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Materials and Metallurgy Subcommittee

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

NOVEMBER 29, 2001

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

MATERIALS AND METALLURGY SUBCOMMITTEE

+ + + + +

THURSDAY

NOVEMBER 29, 2001

+ + + + +

ROCKVILLE, MARYLAND

+ + + + +

The Subcommittee met at the Nuclear  
Regulatory Commission, Two White Flint North, Room  
T2B1, 11545 Rockville Pike, at 8:30 a.m., F. Peter  
Ford, Chairman, presiding.

COMMITTEE MEMBERS:

F. PETER FORD	Chairman
MARIO V. BONACA	Member
THOMAS S. KRESS	Member
WILLIAM J. SHACK	Member

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1 ACRS STAFF PRESENT:

2 Noel F. Dudley

3

4 ALSO PRESENT:

5 Maitri Banerjee

6 Mohamad Behraves

7 Helen Cothron

8 Robert Cullen

9 Farouk Eltawila

10 Bob Exner

11 Lane Hay

12 Gary Henry

13 Robert K. Johnson

14 Ken Karwoski

15 Bob Keating

16 Herm Legally

17 Steve Long

18 Louis Lund

19 Mati Merilo

20 Rick Mullins

21 Emmett Murphy

22 Jim Riley

23 Edmund Sullivan

24

25

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## I N D E X

	<u>AGENDA ITEM</u>	<u>PAGE</u>
1		
2		
3	Opening Remarks by Chairman Ford . . . . .	4
4	Introductory Remarks, E. Sullivan . . . . .	6
5	NEI Presentation, J. Riley, NEI . . . . .	15
6	NEI 97-06	
7	NEI Generic Change Package (GCP)	
8	Present Issues	
9	Concerns with GCP and NEI 97-06 . . . . .	46
10	E. Murphy, NRR	
11	Staff Presentation (Cont.), E. Murphy, NRR . . .	93
12	Proposed resolutions	
13	Status and Plans	
14	Standards Issues, EPRI, Mohamad Behravesesh . .	100
15	NEI Status, J. Riley, NEI . . . . .	114
16	Discussion, Chairman Ford . . . . .	121
17	Adjournment, Chairman Ford . . . . .	135

18

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

(8:36 a.m.)

CHAIRMAN FORD: The meeting will now come to order. This is a meeting of the ACRS Subcommittee on Materials and Metallurgy. I am Peter Ford, Chairman of the Materials and Metallurgy Subcommittee. The other ACRS members and consultant in attendance are: Mario Bonaca; Thomas Kress, and William Shack.

The purpose of this meeting is for the Subcommittee to review the latest revision of the Nuclear Energy Institutes (NEI) 97-06, "Steam Generator Program Guidelines," and the Generic License Change Package. The Subcommittee will gather information, analyze relevant issues and facts, and formulate proposed positions and actions, as appropriate, for deliberation by the full Committee.

Mr. Noel Dudley is the Cognizant ACRS Staff Engineer for this meeting. The rules for participation in today's meeting have been announced as part of the notice of this meeting previously published in the Federal Register on November 9, 2001.

A transcript of this meeting is being kept, and will be made available as stated in the Federal Register Notice. It is requested that speakers first identify themselves and speak with

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1 sufficient clarity and volume so that they can be  
2 readily heard. We have received no written comments  
3 or requests for time to make oral statements from  
4 members of the public.

5 Since the early 1990s, the staff and the  
6 industry have worked to develop a mutually agreeable  
7 regulatory framework to ensure steam generator tube  
8 integrity. In 1998, affected licensees committed to  
9 NEI to follow NEI 97-06, "Steam Generator Program  
10 Guidelines," and the associated Electric Power  
11 Research Institute (EPRI) implementing programs.

12 It was January 2001 that NEI revised NEI-  
13 97-06 and the implementing programs, and has developed  
14 an Industry Steam Generator Program Generic License  
15 Change Package, which provides templates for licensees  
16 to amend their technical specifications. It is our  
17 understanding -- It is the ACRS' understanding that  
18 the staff and NEI are in general agreement concerning  
19 the intent of the NEI 97-06, Rev. 1, and the change  
20 package.

21 The last time the ACRS was involved in  
22 this specific issue was in early 1999. Since these  
23 discussions are approaching agreement, we thought it  
24 appropriate to have a Materials Subcommittee meeting  
25 to bring us up to date so that there is no delay on

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1 our end when this matter is brought up to the full  
2 ACRS meeting next week on December 6th.

3 We will now proceed with the meeting, and  
4 we will call upon Mr. Ted Sullivan of the Office of  
5 Nuclear Reactor Regulations to begin.

6 MR. SULLIVAN: Thank you for that  
7 introduction. I would comment that a lot of the  
8 things I was going to say were contained in your  
9 introduction. So I'll skip them and possibly hit some  
10 other points.

11 My name is Ted Sullivan, and I am just  
12 going to make a few introductory remarks maybe to set  
13 the stage for what is to follow.

14 We met with the Subcommittee, I think, on  
15 September 26. The purpose of that briefing was to go  
16 through the steam generator action plan as it  
17 currently exists. We covered a number of topics,  
18 basically falling in three broad categories,  
19 categories of licensing process, NEI 97-06 and the  
20 DPO. That's sort of a breakdown of it.

21 We devoted a fair amount of time to the  
22 subject of NEI 97-06 and the NRC's process and status  
23 for revising the regulatory framework for steam  
24 generators. Our understanding was that we should come  
25 back and provide more detail, and we thought that this

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1 was a very good request, because as Dr. Ford said, if  
2 there are comments that are going to come from ACRS,  
3 we would like to get them early and factor them in.

4 Basically, the rationale for why we are  
5 doing this, this being revising the regulatory  
6 framework, is that our existing requirements are  
7 prescriptive. They are out of date, and they are  
8 really not focused on the right thing. They are  
9 focused on surveillance.

10 The textbook is on surveillance and repair  
11 criteria. They are not focused on the condition of  
12 the tubing while the plant is operating or what we  
13 refer to as tube integrity.

14 We have been at this for quite some time,  
15 revising the regulatory framework. We worked on  
16 rulemaking in the early to mid-Nineties, and we came  
17 over, I think, a couple of times to brief ACRS on the  
18 rulemaking effort.

19 That was superseded, for reasons that we  
20 explained back then, with a generic letter and  
21 regulatory guide approach. That kind of got off the  
22 ground. We made a fair amount of progress in terms of  
23 getting a generic letter drafted. We got the reg  
24 guide out for public comment.

25 In a fairly similar time frame, the

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1 industry started working on kind of a similar program  
2 which has been named NEI 97-06. It is an industry  
3 initiative. They asked us to put the generic letter  
4 on hold and consider that as an alternative approach,  
5 which we did.

6 We received -- We spent a lot of time  
7 discussing the program and how it would fit into the  
8 framework and what a generic license change package  
9 would consist of. Eventually, after a lot of  
10 discussion, NEI was able to send in a package, which  
11 is on my next Vu-graph, in February 2000.

12 Shortly thereafter, the Indian Point 2  
13 failure occurred, and we were basically sidetracked  
14 for a year. We got the review going in January of  
15 this year, and as I have previously noted, the review  
16 of NEI 97-06 is part of the steam generator action  
17 plan.

18 Through a number of interactions that we  
19 have had with industry, including the workshop we had  
20 earlier this year and some review that we have  
21 explicitly done on the guidelines that are part of the  
22 NEI 97-06 program, we generated some concerns that we  
23 are working on and that, I think, will constitute a  
24 lot of the discussions that are going to follow.

25 The upshot of what we've done is we

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1 basically altered our strategy for how we want to  
2 proceed into basically kind of two time frames, a more  
3 near term approach to get us over these concerns, and  
4 a more long term approach to get us back on track with  
5 a fully performance based approach.

6 I am going to be deliberately vague,  
7 because I think that is going to be explained a lot  
8 more in detail later.

9 Now the presentations to follow: Jim  
10 Riley and, I think, one of his other colleagues is  
11 going to talk about the NEI 97-06 industry initiative.  
12 This is an initiative that is in place in the nuclear  
13 utilities in this country, and we thought that that  
14 would be a good way to set the stage for how our  
15 regulatory framework is going to try to build on top  
16 of that.

17 So we thought it would make sense for NEI  
18 to make a presentation first, and someone from the  
19 staff will follow. We are not exactly sure who at  
20 this moment, but we do have Vu-graphs and a couple of  
21 people ready, willing and able to fill in, if Emmett  
22 isn't here.

23 MR. LUND: Emmett is running late.

24 MR. SULLIVAN: Okay.

25 CHAIRMAN FORD: As you are already up

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1 there, maybe you can give us some idea. It's  
2 disturbing that this has been going on for nigh onto  
3 ten years in one form of the other.

4 MR. SULLIVAN: Yes.

5 CHAIRMAN FORD: So can you give us some  
6 idea as to when this thing might come to an agreed  
7 upon package?

8 MR. SULLIVAN: I'll try. That's a good  
9 lead-in for something that I did want to mention.

10 Because of the Commission meeting that is  
11 coming up on this coming Monday, the staff wanted to  
12 be able to answer that question as best we could. So  
13 our senior managers requested a meeting with NEI,  
14 which occurred yesterday.

15 Basically, the two kind of near term  
16 issues that we have been working on -- One is to  
17 establish maximum inspection intervals in lieu of  
18 going directly to a performance based approach, and  
19 establishing appropriate regulatory controls on those  
20 intervals within the two issues that we have been  
21 discussing most recently.

22 We have reached agreement on the  
23 regulatory controls aspect, and we have reached  
24 agreement on the overall concept of the near term  
25 approach and the longer term approach.

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1           The industry is interested in putting in  
2 place a program that satisfies some of their  
3 objectives and not just make this all one way to  
4 satisfy NRC's objectives. Their objectives are to get  
5 longer inspection intervals for plants, where that can  
6 be justified.

7           They are in the process of resolving a  
8 number of comments that they have generated internally  
9 and that NRC has made on some of the more recent  
10 proposals. They are estimating, based on yesterday's  
11 meeting -- and I'm probably getting ahead, and Jim  
12 Riley would probably address this. But they are  
13 estimating being able to come to complete resolution  
14 on that, including addressing NRC's comments, by the  
15 middle of 2002.

16           We have basically already started writing  
17 a safety evaluation, and I think we can virtually  
18 have the safety evaluation done by that time frame.  
19 That's our intent.

