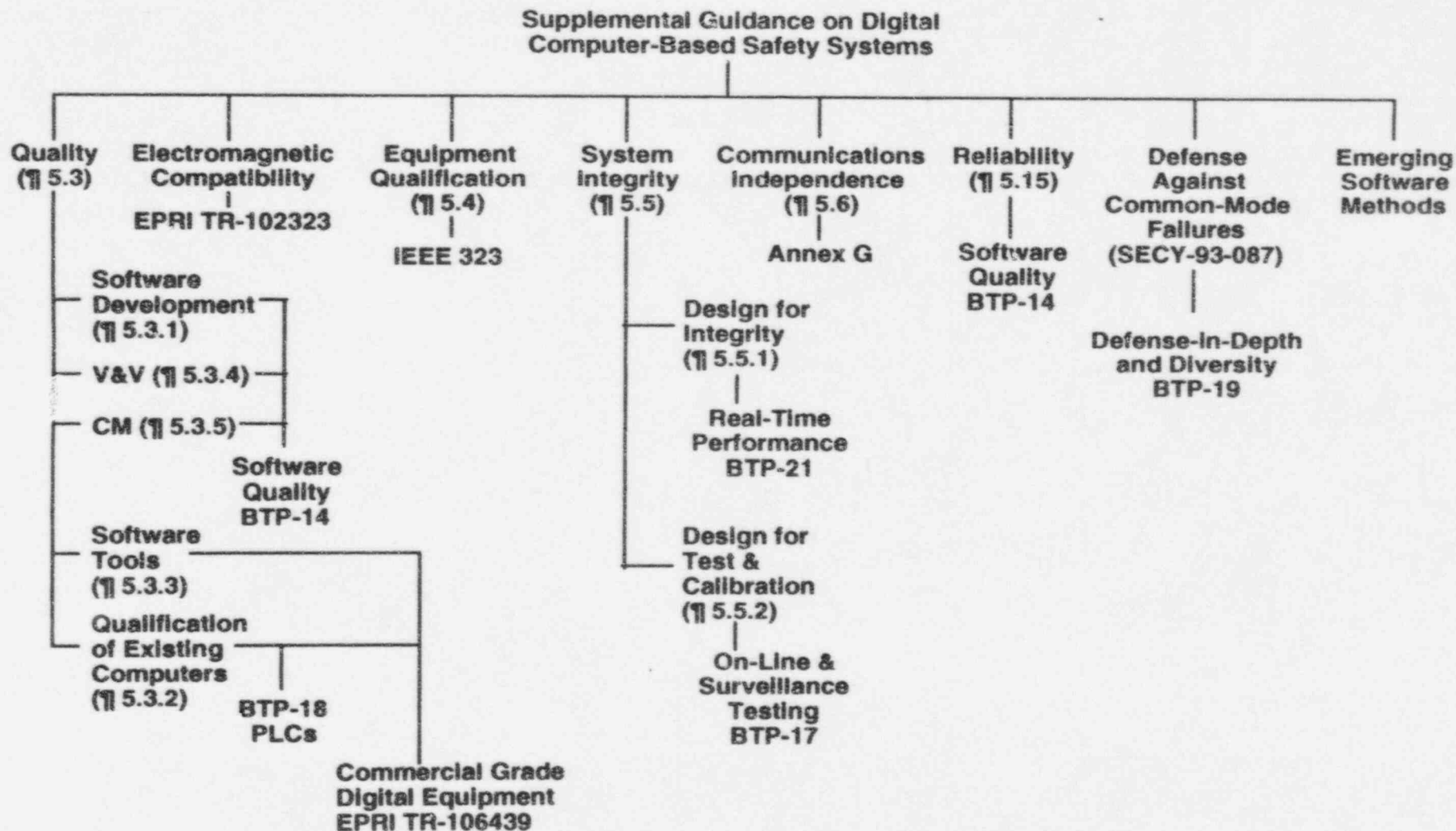
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- **Section 7.1**
  - **Review responsibilities**
  - **Areas of review**
  - **Acceptance criteria**
  - **Review process**
  - **Evaluation findings**
  - **Implementation**
- **Appendix A — Acceptance criteria and guidance**
  - **Summarized in Table 7.1-1**
- **Appendix B — Evaluation with respect to IEEE 279**
- **Appendix C — Evaluation with respect to IEEE 603**