20           So that by the end of 2002, we can have  
21 gone through all the rest of the steps needed, which  
22 include such things as putting the safety evaluation  
23 out for public comment, meeting with the Commission  
24 once we have resolved the public comments, and putting  
25 the safety evaluation out in final form in a

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1 regulatory issue summary, which is a vehicle that NRC  
2 is using these days for this kind of activity.

3 Then what would follow from that generic  
4 activity would be individual submissions by plants of  
5 tech spec revisions. So I hope that answers your  
6 question.

7 CHAIRMAN FORD: So by mid-2002 --

8 MR. SULLIVAN: We should have all the  
9 technical issues resolved.

10 CHAIRMAN FORD: -- Generic Change Package  
11 will be signed and sealed.

12 MR. SULLIVAN: And delivered to us.

13 CHAIRMAN FORD: That opens up the pathway  
14 for individual plants to come and make their  
15 individual cases because of the change in the tech  
16 specs?

17 MR. SULLIVAN: That opens the pathway, but  
18 we have to go through some kind of mandatory steps.  
19 We have to finish our safety evaluation, which we  
20 think will largely be finished by that time, because  
21 we are not going to be operating in a vacuum from each  
22 other.

23 We have to issue that safety evaluation  
24 for public comment. We may have to come back and  
25 brief you one more time. We have to go to CRGR. We

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1 have to resolve the public comments. We have to brief  
2 the Commission, and then we can issue it in final  
3 form. All of that may take an additional four to six  
4 months.

5 CHAIRMAN FORD: By the end of the year of  
6 2002?

7 MR. SULLIVAN: Yes.

8 CHAIRMAN FORD: So as far as the ACRS is  
9 concerned and as far as committee is concerned, all  
10 you are looking from us today is to say, yeah, you've  
11 got the right technical issue. You are arguing and  
12 discussing the various technical issues. Do we see  
13 any further issues?

14 MR. SULLIVAN: Right. Are we on the right  
15 path?

16 CHAIRMAN FORD: And then just go forward  
17 on that.

18 MR. SULLIVAN: I think that would be the  
19 kind of feedback we would like from the full  
20 Committee.

21 CHAIRMAN FORD: Jolly good.

22 MR. SHACK: Ted, just a question. Somehow  
23 in all this, I don't see any mention of severe  
24 accidents. Have those been resolved in some way or  
25 have they just sort of disappeared?

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1 MR. SULLIVAN: Steve might be able to  
2 elaborate, but I think what I would try to say is that  
3 what we are trying to do is put in an approach that  
4 will require -- and not try; we are going to put into  
5 effect an approach that will require licensees to  
6 continue to have NRC approval on any alternate repair  
7 criteria that may affect risk.

8 MR. SHACK: You deal with it when you are  
9 dealing with the alternate repair criteria.

10 MR. SULLIVAN: Right. Do you want to  
11 elaborate, Steve?

12 MR. LONG This is Steve Long with the NRC  
13 staff. Basically, what Ted said -- You will see this  
14 later on when we describe the performance criteria and  
15 how we intend to control the performance criteria  
16 through the tech spec -- this is not really my part,  
17 but the tech spec requirement for a steam generator  
18 program and content of that program being performance  
19 criteria.

20 So that the performance criteria would  
21 need approval from the NRC to change, even though they  
22 are not in the tech specs directly. Those performance  
23 criteria are things that have come from our design  
24 basis regulation so far that we feel are necessary to  
25 control risk, including the risk from severe

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1 accidents.

2 We have had some discussions with the ACRS  
3 before about how that's not a very direct control.  
4 Also, we are not sure exactly what we need to control  
5 to, and there's a lot of work that we have also  
6 described to you about the steam generator research  
7 program, part of which stems from the DPO that you all  
8 reviewed and reported on.

9 As we get research findings that allow us  
10 to know how to allow -- for instance, how much leakage  
11 you can allow in different parts of the RCS and still  
12 be okay during a severe accident, we will be able to  
13 relax some of these performance criteria. But the  
14 intent right now is to be able to maintain control of  
15 the performance criteria that we think are needed to  
16 address severe accidents, insofar as we have them  
17 already at least.

18 MR. SULLIVAN: Okay. I think, if there  
19 are no more questions, it would be appropriate to turn  
20 the microphone over to Jim Riley.

21 MR. RILEY: Good morning. Jim Riley from  
22 the Nuclear Energy Institute.

23 I came with a prepared presentation, but  
24 I, like Ted, found that a lot of the items that you  
25 talked about on your summary were things I was going

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1 to talk about. So I am perfectly willing to focus  
2 this on whatever areas you feel are most beneficial to  
3 you. But here is what I was prepared to talk about.

4 One of the things I do want to get across  
5 to everybody is the extent of the steam generator  
6 organization within the industry and the degree of  
7 commitment that the various utilities, all the  
8 utilities, have to the steam generator -- their steam  
9 generator programs and the steam generator  
10 organization. I think that's an important message.

11 I was going to go through kind of a  
12 history of the regulatory approach. I'm not sure that  
13 is necessary, but stop me, move me around on this as  
14 you wish. I want to give you a little bit of a  
15 background on NEI 97-06. I want to make sure  
16 everybody understands what that document is all about,  
17 what it consists of, and what the industry's  
18 commitment to it is.

19 I'll talk a little about how the program  
20 is continuing to evolve. I do want to talk about the  
21 generic license change package, what's gone on in that  
22 area, and then what we have been doing with the NRC.

23 As Ted indicated, there is another person  
24 here that will be sharing this time with me, although  
25 the way that we would like to do it is to split up our

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1 time so that I'll let Emmett have his say next, and  
2 then Mohamad Behravesh is going to be talking about  
3 the EPRI guideline that governs steam generator  
4 inspection intervals, because that is clearly the  
5 technical issue that is catching the most attention  
6 right now.

7 I think it would make more sense to you  
8 and from a presentation perspective if Emmett first  
9 got into his discussion of what are the issues, and  
10 then we were able to present what we have done in the  
11 way of this guideline in a way that kind of answers  
12 the questions that he raises when he does his  
13 presentation.

14 So that's the way I'd like to do this,  
15 unless there is any objection.

16 CHAIRMAN FORD: Don't feel shy about doing  
17 this, because I personally am new to this, and I would  
18 love to hear what the background is.

19 MR. RILEY: Great, okay. I'll be happy to  
20 then. If I get a little long-winded here --

21 CHAIRMAN FORD: Well, the others will shut  
22 yo up.

23 MR. RILEY: All right. Let me tell you --  
24 This is a little bit of a history lesson, and we are  
25 going to skip over these first slides to some degree,

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1 but I want to go over this.

2 The industry has had a Steam Generator  
3 Management Program in place a long time. This thing  
4 was kicked off in 1976 to take a look at corrosion  
5 that was going on, and an organization that basically  
6 involves all the PWRs in the United States was set up  
7 at that time to look at corrosion concerns and see  
8 what can be done about them.

9 NUMARC entered the fray somewhere along  
10 the line, and since about 1993 has been working with  
11 the Steam Generator Management Project, which is SGMP,  
12 to establish a framework for steam generator  
13 degradation specific management and alternate repair  
14 criteria.

15 NEI, who evolved from NUMARC, entered the  
16 picture in about 1995, and at that time we established  
17 what we call a Steam Generator Working Group and a  
18 number of steam generator task forces, and I will tell  
19 you a little bit about what the differences are there,  
20 to address different issues.

21 So industry's commitment to this and  
22 involvement has been extensive and has been  
23 longstanding.

24 The next -- Approximately the next ten  
25 slides, I'm going to try and summarize, because I

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1 think I'm a little bit short on time, but I'll take  
2 more time if you want on any part of it.

3 This first slide is a rough organization  
4 chart, I guess you could say, of how the industry is  
5 configured to address steam generator issues. There's  
6 really three arms here.

7 One is NEI, and I think everybody is aware  
8 of the fact that NEI is the regulatory interface on  
9 the industry issues. In the case of steam generators,  
10 as I mentioned on the previous slide, we have been  
11 involved for about the last six years or more as NEI,  
12 and before that as NUMARC.

13 EPRI has the technical end of this thing.  
14 EPRI has responsibility for the Steam Generator  
15 Management Project and its organizations and the EPRI  
16 guidelines that provide the detailed guidance on how  
17 NEI 97-06 is going to be implemented.

18 Then finally, we have INPO's involvement  
19 also through a series of steam generator review visits  
20 that they conduct, have been conducting for a number  
21 of years. In fact, I believe now they have visited  
22 all the plants, and they are now starting on their  
23 second go-round. That's accomplished by peer as well  
24 as INPO involvement where they go in and look at the  
25 industries -- at individual utility steam generator

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1 programs and make some evaluations on how well that  
2 program is being conducted.

3 So there's three aspects of this. Let's  
4 talk for a minute about how NEI is set up. NEI's  
5 Nuclear Generation Division has a number of working  
6 groups and task forces within it or associated with  
7 it. As you are probably aware, these working groups  
8 and task forces are all set up with an NEI  
9 coordinator, in my case for steam generators, and  
10 participation by the industry on the groups to form  
11 the real core of the membership.

12 The way the structure is set up with NEI -- and  
13 it isn't even shown on this one, but within the  
14 advisory committees that consist of utility people  
15 within NEI -- it's called the NSIAC. NSIAC stands for  
16 Nuclear Strategic Issues Advisory Committee, and it is  
17 made up of the chief nuclear officers of all the  
18 utilities, nuclear utilities, in the country.

19 They provide kind of strategic direction.  
20 Underneath NSIAC we have a series of working groups on  
21 various issues that raise to this level of importance  
22 within the industry. One of them is a Steam Generator  
23 Working Group. It's been around for quite a few  
24 years.

25 Basically, that group is made up of

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1 executives, managers, highly experienced people from  
2 within the industry who have overall cognizance of  
3 what is taking place in the area of steam generators,  
4 kind of policy, what are we going to do about this  
5 one, and they set the task forces to work to actually  
6 do the job of pulling together whatever effort is  
7 required.

8 The Steam Generator Task Force, a number  
9 of whose members are here today, was set up to look at  
10 this generic license change package, this regulatory  
11 framework, and we have addressed not only that, but we  
12 have also been addressing a series of technical issues  
13 that have come around related to the steam generator  
14 generic license change package over the last couple of  
15 years.

16 So in addition to that, which is the  
17 structure that basically puts this GLCP in process, we  
18 also have a review board set up under NEI. The whole  
19 purpose of that review board -- and its membership is  
20 also pulled from the steam generator organization  
21 industry -- is to answer questions that come up on  
22 these various guideline documents that are out there.

23 It has a pool of experts that addresses  
24 these issues, and then puts an interpretation out  
25 which gets posted on the NEI website, so that the

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1 utilities are aware of what is going on and any  
2 particular question that comes up.

3 That's the NEI organization. The EPRI  
4 organization is -- The SGMP is a pretty large group of  
5 individuals. The SGMP itself is run by a management -  
6 - SGMP management and senior representatives that look  
7 over the SGMP from the standpoint of budget control,  
8 policy, what issues they are going to be working on,  
9 etcetera.

10 Again, the PMMP is a group of fairly  
11 highly placed individuals. Jack Woodward, you  
12 probably know, of Southern Company, a lot of other  
13 vice presidents, etcetera. Again, the intent is let's  
14 keep an eye on how this whole thing is going, where it  
15 is going.

16 Underneath them they have senior  
17 representatives, some overlap there between  
18 membership, and again the same kind of a management  
19 function for steam generators, in particular. The  
20 PMMP, as you note, looks over both the management --  
21 the materials review project, the liability project --  
22 I may get that wrong -- the liability which has vessel  
23 head penetration, cracking and other issues on that  
24 side, as well as the SGMP. The senior reps are pretty  
25 much concentrated on the SGMP.

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1           Within the steam generator end of it, the  
2           major organization is called TAG. It's a Technical  
3           Advisory Group. All of the nuclear utilities who are  
4           members of EPRI are members of this TAG organization.

5           There are meetings, about three meetings  
6           each year of this TAG organization, and typically 80,  
7           90 people, something like that at one of these  
8           meetings, representatives from all these utilities.  
9           They get together for two or three days and share  
10          experiences, and listen to presentations by various  
11          people, myself included, on what happens to be going  
12          on within the steam generator world.

13          The whole idea of that TAG is experience  
14          sharing, technology development for those kinds of  
15          issues that relate to steam generator corrosion  
16          control, steam generator inspections, and things like  
17          that.

18          So this is an extremely good mechanism for  
19          addressing technical issues and for hearing experience  
20          from each other that they can use in their own steam  
21          generator programs to keep themselves as much up to  
22          speed on what's going on as possible.

23          This Technical Advisory Group has a series  
24          of committees set up within it. The committee with  
25          kind of overall responsibility for integrating what is

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1 going on is called the IIG. They have three technical  
2 committees under them that look at the different  
3 aspects of what the steam generator programs are all  
4 about.

5 One of these is the NDE IRG. They are  
6 responsible for NDE issues, technique qualification,  
7 personnel qualification, inspection intervals which is  
8 one of the things we are going to be talking about  
9 this afternoon.

10 They've got a guideline that they have  
11 written specifically to address these issues. It's  
12 called the Steam Generator Examination Guideline.  
13 That's been the center of some of this controversy  
14 and, as I mentioned, Mohamad Behravesch is going to be  
15 talking about that to some degree later.

16 The E & R IRG, as its name implies, does  
17 engineering and regulatory issues. They have three  
18 guidelines underneath them, the in situ pressure test  
19 guidelines which gives us guidance on how to do  
20 pressure testing of tubes, integrity assessment  
21 guidelines which takes the information from the NDE  
22 guys and evaluates it like what's the condition of the  
23 steam generator right now, condition monitoring, what  
24 is it going to be like in order for us to make sure we  
25 can meet the performance criteria at the next

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1 inspection operational assessment. All those things  
2 are in the integrity assessment guidelines.

3 Then finally, and the last one is going to  
4 skip my mind here -- Help me here. What's the third  
5 one? Why am I missing one? Integrity assessment, in  
6 situ -- Okay, there are only two. The other is in  
7 TSS. Thank you.

8 Then the third committee is the Technical  
9 Support Subcommittee, and they do long term research  
10 and various R&D type efforts. They have three  
11 guidelines under them: The primary secondary leak  
12 guideline which talks about what action levels we have  
13 at various levels of primary secondary leakage, and  
14 primary chemistry and secondary chemistry which talk  
15 about chemistry controls.

16 So this organization is basically  
17 responsible for putting together the detailed guidance  
18 of how you run a steam generator program and doing the  
19 work that is necessary to track down the various  
20 technical issues that bubble up from time to time.  
21 They are assigned to one of these committees who are  
22 given responsibility to put something together to  
23 address this thing, come up with an industry position  
24 on them.

25 It's a very active organization. Not only

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1 do they meet three times a year, not only do they  
2 produce these guidelines which, by the way, are looked  
3 at for revision about every other year and, I think,  
4 pretty much have been revised about every other year.  
5 They only put out interim guidance, if necessary, on  
6 various issues that come up.

7 Specifically, about a year or so ago, they  
8 issued two -- Well, one was an interim guidance on in  
9 situ pressure testing that came out of the  
10 pressurization ramp rate issue that was a result of  
11 the ANO situation about a year or two ago. The other  
12 one was a general lessons learned from IP-2 and ANO.

13 That group has continued to be involved in  
14 this pressurization ramp rate study we took which came  
15 out of ANO. We did more work on it, made some  
16 evaluation, tried to decide what this really meant:  
17 WAS there a ramp rate? What was it due to? All that  
18 was falling under the STMP.

19 CHAIRMAN FORD: Jim, quick question.

20 MR. RILEY: Yes?

21 CHAIRMAN FORD: Was there a peer review on  
22 these EPRI documents, guideline documents?

23 MR. RILEY: The way that these guideline  
24 documents are revised is an ad hoc committee is  
25 selected from within the TAG who are given the

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1 responsibility of developing the revision. Then the  
2 revised document is reviewed by the entire TAG.

3 CHAIRMAN FORD: Not outside people?

4 MR. RILEY: Beg pardon?

5 CHAIRMAN FORD: Not outside people?

6 MR. RILEY: I believe there is some amount  
7 of outside involvement in that, too. For example, on  
8 the Rev 6, which we are going to be talking about, the  
9 NRC has had a chance to look at that. The vendors  
10 have had a chance to look at it. The NSSS  
11 organizations have had a chance to look at it. So  
12 it's given a wide review.

13 CHAIRMAN FORD: I'm thinking more of  
14 uninterested parties.

15 MR. RILEY: Well, no, I don't believe  
16 uninterested parties are involved.

17 CHAIRMAN FORD: Yes, you're right.

18 MR. RILEY: No. Then it's approved  
19 through the structure here. The senior reps, the IIG  
20 itself signs off on these documents before they go out  
21 and are used by the industry.

22 MR. SHACK: Jim, while we are on this, we  
23 seem to be focusing on the inspection issues here and  
24 the frequency. There were some other issues that the  
25 staff had beyond the leak rate when you did the

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1 condition monitoring, just how the tubes were selected  
2 for the condition monitoring.

3 Has all that been resolved?

4 MR. RILEY: No, it hasn't been resolved,  
5 but it is being addressed. I can talk about that, if  
6 you would like. In fact, I was kind of thinking we  
7 might get into some of this. So I made some extra  
8 presentation.

9 I think what you might be referring to is  
10 the steam generator action plan. Are you? There were  
11 a bunch of issues that were identified by the steam  
12 generator action plan and, as luck would have it, I've  
13 got some stuff you guys can take a look at, and I can  
14 talk about this for a minute.

15 As you know, about a year ago or so, the  
16 NRC issued their Steam Generator Action Plan. That  
17 was kind of a consolidation of various lessons learned  
18 and other things that came out of the IP-2 event.

19 I think, if I was to categorize the issues  
20 that came out, we could lump them into these kind of  
21 areas: Assessment of degradation mechanisms -- what  
22 do you do about new degradation mechanisms, how do you  
23 assess them, what kind of process do you have to have  
24 in place to assessment? What about hour glass, and  
25 what do you do about those? What are the implications

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1 of all these things?

2 CHAIRMAN FORD: Before you go, just to  
3 make sure we've got our definitions right, to me,  
4 steam generator action plan refers to the NRC. Is it  
5 the same thing we are talking about?

6 MR. RILEY: That is the same thing we are  
7 talking about. A whole number of items were  
8 identified. Twenty-seven of them were shown as things  
9 that the industry was supposed to be doing something  
10 about.

11 You take those 27, and you kind of pigeon-  
12 hole them. These are the pigeon holes we came up  
13 with, and this is nothing new to Ted, of course.  
14 We've been working with Ted and with Emmett and Louise  
15 and others on this. In fact, I think this was  
16 Emmett's characterization of how these things would be  
17 pulled together into bins, if you want to call it  
18 that.

19 Anyway, NDE data quality, NDE  
20 qualification, NDE data analysis for all issues that  
21 were identified as part of the Steam Generator Action  
22 Plan. All of those are being addressed as part of  
23 this Rev 6 work on the steam generator exam  
24 guidelines.

25 We are talking about inspection intervals.

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1 That's kind of what we are focusing on today, but all  
2 these other things are also being looked at on Rev 6,  
3 and Rev 6 has a lot of new information on these other  
4 aspects. Hopefully, a lot of this is going to be  
5 cleared up when we get Rev 6 finally issued.

6 Pressure testing: There were some  
7 questions that came out of the action plan on what do  
8 you do about cases where you've got leakage that  
9 exceeds the test equipment? How do you go about  
10 performing some kind of an analysis to decide whether  
11 you had a burst or whether you didn't have a burst,  
12 and how do you establish the criteria, and all that.

13 That's all being looked at by an in situ  
14 test ad hoc committee. I mentioned earlier, these  
15 committees are set up to revise these guidelines on a  
16 biennial basis. That guideline is up for revision,  
17 and that committee has already been formed, and it is  
18 looking at those particular issues and, hopefully,  
19 will be addressing them and, hopefully, resolving them  
20 as part of the upcoming revision to the in situ  
21 pressure test guidelines.

22 Operational assessment: That gets right  
23 into inspection intervals, of course, and there's  
24 other questions that were involved in the Steam  
25 Generator Action Plan for operational assessment. We

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1 have an Integrity Assessment ad hoc Committee, and  
2 this one is a little bit different. Even though its  
3 name might imply that they are looking at a revision  
4 to the integrity assessment guidelines, their scope is  
5 a little bit broader than that.