# The review of digital systems follows IEEE Standard 7-4.3.2





## **Table 7.1-1 summarizes the acceptance criteria and guidance for each system**

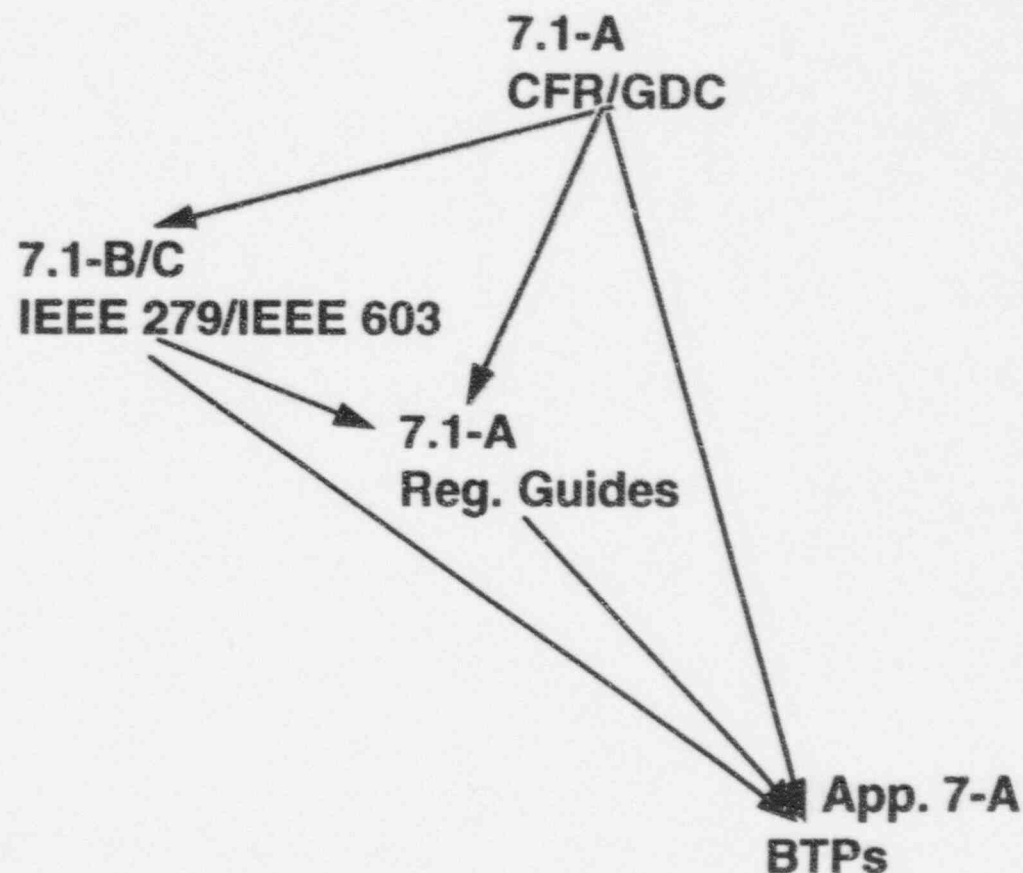
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- **For use as a quick reference by reviewers**
- **The table is a starting point**
  - **The criteria and guidance for a specific system may be different depending upon**
    - » **design characteristics**
    - » **licensee/applicant commitments**



## **Appendix 7.1-A outlines the review procedures for each acceptance criteria and Reg. Guide**

- Sections 7.2 thru 7.9 reference 7.1-A for review procedures
- Reviews start with acceptance criteria
- 7.1-A provides the road map from acceptance criteria to more detailed guidance





## **Appendices 7.1-B and C discuss review against 10 CFR 50.55a(h) (IEEE 279)**

---

- **The reviewer selects one depending upon the licensee/ applicant's commitments**
  - **7.1-B for IEEE 279**
  - **7.1-C for IEEE 603**
- **Compliance with IEEE 279 also satisfies many of the protection system GDC**
  - **Therefore 7.1-B and C are used in the review process for these acceptance criteria**



## **Sections 7.2 through 7.9 follow a common outline**

---

- **Areas of Review**
- **Acceptance Criteria**
- **Review Procedures**
- **Evaluation Findings**
- **Implementation**
- **References**