6 What they were trying to do is get the NDE  
7 community together and the integrity assessment  
8 community together and come up with better tools for  
9 making those two communities talk to each other and  
10 come up with better results for steam generator  
11 inspections, better operational assessments, etcetera.

12 That committee is also ongoing right now,  
13 and is addressing the operational assessment issues as  
14 part of what they are looking at.

15 Then finally, the other bins that we've  
16 talked about here, tech specs and NEI 97-06 initiative  
17 implementation, feedback NRC, that's all being handled  
18 as part of the Generic License Change Package  
19 basically by the Steam Generator Task Force, the  
20 people that you are seeing in this room.

21 MR. SHACK: I get confused gain about  
22 where NRC reviews, what tier documents, what changes.  
23 Suppose in your operational assessment you wanted to  
24 change the probability of detection. Is that an NRC  
25 reviewable change?

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1 MR. RILEY: No, except for the fact that  
2 the NRC takes a look at your operational assessments  
3 as they see fit based on their inspections of your --  
4 their review of your steam generator inspections.  
5 PODs, etcetera, I believe, come off the ETSS sheets,  
6 do they not, which -- and those sheets, the equipment  
7 -- I'm going to fail on the name. But basically, they  
8 are the sheets that define the capabilities of the  
9 different NDE techniques, and they are controlled by  
10 a QA program within EPRI and the NDE Center that talks  
11 about what are the critical parameters of this  
12 particular NDE technique that you want to use and the  
13 kind of performance you can expect out of them. All  
14 that kind of rolls up into a POD.

15 Now the issue of POD, though, is a good  
16 one, and the industry is also struggling with what do  
17 we do about POD, how do we make it better. That's  
18 part of the Integrity Assessment ad hoc Committee  
19 that's meeting right now, too.

20 If you want some details on it, we can  
21 probably give it to you, because we got the right  
22 people in this room to talk about it. But in general,  
23 that's --

24 MR. SHACK: I was more interested this  
25 time as to whether that was within your bailiwick to

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1 change or they had to review that.

2 MR. RILEY: That's our bailiwick.

3 Okay, regarding the Action Plan issues,  
4 back to these bins, if you will, I mentioned that  
5 there were 27 industry issues that were identified.  
6 We have written up an initial response on all 27 of  
7 those and provided them to the staff. That was done  
8 the early part of the summer.

9 We have gotten comments back on a number  
10 of them, not quite all of them, and we are addressing  
11 revisions to them right now. The revisions to these  
12 are tied up -- When I say tied up, I don't mean to use  
13 it from the sense of being stopped, but they are  
14 wrapped up with the work that is ongoing on cycle  
15 lengths, the work that are ongoing with these various  
16 ad hoc committees.

17 We have reached resolution on, I think,  
18 about three or four of them. The others are active.  
19 They are ongoing, but they are not resolved yet. So  
20 it's part of the continuing effort.

21 One thing you need to keep in mind with  
22 all of this is we are talking about having a target in  
23 mind for completion of the Generic License Change  
24 Package, but it doesn't mean industry is going to quit  
25 working with the NRC at the time the GLCP is done.

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1           The industry has a commitment to continue  
2 working with the NRC on technical issues as they  
3 arise. Some of these have already been identified.  
4 We are already working on them, and we are going to  
5 resolve them. They may not get resolved at the same  
6 time the GLCP is done, but they will continue to be  
7 worked on.

8           The Steam Generator Task Force isn't going  
9 anywhere. It will still be around. It will still  
10 work with the staff, and will continue to address new  
11 issues as they come up. These are the ones that we  
12 have in place right now.

13           CHAIRMAN FORD: So coming from, for  
14 instance, the work that is being done at Argonne or  
15 the work that is being done in the various tasks, one,  
16 two and three, in the action plan within the  
17 NRR/Research, they will just -- There will be a living  
18 document. These guidelines will be living documents.  
19 They will change?

20           MR. RILEY: Definitely living documents,  
21 and they will change as time goes on and new  
22 information is identified. The SGMP has got the  
23 responsibility for keeping those things up to date,  
24 and like I said, they look at them every other year.

25           So I'd like to skip through, because I

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1 really talked about most of these slides up to Slide  
2 14, which provides a summary of what I've said. But  
3 I guess this is the message I want to leave you with  
4 here with respect to the industry steam generator  
5 organizations.

6 It is a highly active, running all the  
7 time organization, and does address issues promptly.  
8 The SGMP, as a matter of fact, had people at TMI  
9 helping with TMI's evaluation of what went on with  
10 their tube sever issue.

11 We've got a TAG meeting that is coming up  
12 in a couple of weeks. We intend to have  
13 presentations. We will have presentations from TMI,  
14 what went on there, just for an example. That's  
15 pretty recent stuff, and we've already got people  
16 involved with it.

17 At this TAG meeting we are going to be  
18 sitting down with the folks who are doing the Rev 6  
19 work. We are going to be talking about what are all  
20 these comments we've gotten from the industry and the  
21 NRC. They have been dispositioned to some point. We  
22 are going to talk more about what the final  
23 disposition of these is.

24 It's a vibrant organization. We have  
25 broad utility participation in this organization from

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1 across the country and EPRI, in general and in the  
2 SMP.

3 We make a particular effort to encompass  
4 all the different steam generator designs within these  
5 different organizations. The IIG, for example, they  
6 make a real effort to make sure they have folks in  
7 there who have an understanding of all the different  
8 steam generator designs. So we got a good, broad  
9 perspective on it.

10 They know about the guidelines and the  
11 policies. They've been talking about them. The peer  
12 reviews: We have that going on through INPO. As  
13 well, NEI 97-06 suggests peer reviews within its own  
14 framework, separate from INPO. That also takes place  
15 within SGMP when people use each other's expertise to  
16 look at aspects of their program, help them get things  
17 set up, help them maybe do a little bit better on this  
18 part or some other part.

19 The organization interfaces to the NRC  
20 through us, and maintains research and improvement  
21 efforts all the time.

22 So that's the issue. Anymore questions on  
23 what the industry is doing here with respect to this?  
24 I want to get into a little now about what is this  
25 regulatory approach all about. How did we get here,

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1 and what does it mean?

2 As you probably know, the original  
3 approach from the regulatory perspective was to put  
4 out a rule. How am I doing on time? Do I need to  
5 hurry this up or am I okay?

6 CHAIRMAN FORD: Was your plan to go from -  
7 - You are currently on this Item 3. Is that right?

8 MR. RILEY: Yes, and I can skip over as  
9 much as this as you want, and we can make it as quick  
10 as you want. You wanted to spend some time on that  
11 one. So I spent more than I was planning to. When do  
12 you want me to be done, though?

13 MR. DUDLEY: In about three minutes.

14 MR. RILEY: Three minutes? All right.  
15 Well, let's not talk about history then.

16 CHAIRMAN FORD: No more history.

17 MR. RILEY: Okay. No more history. Let  
18 me talk a little about 97-06, because it's essential  
19 to this thing. 97-06 is a document that's put out by  
20 NEI. It establishes the framework for a steam  
21 generator program.

22 It's an overall guidance document. It  
23 does not provide the details. The guidelines provide  
24 the details, but NEI 97-06 provides the direction. It  
25 contains a lot of key issues, basically the whole

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1 aspect of what is a steam generator program and what  
2 does it consist of.

3 The next slide already talks about the  
4 guidelines that are included within it. I want to go  
5 into the initiative a little, because it's very  
6 important.

7 Revision 0 of 97-06 was put out in 1997,  
8 I guess, as its name might imply. That was followed  
9 by an NSIAC initiative, and this is really important.  
10 I told you what NSIAC is. When NSIAC decides to look  
11 at what they call a formal initiative, they take a  
12 vote on some policy.

13 Eighty percent of the chief nuclear  
14 officers in this country agree with this policy. That  
15 policy becomes a commitment to all the chief nuclear  
16 officers in the country, and this is the commitment  
17 that was voted on in 1997. It's in italics and in the  
18 box:

19 "Each licensee will evaluate its existing  
20 steam generator program and, where necessary, revise  
21 and strengthen program attributes to meet the intent  
22 of the guidance provided in NEI 97-06, Steam Generator  
23 Program Guidelines, no later than the first refueling  
24 outage starting after January 1, 1999."

25 In fact, 97-06 has been implemented at all

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1 the plants, and it is part of the driving force behind  
2 all this industry involvement that we see and  
3 commitment to working together to make our programs  
4 better.

5 97-06 is also a living document. It's  
6 been revised once, I think you mentioned earlier, in  
7 January of this year. We are working on Rev 2 right  
8 now. The intention of both these revisions is to keep  
9 it up to date with what the industry sees in the way  
10 of a steam generator program, what we discuss with the  
11 NRC, what new issues come up and get resolved.

12 I can move through the rest of these with  
13 almost saying nothing about them. I told you about  
14 TAG. This is just a reemphasis of the fact that we  
15 have a lot of things going on with respect to  
16 communications, that the industry is talking to each  
17 other. People are aware of what is going on at other  
18 plants, and we do so through the TAG organization in  
19 the SGMP.

20 We already know, I think, about the  
21 Generic License Change Package. We are in the middle  
22 of revising it. I will say a little bit about some of  
23 the issues that are going on with it. You know, or  
24 maybe you don't know so I'll take a minute to tell  
25 you, that the License Change Package really is, as its

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1 name implies, everything you need to change your  
2 license to be in compliance with this regulatory  
3 framework we are developing.

4 It includes the regulatory framework. It  
5 includes the steam generator tube integrity tech spec,  
6 which basically says you will maintain steam generator  
7 tube integrity and, if you have reason to believe you  
8 got a problem with it, you got actions to take, and  
9 you got surveillances to perform to verify that indeed  
10 you do have integrity that involve inspecting and  
11 plugging your tubes at certain intervals.

12 It has a bases associated with it, a  
13 fairly detailed one that goes into a lot of  
14 information on what we've done over the last couple of  
15 years with the NRC to pull this thing together to give  
16 people an understanding of where all these  
17 requirements came from.

18 It includes change to the operational  
19 leakage tech spec which you know governs primary,  
20 secondary leakage. In fact, it requires 150 GPD  
21 primary, secondary leakage level, which is a change  
22 from what a lot of folks have in their tech specs  
23 right now, and it reflects what we have discussed with  
24 the NRC and what's in the primary, secondary leak  
25 guideline.