# **Coordination of reviews is similar for all sections**

---



- **Reactor Systems Branch**
  - Required I&C functions
  - Reactivity measurement and control aspects
- **Plant Systems Branch**
  - Required I&C functions
  - Supporting systems
- **Mechanical Engineering Branch**
  - Seismic qualification
- **Containment Systems & Severe Accident Branch**
  - Required I&C functions
  - Severe accident I&C
- **Electrical Engineering Branch**
  - Power supply and cable separation
  - Environmental qualification
- **Human Factors Assessment Branch**
  - User Interface
- **ITAAC (Part 52) review described in Chapter 14**





# **Summary of Section 7.2 (Reactor Trip System)**

---

- **Scope**
  - Automatic initiation of reactivity control
- **Acceptance Criteria**
  - 10 CFR 50.55a(h)— Codes & Standards (IEEE 279)
  - 10 CFR 50.35(f) — TMI Requirements
  - GDC 1 — Quality
  - GDC 2 & 4 — Environmental & Natural Phenomena Hazards
  - GDC 13 & 19 — Instrumentation & Control/Control Room
  - GDC 20-25 & 29 — Protection Systems
  - 10 CFR 52 — Resolution of Safety Issues, ITAAC, Interface Requirements, Level of Detail, Innovative Safety Systems



## **Summary of Section 7.2 (cont.)**

- **Review Emphasis**
  - **RTS design basis**
  - **Single failure criterion**
  - **Quality of components and modules (including software)**
  - **Independence**
    - » **Between redundant channels**
    - » **Between control and protection**
  - **Defense-in-depth and diversity**
  - **System testing and surveillance measures**
  - **Use of digital systems**
  - **Setpoint determination**

**The evaluation findings describe the  
conclusions a reviewer should be able to reach**

---



- **All acceptance criteria are met**
- **Typical SER language is provided**

**This is typical for Sections 7.2 - 7.9**



## **Summary of Section 7.3 (Engineered Safety Features)**

---

- **Scope**
  - **Engineered Safety Feature Actuation**
  - **Engineered Safety Feature Control**
- **Acceptance criteria**
  - **Same as for RTS**
  - **Also criteria for ESF functions supported**
- **Review emphasis**
  - **Same as RTS**

## **Summary of Section 7.4 (Safe Shutdown)**



- **Scope**
  - I&C for safe shutdown from control room or remote location
- **Acceptance criteria**
  - GDC 2 & 4 — Environmental & Natural Phenomena Hazards
  - GDC 13 & 19 — Instrumentation & Control / Control Room
  - GDC for supported systems (RHR, ECCS, Cont. Heat Removal)
  - 10 CFR 52



## **Summary of Section 7.4 (cont.)**

- **Review emphasis**
  - **Safe & remote shutdown functions**
  - **Single failure criterion**
  - **Independence from protection systems**
  - **Use of digital systems**
  - **Surveillance test provisions**





# **Summary of Section 7.5 (Information Systems)**

---

- **Scope**
  - Post Accident Monitoring (PAM)
  - Bypass & Inoperable Status Indication
  - Annunciators
  - SPDS, ERF, Nuclear Data Link / protection system independence
- **Acceptance criteria**
  - 10 CFR 50.34(f) — TMI Requirements
  - GDC 1 — Quality
  - GDC 2 & 4 — Environmental & Natural Phenomena Hazards
  - GDC 13 & 19 — Instrumentation & Control / Control Room
  - GDC 24 — Control/ protection independence
  - 10 CFR 52



## **Summary of Section 7.5 (cont.)**

---

- **Review Emphasis**
  - **PAM compliance with Reg. Guide 1.97**
  - **PAM support of EOP actions**
  - **Severe accident monitoring**
  - **Scope of bypass and inoperable status indication**
  - **BISI conformance with Reg. Guide 1.47**
  - **Annunciator reliability**
  - **ALWR annunciator requirements**
    - » **limited redundancy**
    - » **self-test provisions**
    - » **safety related annunciators in particular cases**
  - **Use of digital systems**
  - **Independence from protection systems**

# Summary of Section 7.6 (Interlock Systems)

---



- **Scope**
  - Interlocks credited for preventing events or maintaining availability of safety systems
- **Acceptance criteria**
  - 10 CFR 50.55a(h) — Codes & Standards (IEEE 279)
  - GDC 1 — Quality
  - GDC 2 & 4 — Environmental & Natural Phenomena Hazards
  - GDC 13 & 19 — Instrumentation & Control / Control Room
  - GDC for supported systems
  - 10 CFR 52