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1           It includes admin tech specs to place  
2 controls on certain key elements of the program. In  
3 fact, the issue of regulatory control of inspection  
4 intervals is going to be resolved through this admin  
5 tech spec. We are looking at how do we change  
6 performance criteria, repair criteria, repair methods  
7 and, in this case, inspection rules going forward.

8           Basically, what this sets up is a means to  
9 do so. The NRC wants to have a part of the approval,  
10 wants to approve these changes if they occur. Once  
11 they have approved them, if they have approved them  
12 generically, others can use them. But it kind of  
13 keeps things under control with respect to these key  
14 elements. That's in the admin tech spec.

15           It also includes significant hazards  
16 evaluation, safety analysis. The intent is that, when  
17 this is approved, it will be clipped. If you are  
18 familiar with the clip process, which basically it  
19 puts something out there for everybody, and other  
20 plants can use it a lot quicker and avoid the whole  
21 license amendment -- avoid the time involved in the  
22 difficult license amendment process.

23           We hope to be able to clip the Generic  
24 License Change Package when it's done, so plants will  
25 be able to implement it relatively quickly.

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1 Real quick here, inspection rules: We are  
2 going to be talking about later, there's two aspects,  
3 as Ted said. There is a regulatory control issue, and  
4 there is a technical issue.

5 I think, with our meeting yesterday, we  
6 are on the same beam with respect to regulatory  
7 controls. Technical issues still need to be worked  
8 out. We are going to talk to you about what we are  
9 doing on inspection intervals. We are working with  
10 the NRC on their comments.

11 So in general, I believe we've got a real  
12 commitment within the industry to perform -- to make  
13 our steam generator performance as good as it possibly  
14 can be. It's living. It's viable. It's continuing,  
15 and we are very proud of it, actually.

16 That's it. Questions?

17 CHAIRMAN FORD: Just to make -- so that I  
18 am sure, as far as being proactive with what we do,  
19 you are saying that -- I'm sure, Ted, you will jump in  
20 and tell me if I'm wrong -- that you are agreed on the  
21 regulatory aspects. Therefore, unless we decide  
22 otherwise, do we just forget about regulatory aspects?  
23 So it's only the technical issues from this point on  
24 that we are interested in, the inspections of those --  
25 these are the things that we are mainly interested

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1 from this point on?

2 MR. SULLIVAN: Yes, and I might note that  
3 the tech specs currently contain controls on  
4 inspection intervals. So we are not inventing  
5 something new here. It's more that we are carrying it  
6 over into the new framework.

7 We weren't initially intending to do that,  
8 but because of the concerns that the staff has with  
9 the performance based approach, we want to carry that  
10 over until we get those issues fully resolved. And  
11 I'll discuss a little bit more, or whoever is going to  
12 give this presentation will discuss a little bit more  
13 some of the flexibility we are trying to build into  
14 this admin tech spec so that we won't have to revise  
15 the tech specs yet one more time to get rid of these  
16 prescriptive maximum inspection intervals. That is  
17 covered later on.

18 CHAIRMAN FORD: I noticed in the timing,  
19 in the majority of the time left we are going to be  
20 hearing primarily NRR's views on these technical  
21 issues. And there's only ten minutes for the NEI to  
22 argue against them. Is this what the wish was? I  
23 mean, so we get a balanced view?

24 MR. DUDLEY: That's really up to you.

25 CHAIRMAN FORD: Well, the question is, has

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1 NEI got the veto in the arguments? I know you guys  
2 have gone through this backwards and forwards quite a  
3 few times. Do you all have the data upon which these  
4 technical issues are being argued backwards and  
5 forwards?

6 MR. RILEY: We have an explanation of the  
7 details of our guidelines on inspection intervals. We  
8 didn't come here with a lot of detailed technical data  
9 on the NRC comments. As a matter of fact, we are  
10 still dispositioning their comments and developing  
11 that technical data right now.

12 CHAIRMAN FORD: That's the things to do in  
13 early next year. Is that right?

14 MR. RILEY: Well, yes. That's the thing  
15 that we believe we want to have this guideline on the  
16 street by the middle of next year, and our intent is  
17 before that time that we will have responded to not  
18 only the NRC comments but also the internal industry  
19 comments.

20 CHAIRMAN FORD: So in your comments and  
21 the NRR comments, we will hear both sides, what they  
22 say and then what you dispute?

23 MR. SULLIVAN: I think so, and I think I  
24 want to just add one thing and see if Jim Riley agrees  
25 with me. When Jim was talking about putting together

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1 the information in the time frame of the first -- you  
2 know, between now and the middle of 2002, that's  
3 information to address staff comments and their own  
4 comments on inspection intervals. But over a longer  
5 time period, I believe industry and the NRC are going  
6 to be working together on other -- on technical issues  
7 associated with the performance based approach, which  
8 are issues that I'm going to touch on in this  
9 presentation somewhat topically.

10 CHAIRMAN FORD: Okay. So if we ask  
11 technical questions, you can both jump in. Yes?

12 MR. SULLIVAN: That's true.

13 CHAIRMAN FORD: Okay, let's roll. Thanks,  
14 Jim.

15 MR. RILEY: Thank you.

16 MR. SULLIVAN: Okay. The fall-back plan  
17 was that I was going to start this presentation. But  
18 since Emmett is here, Emmett, you came in at the  
19 perfect time. Now could you help us understand the  
20 time frame here? Emmett is going for how long before  
21 the break?

22 MR. DUDLEY: Right now, about half an  
23 hour.

24 MR. SULLIVAN: Okay. We are on schedule.

25 CHAIRMAN FORD: Emmett, would you like to

1 -- Would it help you if we took a ten-minute break now  
2 let you regain your breath?

3 MR. MURPHY: To collect my thoughts? I  
4 wouldn't mind.

5 CHAIRMAN FORD: Excellent. Okay.

6 (Whereupon, the foregoing matter went off  
7 the record at 9:29 a.m. and went back on the record at  
8 9:41 a.m.)

9 CHAIRMAN FORD: Emmett, if you would like  
10 to start, we would appreciate it.

11 MR. MURPHY: Okay. Well, thank you.

12 In September we briefed the Subcommittee  
13 on the Steam Generator Change Package, describing some  
14 background, outstanding issues, that kind of thing.  
15 The Subcommittee expressed a desire to be briefed on  
16 additional details of the outstanding issues in the  
17 proposed resolution. So that is why I am here today.

18 I will jump quickly ahead perhaps to the  
19 punchline of all of this, and that is there has been  
20 in recent days and weeks considerable progress toward  
21 reaching some sort of conceptual agreement on a  
22 resolution path for resolving these issues and moving  
23 on with the review of the Generic Change Package.

24 Now just to have for purposes of a  
25 perspective on the revised generic framework that is

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1 being proposed, it's helpful to remember where we are.  
2 I don't think we have talked about this for a couple  
3 of years.

4 Existing requirements are highly  
5 prescriptive. Basically, you are required under  
6 existing tech specs to inspect a specific number of  
7 tubes at specific intervals, and you plug the  
8 defective tubes that you find at a prescribed plugging  
9 limit.

10 Typically, under the tech specs plants are  
11 implementing a 24 calendar month inspection interval.  
12 That can be extended to 40 months, to the extent that  
13 there's not really a whole lot going on in your  
14 generators.

15 MR. KRESS: Why not 48?

16 MR. MURPHY: These numbers date back to  
17 the -- basically, to the mid-Seventies. Their origin,  
18 prescribed origin and basis is obscure, but clearly --  
19 Well, we'll just leave it there.

20 CHAIRMAN FORD: When you say degradation  
21 activity is minimal, is there a metric to do that? I  
22 mean the number of cracks or the depth of cracks?

23 MR. MURPHY: Yes, there is a metric in the  
24 tech specs, precisely how many flaws that would get  
25 you above a threshold beyond which you do more

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1 frequent inspections and more inspections in general.

2 MR. SHACK: What is a guy with the 690  
3 steam generator actually doing at the moment?

4 MR. MURPHY; It varies. Some now are  
5 beginning to implement the 40 months, take advantage  
6 of the 40 months interval allowed in the tech specs.  
7 Historically, there were not many plants ever that  
8 were able to take advantage of that, if for no other  
9 reason, even if corrosion hadn't started yet, you  
10 know, wear problems would --

11 MR. SHACK: Got nailed by something?

12 MR. MURPHY: So it's only been in recent  
13 times that plants are really able to begin to take  
14 advantage of this 40 month interval, and that's, you  
15 know, plant with replacement generators with the more  
16 modern designs that minimize wear problems.

17 MR. SHACK: Now what are they doing with  
18 sample sizes, for example

19 MR. MURPHY: Sample sizes they do in  
20 accordance with the guide -- Well, they meet the tech  
21 specs, of course. That's no problem. The driving  
22 force is what the EPRI guidelines say.

23 MR. SHACK: Okay, right. Right. So they  
24 are all committed to that.

25 MR. MURPHY: Yes. Just one other

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1 observation I think that's important to make is that  
2 tech specs don't speak at all to inspection methods:  
3 Eddy current, how do you do eddy current. There are  
4 code requirements with respect to how you do eddy  
5 current, but the improved inspection performance  
6 through the years has really been driven largely by  
7 technology improvements and improved industry practice  
8 in accordance with industry guidelines.

9 I guess the point I wanted to make here is  
10 that these are prescriptive requirements. Their  
11 origin is obscure. There aren't -- One might ask do  
12 these ensure that you maintain tube integrity. They  
13 don't force you to ask yourself am I inspecting  
14 frequently enough? Are the flaws that I'm finding  
15 during inspection within a comfort zone that I'm  
16 assured that I am maintaining adequate tube integrity?  
17 The existing tech specs don't force you to ask that  
18 question.

19 So one might ask then where are we from a  
20 safety perspective today? The available evidence is  
21 that steam generators are generally operated with  
22 acceptable safety margins, consisting with the  
23 licensing basis.

24 MR. KRESS: What does that mean? What  
25 exactly does that mean?

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1 MR. MURPHY: It means that typically, to  
2 the best of our knowledge, steam generators are  
3 operating while meeting margins of three with respect  
4 to a burst under normal operating pressure.

5 MR. KRESS: Three with respect to --

6 MR. MURPHY: Yes. I mean, you know, we  
7 might see one or two plants a year out of the fleet  
8 that are -- during an inspection we find that they  
9 have challenged that criteria. But in the main,  
10 plants typically do not trip this criteria during  
11 their operation. But, of course, there are  
12 exceptions.

13 We would argue that they appear to be  
14 relatively isolated occurrences. Exceptions include,  
15 but are not limited to, the eight SGTR events that  
16 have occurred. There are other events besides SGTR's  
17 where we don't degrade to the point of failure, burst  
18 during normal operation, but you know, you don't have  
19 the margins you would like to have.

20 A recent example is TMI with the wear  
21 associated with the severance of a plugged tube. The  
22 other example recently was Arkansas Unit 2 where again  
23 they didn't have a tube rupture during normal service,  
24 but they didn't have the margins that -- the margin 3,  
25 for example, at the end of the operating cycle.

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1           So you know, available risk studies  
2 indicate that from an industry-wide perspective the  
3 risk is within acceptable levels. As you know, there  
4 is ongoing work in this area as part of the SG Action  
5 Plan, in part responding to some of the concerns that  
6 ACRS has with respect to risk, steam generator risk.

7           MR. KRESS: Remind me what an acceptable  
8 level is.

9           MR. MURPHY: I'm not sure. I can't give  
10 you the precise numbers, but acceptable levels in  
11 terms of the available estimates on the core melt  
12 frequency and LERF. Both those considerations were  
13 looked at. The best --

14          MR. KRESS: In reg guide 174?

15          MR. MURPHY: Forgive me?

16          MR. KRESS: The values in Reg Guide 1.174?

17          MR. MURPHY: Yes. Yes. The available  
18 risk studies today would indicate that risk from steam  
19 generator related events are not a significant  
20 contributor to core melt risk or LERF.

21          Steve, do you want to add to that?

22          MR. LONG: This is Steve Long with the NRC  
23 staff. I think I understood your question was related  
24 to the slides saying that the risk studies have  
25 indicated that the risk from SG related causes are

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1 within acceptable levels.

2 MR. KRESS: Basically, what?

3 MR. LONG: We've been doing PRAs for  
4 sometime, and steam generator tube rupture since -- It  
5 really wasn't included in WASH 1400, but since then  
6 it's been there. It's been a fairly small contributor  
7 to the core damage frequency, but it's been one of the  
8 major contributors to the off-site consequences.  
9 That's what attracts our attention to it, to try to  
10 make sure that we maintain adequate control of the  
11 tube integrity, because we don't want that number to  
12 go up.

13 We have accepted the numbers we've been  
14 finding. In terms of whether or not we would like to  
15 see changes in them, that usually gets into a backfit  
16 consideration: Is the change worth the cost in terms  
17 of dollars or operational exposure or whatever?

18 As late as NUREG 1570 in the middle of the  
19 1990s, we were looking at what we thought the risk  
20 was, including the severe accident risk and what we  
21 thought some of the changes that the industry was  
22 requesting at the time might mean in terms of severe  
23 accident risk and other risks.

24 I think we continue to conclude that with  
25 the regulatory framework we are trying to enforce now

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1 that the risk is pretty much where we have thought it  
2 was and accepted in the past, which is probability of  
3 core damage that is in the low  
4  $10^{-6}$  range from all the degradation mechanisms, and a  
5 probability of -- The definition of LERF is kind of  
6 hard to deal with -- a combination of core damage with  
7 containment bypass through tube failure. It's in the  
8  $10^{-6}$  range.

9 We've been accepting that all along. So  
10 I guess that is our definition, at least, of something  
11 that is so far acceptable.

12 MR. BONACA: Those are the values we  
13 looked at for the BPR in the NUREG?

14 MR. LONG: Now in 1570 we also looked at  
15 what might be the implications for some things like  
16 allowing steam generator tube leakage during  
17 depressurization transients to go maybe 100 BPM or  
18 higher. We concluded we didn't know enough to say  
19 that that would remain acceptable. We needed to know  
20 more.

21 So we think what we are enforcing now is  
22 acceptable. We are not sure about some of the things  
23 that would be economically beneficial to allow but  
24 maybe not acceptable safety if we allowed them.

25 MR. MURPHY: Thanks, Steve. Okay. safety

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1 record to date reflects two things. One, it does, to  
2 some extent, of course, reflect existing requirements,  
3 and we would argue, in particular, it reflects the  
4 tight requirement on inspection intervals that  
5 currently reside in the tech specs.

6 Arguably, if that's all there was, that  
7 would have been sufficient, that clearly, a very  
8 significant factor in the overall safety record of  
9 steam generators through the years have been industry  
10 initiatives that have been and guidelines embodied in  
11 industry guidelines that have resulted in industry  
12 actions in excess of minimum requirements.

13 These industry practices have resided in  
14 industry guidelines. Some of the more powerful  
15 influences on experience through the years have been  
16 the water chemistry guidelines and SG examination  
17 guidelines. These have had a tremendous influence  
18 through the years in reducing the level of --  
19 minimizing corrosion problems or reducing them to  
20 levels that we experienced early on, and resulting in  
21 the application of more sensitive eddy current  
22 inspection methods toward detecting these problems and  
23 detecting them early.

24 MR. KRESS: What message are we supposed  
25 to get from that, that industry takes it seriously?

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1 MR. MURPHY: The industry takes it  
2 seriously, but I think that one of the things we are  
3 getting to -- where's my previous slide?

4 MR. KRESS: The one just before?

5 MR. MURPHY: What we are going to do --  
6 What has been proposed is to -- We are going to  
7 eliminate current requirements, and essentially we are  
8 going to rely on a framework that is built around  
9 industry guidelines.

10 So then the question is: Is a regulatory  
11 framework built around industry guidelines -- is that  
12 adequate to do the job? to what extent has the safety  
13 record to date been a function of both? Actually, we  
14 think it's been a function of both, and when we move  
15 to the new regulatory framework, we have to keep in  
16 mind what's been helping us out in the past, make sure  
17 that we are adequately covered in that respect.

18 One of the major issues in this respect,  
19 I think, is the 24 month inspection interval. It's  
20 only been just recently the industry issued its tube  
21 integrity assessment guidelines, guidelines allowing  
22 you to predict how much safety margin you have now  
23 based on your inspection results and to predict where  
24 you are going to be at the time of your next  
25 inspection, how much safety margin you are going to

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1 have -- or tube integrity margin you are going to have  
2 then.

3 We think that these guidelines need  
4 further development before they going to be fully  
5 effective. I think the major concerns, not the only  
6 concerns but the major concerns at this point, are the  
7 ability to project, based upon current inspection  
8 results -- the ability to project where you are going  
9 to be tube integrity-wise at the time you do your next  
10 inspection.

11 Okay. So we are on to -- Under the  
12 proposed, industry proposed Generic Change Package, we  
13 are essentially going to delete the existing  
14 prescriptive requirements and replace them with this:  
15 "An SG program shall be established and implemented to  
16 ensure SG tube integrity performance criteria are  
17 maintained."

18 MR. KRESS: Integrity performance criteria  
19 -- Could you spell out what those are?

20 MR. MURPHY: Yes, I'll get -- As a matter  
21 of fact, I'll give you a brief summary of what those  
22 performance criteria look like, but the performance  
23 criteria are identified in the SG Program which is  
24 outside of the tech specs. They are also identified  
25 in NEI 97-06.

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1 MR. KRESS: Are they the same for every  
2 plant?

3 MR. MURPHY: They will be -- In general,  
4 they will be the same for every plant. There is an  
5 admin tech spec that says that, if people want to  
6 implement different performance criteria, they have to  
7 come to NRC for review and approval.

8 The details of the SG Program, of course,  
9 as Ted talked about in September during the earlier  
10 meeting with you -- Details of that program are  
11 outside of tech specs, and these programs will  
12 generally be developed in accordance with the industry  
13 guidelines that we talked about earlier. But the  
14 admin tech spec will require periodic condition  
15 monitoring of the tubing relative to the performance  
16 criteria every time you do an SG inspection. This  
17 requirement, of course, does not specify how  
18 frequently you will be inspecting or how frequently  
19 you will be doing condition monitoring.

20 Basically, this is a performance based  
21 approach. Performance criteria are identified.  
22 Periodically, you are assessing the condition  
23 relative to this performance criteria.

24 The performance criteria we've talked  
25 about in past years with this Subcommittee. Just as a

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1 brief refresher, they include -- Under the heading of  
2 structural criteria, they include maintaining a factor  
3 of three against burst under normal full power  
4 operating conditions. Also includes maintaining a  
5 factor of 1.4 against burst for accident conditions.

6 That's the structural criteria. There's  
7 also an accident induced leakage criteria, which is  
8 applied to the population of tubes. Under this  
9 criteria accident leakage from the population shall  
10 not exceed that assumed in the licensing basis  
11 accident analysis. In addition, it should not exceed  
12 a number such as 1 gpm, which is normally assumed in  
13 the licensing basis, except as approved by NRC.

14 This criteria is intended to ensure that,  
15 even if one is using a number within the licensing  
16 basis, one is not using a number that might have  
17 potential risk implications, that if you are going to  
18 -- If your leakage criteria is going to be 1 gpm, you  
19 need to be risk informed, and that's what this  
20 criteria is about.

21 There are a number of plants out there,  
22 for example, that utilize -- that have done accident  
23 analyses to justify leakage numbers on the order of 15  
24 gpm, 20 gpm, under accident conditions.

25 These numbers are consistent with

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1 maintaining a small fraction of Part 100, those  
2 limits, during a design basis steam line break. But  
3 we also had to -- You know, the staff determined that  
4 provided this leakage was coming from -- that the  
5 calculated leakage was coming exclusively from cracks  
6 at tube support plates, that there shouldn't be any  
7 severe implications.

8 It wouldn't be acceptable, for example, to  
9 have free span cracks leaking at this amount, the  
10 difference being that actual leakage under steam line  
11 break conditions from cracks at the tube support  
12 plates are believed to be substantially less than what  
13 were calculated.

14 CHAIRMAN FORD: Before you move on, do I  
15 understand that these are the criteria that are  
16 currently in the 97-06 Rev 1?

17 MR. MURPHY: That's correct.

18 CHAIRMAN FORD: And you approve of it, and  
19 no problems at all with these?

20 MR. MURPHY: These criteria were arrived  
21 at through a consensus reaching process with industry.  
22 So I guess it would be fair to say we negotiated these  
23 criteria with the industry.

24 CHAIRMAN FORD: So when I see in the  
25 various memoranda a question about the factor of 1.4,

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1 for instance, that as of today is no longer an issue?