## **Summary of Section 7.6 (cont.)**

---

- **Review emphasis**
  - **Interlock functions included**
  - **Single failure criterion**
  - **Quality of components and modules**
  - **Independence from control systems**
  - **Surveillance testing**
  - **Use of digital systems**



# Summary of Section 7.7 (Control Systems)

---

- **Scope**
  - Non-safety I&C that can affect performance of safety functions
- **Acceptance criteria**
  - 10 CFR 50.34(f) — TMI Requirements
  - GDC 1 — Quality
  - GDC 13 & 19 — Instrumentation & Control / Control Room
  - GDC 24 — Control/protection independence
  - 10 CFR 52



## **Summary of Section 7.7 (cont.)**

---

- **Review emphasis**
  - **Design basis**
  - **Safety classification**
  - **Effect of control systems on transients**
  - **Effect of control system failures**
  - **Environmental control for safety systems**
  - **Use of digital systems**
  - **Control / protection independence**
  - **Control system functions credited for defense-in-depth and diversity**





# **Summary of Section 7.8 (Diverse I&C Systems)**

---

- **Scope**
  - **ATWS mitigation**
  - **Systems provided specifically for defense-in-depth and diversity position**
    - » **Diverse Actuation**
    - » **Manual Displays and Controls**
- **Acceptance criteria**
  - **GDC 1 — Quality**
  - **10 CFR 52**
  - **10 CFR 50.62 —ATWS**



## **Summary of Section 7.8 (cont.)**

---

- **Review emphasis**
  - **Design basis**
  - **Quality of components and modules**
  - **Surveillance test provisions**
  - **Consistency with defense-in-depth and diversity analysis**
  - **Power supply availability**
  - **Environmental Qualification**
  - **Independence from protection system**
  - **Manual initiation capability**
  - **Completion of protective action**



# Summary of Section 7.9 (Data Communication)

---

- **Scope**
  - Communications systems supporting multiple systems
    - » Other than “point-to-point” cables (e.g., multiplexed systems)
- **Acceptance criteria**
  - Union of acceptance criteria for supported systems
- **Review emphasis**
  - Quality of components & modules
  - Software quality
  - Performance
  - Reliability



## **Summary of Section 7.9 (cont.)**

---

- **Additional review emphasis for safety-related data communication**
  - **Single failure criterion**
  - **independence between redundant channels**
  - **Failure modes**
  - **Surveillance test provisions**
  - **EMI/RFI susceptibility**
  - **Consistency with defense-in-depth and diversity analysis**
  - **Seismic qualification**

# Appendix 7.1-A contains the Branch Technical Positions



BTP number	Subject
1	Isolation of Low-Pressure Systems from the High-Pressure Reactor Coolant System
2	Motor-Operated Valves in the Emergency Core Cooling System Accumulator Lines
3	Protection System Trip Point Changes for Operation with RCS Pumps Out of Service
4	Guidance on Design Criteria for Auxiliary Feedwater Systems
5	Spurious Withdrawals of Single Control Rods in Pressurized Water Reactors
6	Design of I&C Provided to for Changeover from Injection to Recirculation Mode
7	Not used
8	Application of Regulatory Guide 1.22
9	Reactor Protection System Anticipatory Trips
10	Application of Regulatory Guide 1.97 (Post Accident Monitoring Systems)
11	Application and Qualification of Isolation Devices
12	Establishing and Maintaining Instrument Setpoints
13	Replacement of Reactor Coolant RTD Bypass Manifold Temperature Instruments
14	Software Reviews for Digital Computer-Based I&C Safety Systems
15	Not used
16	Level of Detail Required for Design Certification Applications Under 10 CFR Part 52
17	Self-Test and Surveillance Test Provisions in Digital Computer-Based I&C Systems
18	Use of Programmable Logic Controllers in Digital Computer-Based I&C Systems
19	Defense-in-Depth and Diversity in Digital Computer-Based I&C Systems
20	Not used
21	Digital System Architecture and Real-Time Performance