2 MR. MURPHY: No. We were recently  
3 informed by NEI that one or two of the NSSS vendors  
4 who were asked to comment had a potential difficulty  
5 with the 1.4 as it applies to differential thermal  
6 stresses, and that they may seek a proposed refinement  
7 or revision to this criteria. Maybe this criteria, in  
8 their mind, needs some clarification.

9 Other than being alerted to the fact that  
10 there's a potential issue here, we have not been --  
11 The industry has not submitted their position, their  
12 revised position, on this point yet.

13 So to the extent that -- You know, we  
14 expect that the industry is going to come at us in a  
15 few weeks and say, look, we have these comments with  
16 respect to that criteria, and this is what we think we  
17 need to do about it.

18 CHAIRMAN FORD: But what is the technical  
19 basis for your approving these criteria, and also the  
20 operation that you speak of, I think, has changed, is  
21 it not, from 500 to 150?

22 MR. MURPHY: Well, as I said, you know, we  
23 -- The criteria, as they exist as of this point, were  
24 believed -- They were developed with the belief that  
25 they were consistent with the existing licensing

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1 basis. For example, we believe that they were  
2 consistent with the safety factors that went into the  
3 development of the 40 percent plugging limit in the  
4 existing tech specs.

5 So the dogma behind the development of the  
6 performance criteria was to try to maintain  
7 consistency with the structural margins and the  
8 leakage margins that we have been maintaining all  
9 along, not to cut back relative to those margins.

10 That was the goal. That was the goal  
11 behind the development of the performance criteria.  
12 Now there's a suggestion out there that perhaps we  
13 didn't quite succeed with respect to all the  
14 applications of the 1.4 safety margin for accidents.

15 It's a little bit early for me to react to  
16 that until I see exactly what kind of position the  
17 industry is developing on this. But this is -- You  
18 know, this was something we arrived at a couple of  
19 years ago, and --

20 CHAIRMAN FORD: I guess I keep coming back  
21 to next week when you make a presentation at the full  
22 Committee of the ACRS. Do I take it that those lists  
23 of things you've got up there -- there's a sound  
24 technical basis for having approved them?

25 MR. MURPHY: Yes, I think they are

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1 conservative. I think there's, you know --

2 CHAIRMAN FORD: So if someone on the full  
3 Committee asks, well, where is your data to justify  
4 that approval, that could be shown?

5 MR. MURPHY: We would certainly be  
6 prepared to discuss the basis for these performance  
7 criteria, and I think the industry concern with  
8 respect to the 1.4 is that, with respect to  
9 differential thermal stresses, the safety factor is  
10 over-conservative, that we need to --

11 CHAIRMAN FORD: I guess we are taking a  
12 lot on faith here. We've really been asked as a group  
13 here to put our signature that, hey, this is okay, and  
14 yet we have seen no evidence that it is okay.

15 MR. BONACA: I have a question on that, if  
16 I may. Accidents that you are talking about, I mean,  
17 what conditions are they assuming to measure against  
18 at a 1.4 factor? Could you put up that slide again?

19 MR. MURPHY: Yes.

20 MR. BONACA: Seems now that number is  
21 supposed to be conservative. What puts that an  
22 accident? I mean, any accident, any over-pressure?

23 MR. MURPHY: Any design basis --  
24 typically, main steam line break is the most limiting  
25 accident when dealing with steam generator tubes, and

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1 typically the main loading that needs to be considered  
2 for that condition is differential pressure that may  
3 exist across the tubes, typically on the order of 2500  
4 psi.

5 For plants such as -- For B&W type  
6 generators, tubes also tend to experience a high  
7 degree of tension with respect to -- you know, during  
8 the cool-down part of the transient. These are  
9 thermally induced stresses.

10 The code requirement for faulty  
11 conditions, of course, were not -- The code equations  
12 or the code limits apply to primary stresses, not to  
13 secondary stresses. There's some question as to what  
14 this 1.4 means with respect to the treatment of axial  
15 stresses in B&W tubes.

16 If one applies this -- It's maintained at  
17 applying this directly to -- To thermal stresses, it's  
18 over-conservative. There needs to be a different  
19 treatment with respect to thermal stresses, and this  
20 is the issue I think the industry wants to take up  
21 with us.

22 MR. SULLIVAN: It might be worth it to tie  
23 this into the ASME code also. We're getting a little  
24 bit of question about the soundness of these criteria.  
25 They originally came from the code.

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1           MR. MURPHY: Yes. There is an assumption  
2       -- There's an assumption in the design rules, Section  
3       3 design rules, that a one-time application of thermal  
4       stress cannot lead to component failure, and that's  
5       fully appropriate for design conditions. But if we  
6       are talking about a long tube with a circ crack under  
7       a significant axial load, a thermally induced axial  
8       load, that may no longer be an appropriate assumption  
9       to make.

10           That is, a large axial load, thermally  
11       induced axial load, could well --

12           CHAIRMAN FORD: What would the likelihood  
13       of there being such a thermally induced axial load be?

14           MR. MURPHY: Oh, it will occur.

15           CHAIRMAN FORD: So, in fact, that is not  
16       necessarily -- If you want to put a probability  
17       against it, that criteria is not absolutely safe. I  
18       don't know how you qualify that, but it could occur.  
19       You could get burst even by maintaining that criteria  
20       of a factor of 1.4.

21           MR. MURPHY: Actually, I think what is  
22       being maintained is -- and we haven't heard the  
23       position yet from the industry, but I think what is  
24       being maintained is that applying this factor to a  
25       different thermal load leads to overconservatism.

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1 CHAIRMAN FORD: I guess that's the nub of  
2 my question. We are being asked to -- or the  
3 Committee will be being asked next week to say, hey,  
4 yeah, we bless this. But you have already said that  
5 that is not an absolute guaranty that you will not get  
6 a catastrophic 360 degree burst.

7 MR. MURPHY: No. I think that --

8 CHAIRMAN FORD: Therefore, what would the  
9 consequence of that be? I need guidance from my  
10 colleagues here. Am I pushing this too much?

11 MR. SHACK; Well, I think the answer you  
12 are looking for is that those factors really come out  
13 of the implied factors that are in the code. Those  
14 are kind of the implied structural integrity factors  
15 that the code has.

16 Now the code didn't really mean to sort of  
17 imply them to defective -- You know, the code assumes  
18 that you didn't have defective structures. So this is  
19 kind of a pseudo ASME limit, but that was really the  
20 intent of the code, was to provide a significant  
21 margin against burst under normal conditions, which is  
22 three, and then under accident conditions, which are  
23 presumably not going to occur nearly as often. They  
24 were willing to back off, and so they came down to the  
25 1.4.

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1                   Now the question is: Typically, the code  
2                   has different allowances for thermal stresses for  
3                   secondary stresses than they do primary stresses,  
4                   simply because a little bit of deformation relieves  
5                   the secondary stress. I guess the question here is  
6                   whether you are going to -- They are nominally  
7                   treating this differential thermal expansion now as a  
8                   primary stress when you apply the 1.4, I guess, is the  
9                   argument that you are getting.

10                   MR. MURPHY: Yes.

11                   MR. SHACK: Whether that's appropriate or  
12                   not.

13                   CHAIRMAN FORD: But for an non-defective  
14                   tube, you said.

15                   MR. SHACK; Even for a defective tube, you  
16                   know, the -- I would argue that the three and the 1.4  
17                   come from code limits. Now the discussion as to  
18                   whether this applies to the differential thermal  
19                   stress sort of has to come back to a discussion of  
20                   whether you think in this particular case the  
21                   differential thermal stresses are acting like  
22                   secondary stresses or they are acting like primary  
23                   stresses.

24                   You know, we normally think of thermal  
25                   stresses as being secondary stresses, but sometimes

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1       there is a -- they act a whole lot like primary  
2       stresses, and sometimes they don't. So that's  
3       presumably the discussion that comes in as to whether  
4       you maintain this on the differential thermal stresses  
5       or not. But the factors of the three and the 1.4 are  
6       essentially derived from the code.

7               CHAIRMAN FORD: What I would suggest is,  
8       rather than belabor this and take up all the time,  
9       bearing in mind that we will be talking next week  
10      about this whole thing in a condensed fashion, you may  
11      well be asked a question, what is your technical basis  
12      for making this approval, and the ASME code were  
13      based, I understand, on undefected tubes. So --

14             MR. MURPHY: Let me just give you this  
15      answer. I think it's the same answer I'll give next  
16      week. These limits were intended to be consistent not  
17      just with the licensing basis as well as the original  
18      design basis of the tubes in Section 3 of the code.  
19      The margin criteria here were derived from the Section  
20      3 stress limits, even though the stress limits are  
21      developed -- are to be used for design space, and we  
22      are applying these to an operational situation where  
23      the components have cracks.

24             I think the way these criteria presently  
25      read -- The performance criteria, I think that they

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1 represent a conservative set of criteria with respect  
2 to accident situations. I think what we are going to  
3 hear from the industry in the future is that they are  
4 over-conservative with respect to how one ought to be  
5 treating thermal stresses and that maybe the 1.4 will  
6 continue to be applied to primary stresses in the  
7 tubing, that perhaps we need to do something --  
8 consider the differential thermal stresses in a little  
9 bit different way, not applying this factor of 1.4.

10 CHAIRMAN FORD: Well, I think there's been  
11 some tests done, have there not been, on burst  
12 pressures for defective tubes? Can you not use that  
13 data as support for this contention, and also to  
14 support industry if that is going to be their argument  
15 that these original curbs are overconservative? I'm  
16 trying to help you in terms of convincing an  
17 independent review body.

18 MR. MURPHY: Well, I think there's a lot  
19 of test data with respect to the burst strength of  
20 tubing and how it varies with the size of the flaws  
21 and the orientation of flaws in the tubing. There's  
22 certainly a lot of data there.

23 I think the available body of evidence is  
24 that the sort of safety margins that we are talking  
25 about, the factor of three and the factor of 1.4, are

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1 generally sufficient safety margins that through the  
2 years have been successful in minimizing any safety or  
3 risk implications with the actual condition of the  
4 generators.

5 So that the safety margins appear to be  
6 sufficient based on experience. The goal is being  
7 consistent with the code. Yes?

8 MR. LONG: Can I add one other thought.  
9 This is Steve Long with the NRC staff again.

10 You had asked earlier in the presentations  
11 about severe accident issues. One of the things that  
12 we are counting on to maintain the tube integrity  
13 during severe accidents are these margins.

14 So when we think about the adequacy of the  
15 margins, we need to think about them with regard to  
16 all the challenges that relate to the risk equations,  
17 and some of those are higher than normal operating  
18 temperature and various delta P's.