## **There are four groups of BTPs**

- **BTP 1 - 9 are existing BTPs**
  - **One BTP deleted because now covered in Chapter 18**
  - **Others unchanged except for format and reference to IEEE 603**
- **BTP 10 - 13 reflect lessons learned from operating reactor reviews**
- **BTP 14, 17, 18, 19, and 21 deal with digital system issues**
- **BTP 16 discusses level of detail for Design Certification applications**



## **BTPs 10 through 13 address operating plant lessons learned**

---



- **BTP-10 deals with lessons learned from implementation of Reg Guide 1.97 (PAM)**
  - **Acceptable deviations for selected variables**
- **BTP-11 deals with the application and qualification of electrical isolation devices in instrumentation circuits**
  - **Identifies acceptable design characteristics and test methodologies**
- **BTP-12 deals with lessons learned from implementation of Reg Guide 1.105 (Setpoints)**
  - **Adequacy of setpoint calculation methodologies**
- **BTP-13 documents staff position on cross-calibration of RCS temperature detectors**
  - **Acceptable methods and impact upon setpoints**



## **BTPs 14, 17-19, and 21 deal with digital topics**

---

- **BTP 14 describes the review of software**
  - Criteria for planning, process, and design outputs
- **BTP 17 discusses self-test and surveillance test features**
  - Criteria for types of tests and constraints on tests
- **BTP 18 discusses considerations in the use of PLCs**
  - The use of PLCs may simplify design activities
- **BTP 19 describes the review of defense-in-depth and diversity analysis**
  - Key points in evaluating level of diversity provided
- **BTP 21 discusses topics for consideration in confirming real-time performance**
  - Architectural considerations and timing demonstration



## **The new BTP's follow a common outline**

- **Background**
  - **Regulatory Basis**
  - **Applicable Guidance**
  - **Purpose**
- **Branch Technical Position**
  - **Acceptance Criteria**
  - **Review Procedures**
- **References**

4

**ACRS PRESENTATION  
PALO VERDE UNIT 2  
SIMULTANEOUS FIRES IN CONTROL ROOM  
AND DC EQUIPMENT ROOM  
APRIL 4, 1996**

**PRESENTED BY:  
ROBERT DENNIG, 415-1156  
EVENTS ASSESSMENT AND GENERIC COMMUNICATIONS BRANCH  
DIVISION OF REACTOR PROGRAM MANAGEMENT, NRR**

**PALO VERDE UNIT 2  
SIMULTANEOUS FIRES IN CONTROL ROOM  
AND DC EQUIPMENT ROOM  
APRIL 4, 1996**

**PROBLEM**

- **SIMULTANEOUS FIRES IN CONTROL ROOM AND DC EQUIPMENT ROOM B**

**CAUSE**

- **IMPROPER GROUNDING OF ELECTRICAL CIRCUITS**

**SAFETY SIGNIFICANCE**

- **SINGLE FAULT COULD CAUSE FIRE IN CONTROL ROOM AND IN A ROOM NEEDED FOR ALTERNATIVE SAFE SHUTDOWN OUTSIDE OF THE CONTROL ROOM**

## INITIAL CONDITION

- REFUELING, REACTOR CORE OFFLOAD IN PROGRESS

## PROGRESSION OF EVENT

- AT APPROXIMATELY 1700, LICENSEE FIREWATCH DETECTED SMOKE IN THE BACK PANEL AREA OF THE CONTROL ROOM.
- SMOKE WAS FROM THE TRAIN B ESSENTIAL LIGHTING UNINTERRUPTIBLE POWER SUPPLY (ELUPS) PANEL AND THE ESSENTIAL LIGHTING DISTRIBUTION PANEL.
- FIREWATCH IMMEDIATELY NOTIFIED THE SHIFT SUPERVISOR AND SECURITY, REQUESTING EMERGENCY RESPONSE FROM ONSITE FIRE DEPARTMENT.



- **BREAKER SUPPLYING POWER TO THE ELUPS TRIPPED WHEN WIRING IN THE CONDUIT MELTED AND CAUSED A SHORT.**
- **LOSS OF ELUPS PANEL CAUSED LOSS OF SOME CONTROL ROOM LIGHTS AND SEVERAL AUXILIARY BUILDING FIRE ALARMS.**
- **OPENING OF THE ELUPS SUPPLY BREAKER ALSO CAUSED THE TRANSFER RELAY TO DROP OUT WHICH INTERRUPTED THE SHORT CIRCUIT CURRENT.**
- **AT APPROXIMATELY 1709, THE CONTROL ROOM FIRE WAS EXTINGUISHED.**
- **AN AUXILIARY OPERATOR SENT TO SURVEY HIS DUTY AREA DISCOVERED SMOKE AND FIRE IN THE TRAIN B DC EQUIPMENT ROOM.**
- **THE FIRE WAS LOCATED IN THE 480/120 VOLT TRANSFORMER.**

- **AT 1714, THE CONTROL ROOM STAFF CLASSIFIED THE EVENT AS AN ALERT.**
- **OPERATORS MANUALLY OPENED THE SUPPLY BREAKER TO THE 480/120 VOLT TRANSFORMER TO TERMINATE THE SHORT CIRCUIT IN THE TRANSFORMER.**
- **THE FIRE IN THE DC EQUIPMENT ROOM WAS EXTINGUISHED AT APPROXIMATELY 1725.**
- **THE ALERT WAS TERMINATED AT APPROXIMATELY 1805.**

## **ROOT-CAUSE**

- **THE CORE FAILED AND SHORTED THE TRANSFORMER COILS TO STATION GROUND.**
- **THIS SHORT CAUSED THE FIRE IN THE DC EQUIPMENT ROOM.**
- **THE NEUTRAL LEG OF TRANSFORMER WAS NOT GROUNDED LOCALLY.**
- **THE FAULT CURRENT PROPAGATED INTO THE PANELS IN THE CONTROL ROOM AND CAUSED THE CONTROL ROOM FIRE.**
- **CONTRARY TO THE IEEE STANDARD 142, TO WHICH THE LICENSEE WAS COMMITTED, THE SYSTEM WAS GROUNDED IN THE CONTROL ROOM RATHER THAN AT THE TRANSFORMER.**

- **THE CONDUCTORS IN THE CIRCUIT WERE OF INSUFFICIENT SIZE TO HANDLE THE HIGH FAULT CURRENTS AND IGNITED.**
- **THE ELECTRICAL DESIGN WAS IN ACCORDANCE WITH THE ORIGINAL ARCHITECT-ENGINEER DESIGN (BECHTEL).**
- **THE SAME CONFIGURATION WAS FOUND AT PALO VERDE UNITS 1 AND 3.**

## **LICENSEE CORRECTIVE ACTIONS**

- **THE TRANSFORMER NEUTRAL LEG HAS BEEN GROUNDED AND THE OUTPUT OF THE TRANSFORMER HAS BEEN FUSED TO PREVENT FAULT PROPAGATION.**
- **THE GROUND HAS BEEN REMOVED FROM THE CONTROL ROOM ELUPS PANEL.**
- **A REVIEW WAS CONDUCTED AND IDENTIFIED TWELVE COMPONENTS PER UNIT (REGULATING TRANSFORMERS, BATTERY SUPPLIES, AND INVERTERS) THAT REQUIRE MODIFICATIONS FOR ELECTRICAL CIRCUIT PROTECTION AND/OR GROUNDING.**

## **NRC ACTIONS**

- **CONDUCTED SPECIAL INSPECTION WHICH RESULTED IN A LEVEL IV VIOLATION AGAINST APPENDIX B, CRITERION III, DESIGN CONTROL.**
- **DRAFTING INFORMATION NOTICE ON EVENT.**





Control Building Elevation 140'

2E-QBR-84  
Essential Lighting  
Distribution Panel

Fire Panels &  
Essential Lighting

N

1-2/C #10  
(In Conduit)

Control Room  
Emergency Lights

1-2/C #10 (In Conduit)

1 2 3 4 5

(In Conduit)

2-1/C #4/0

5th  
Harmonic  
Coil

Ground

3rd  
Harmonic  
Coil

2E-QBB-V02  
Isolation Transformer

1-2/C #2

M3217

MCC 2E-PHB-M32

Routed in conduit and tray (F01)

1-2/C #8

Battery  
2E-QDN-F02

CBI  
2P

Inverter

2E-QDN-N02  
Control Room Emergency  
Lighting Uninterruptible  
Power Supply

## Unit 2 Control Room Fire Event Electrical Schematic

- Short Circuitted Small Conductors
- Short Circuitted Large Conductors

Control Building Elevation 100'