19 So when you get into whether or not this  
20 is overly conservative or maybe not quite conservative  
21 enough for some reactor designs which get to fairly  
22 high temperatures in the tubes during severe  
23 accidents, we are not quite sure yet.

24 For some of the designs it looks like  
25 we've got enough margin here. Maybe for some we don't

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1 quite have enough margin at three times normal  
2 operating pressure as the strength requirement for  
3 normal operating temperatures.

4 So it's a little more debatable than it  
5 would sound when you just stuck to the design basis  
6 conditions. We are still doing research to try to  
7 nail it down a little bit better.

8 CHAIRMAN FORD: Recognize where I'm coming  
9 from. I'm coming from an ACRS member that's been  
10 asked to stamp your conclusions, not having seen the  
11 detailed technical case you have made for making those  
12 conclusions. I don't doubt you have a good argument,  
13 but this makes you feel good to see some data that  
14 backs up -- as a back-up. Have a back-up slide next  
15 week to show that, hey, you've thought about this.

16 MR. BONACA: I have just one last question  
17 I want to ask about this. The guidelines -- They  
18 consider the possibility that you have -- during the  
19 cycle. Okay, not necessarily a similar break. But  
20 you have cool-downs and heat-ups.

21 MR. MURPHY; Yes.

22 MR. BONACA: And they will place some  
23 stress on the tubes, and will it affect the  
24 temperature in some way? I mean, there are  
25 considerations of that in the guideline?

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1 MR. MURPHY: Well, of course, the design  
2 rules in Section 3 consider that. You have the  
3 different service level stress limits. In fact, years  
4 ago when discussing with the industry what the  
5 performance criteria should look like, we had proposed  
6 that there should be different safety factors,  
7 dependent upon whether we were talking about service  
8 level A, B, C type loadings.

9 The industry maintained that that would be  
10 going beyond the existing licensing basis, that if one  
11 looks at the 40 percent plugging limit, and if one  
12 looks at the factors of safety that are implicit in  
13 the 40 percent plugging limit, that while those  
14 factors of safety -- while you are maintaining a  
15 factor of safety of three with respect to operation at  
16 normal full power steady state operation, that in fact  
17 during a heat-up, cool-down or other operational  
18 transient, you might actually have less than a factor  
19 of three.

20 Apart from the performance criteria  
21 themselves in NEI 97-06, the guidelines -- the  
22 industry guidelines go into additional detail about  
23 how licensees should assess structural integrity. it  
24 talks about consideration of these other operational  
25 transients, making sure, for example, that you don't

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1 exceed the no yield criterion.

2 You know, you need to -- These are -- and  
3 I guess one might say, to some extent, these criteria  
4 that I presented on the previous slide are sort of the  
5 criteria that the guidelines do contain additional  
6 details about the kinds of evaluations people should  
7 do to assess structural and leakage integrity.

8 CHAIRMAN FORD: Emmett, I noticed you've  
9 skipped one slide. Would you mind going back to the  
10 steam generator program, a request, actually. I  
11 understood from Jim's earlier comment that the second  
12 bullet that makes reference to detailed EPRI  
13 guidelines.

14 Could I suggest that maybe you have a sub-  
15 bullet in there making note of the fact that they  
16 agree that these are living documents. I'm aware that  
17 -- environmental degradation in the whole light water  
18 reactor business. We are forever learning, and new  
19 data will come along, and those EPRI guidelines are a  
20 living document.

21 MR. MURPHY: All right.

22 CHAIRMAN FORD: It would be worthwhile  
23 pointing this out, because if you come back to this  
24 thing in ten years' time, there could be --

25 MR. MURPHY: All right. Point taken. in

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1 fact, I was going to get into that a little bit later.

2 CHAIRMAN FORD: Oh, okay. Fine.

3 MR. MURPHY; But at this point, obviously,  
4 I am going to be reconstructing this presentation as  
5 I go along.

6 CHAIRMAN FORD: That would have been  
7 helpful there. That's the first thing I want to say.

8 MR. MURPHY: Here it is. Okay. So we are  
9 going to have an admin tech spec that says you are  
10 going to implement a program to ensure that the  
11 performance criteria maintained, and you are going to  
12 periodically condition monitor the tubing to ensure  
13 the fact that you are meeting the performance  
14 criteria.

15 This is really an embodiment, in our mind,  
16 of criterion 16 of 10 CFR 50, Appendix B, namely,  
17 which specifies that measures shall be established to  
18 ensure that conditions adverse to quality are promptly  
19 detected and corrected.

20 Condition monitoring programs must be  
21 capable of meeting this requirement. They've got to  
22 be able -- Condition monitoring programs have to be  
23 able to promptly detect the condition of the tubing  
24 which was not meeting performance criteria.

25 Performance criteria, of course, should

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1 represent tolerable conditions, if one is in a  
2 performance based -- implementing a performance based  
3 strategy, and that is -- we hold that that is true  
4 also for the performance criteria that are part of  
5 this Generic Change Package. But this is all premised  
6 on the fact that, if you do exceed these performance  
7 criteria, that that kind of condition is promptly  
8 detected.

9 To the extent that you continue to eat  
10 away at your safety margins after you have exceeded  
11 the performance criteria, at some point, you know, you  
12 are getting into a difficulty from the safety  
13 perspective. So it's critical that condition  
14 monitoring be capable of promptly detecting such  
15 conditions.

16 So the question for us, the staff, as we  
17 look at the Generic change Package is: Is there  
18 enough here, not just with respect to the admin tech  
19 specs but with respect to the industry guidelines,  
20 that give us assurance that the programs, the SG  
21 programs the utilities will be implementing will be  
22 able to promptly detect and correct such conditions.

23 I would like to move on to slide 11  
24 briefly.

25 (Slide change.)

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1 MR. MURPHY: The current version of the  
2 EPRI guidelines with respect to examination  
3 requirements is Rev 5, which was issued in 1997. They  
4 provide for two different approaches, potential  
5 approaches, for determining the appropriate cycle  
6 length.

7 One is a prescriptive approach, which is  
8 not all that different from what we have today under  
9 existing requirements. In general, you inspect every  
10 fuel cycle unless you've had minimal problems, in  
11 which case you can go for two cycles.

12 There is also conceptually in Rev 5 a  
13 performance based approach that says that you can use  
14 operational assessment to look ahead and determine how  
15 long you can operate the steam generators before you  
16 predict that you would exceed the performance  
17 criteria, and then you would set your inspection  
18 interval on that basis, but the inspection interval  
19 could not exceed two fuel cycles.

20 So that is the current version of the  
21 industry guidelines, and in that respect they are not  
22 too different from where we are today with existing  
23 requirements.

24 I'm going to skip the next few slides.

25 CHAIRMAN FORD: Just to -- I'm trying to

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1 tie it in with what Jim was saying. He said that this  
2 essentially -- What you say here is essentially not  
3 the 97-06, and Jim said 97-06 is already applied. Is  
4 that correct?

5 MR. MURPHY: NEI 97-06 is already being  
6 implemented by utilities. Utilities are also -- As  
7 part of that effort, even before NEI 97-06, utilities  
8 have been implementing these examination guidelines,  
9 and since '97, of course, they have been implementing  
10 Revision 5 of the examination guidelines.

11 CHAIRMAN FORD: And they are not going  
12 against the original regulatory prescriptive formulas?

13 MR. MURPHY: Correct. That is correct.  
14 And so they are subject to the criteria of the  
15 guidelines. In addition, they are subject to  
16 regulatory requirements. Where we're going with this  
17 presentation is industry basically wants to move from  
18 Revision 5 to Revision 6 of the guidelines. That is  
19 going to allow for longer operating intervals. Okay?

20 So to get there, industry needs this  
21 revised regulatory framework, because right now they  
22 are constrained by the regulatory requirement for 24  
23 month to a 40 month inspection interval, and they need  
24 -- they would like to dispense with that.

25 With respect to the ability of condition

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1 monitoring to fulfill its Appendix B obligation, there  
2 are a number of guidelines that are relevant to that  
3 capability. One of them is the examination  
4 guidelines, of course.

5 Also the tube integrity assessment  
6 guidelines which give guidelines for doing operational  
7 assessments, guidelines for doing condition monitoring  
8 assessments are relevant. Also industry guidelines  
9 with respect to in situ pressure testing, which is a  
10 component of condition monitoring, are relevant to the  
11 capability of condition monitoring to fulfill its  
12 Appendix B obligation.

13 (Slide change.)

14 MR. MURPHY: I'm at Slide 15.

15 CHAIRMAN FORD: Just to make sure that I'm  
16 calibrated. So far we haven't heard anything -- You  
17 haven't touched on any of the technical issues that  
18 currently exist. Is that correct?

19 MR. MURPHY: That's correct. It had not  
20 initially been our intent to formally review or to  
21 endorse the sub-tier detailed EPRI guideline documents  
22 such as the examination guidelines, the tube integrity  
23 assessment guidelines, that kind of thing.

24 It had been our expectation that the  
25 guidelines would be sufficiently well developed to

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1 lead to improved tube integrity performance within the  
2 context of the new regulatory framework being  
3 proposed. We knew that there were going to be issues,  
4 outstanding issues, with respect to the guidelines,  
5 but these issues were issues that have existed all  
6 along. These are not issues introduced by the new  
7 framework and issues that are not unique to the  
8 revised framework.

9 It was our expectation -- I think this  
10 responds to one of the questions earlier -- that the  
11 guidelines would continue to evolve over time. They  
12 are living documents in response to identified issues,  
13 technology changes, lessons learned from operating  
14 experience, and the results of industry and NRC  
15 studies, such as the NRC SG round robin study, the  
16 action plan including the work that's being done to  
17 address some of the ACRS comments with respect to the  
18 DPO.

19 Findings from all of these activities will  
20 influence the future course of these guidelines over  
21 time. There's no question about that.

22 MR. SHACK: Have you formally reviewed  
23 your Revs 3, 4, 5 with respect to inspection  
24 guidelines?

25 MR. MURPHY: We never formally reviewed

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1 the guidelines. We always read the guidelines, tried  
2 to know what's in there, but they were never submitted  
3 for our formal review and approval, and we have never  
4 gone through a formal process like that with respect  
5 to the guidelines.

6 MR. SHACK: But an inspector sort of  
7 accepts them as an acceptable Appendix B approach to  
8 quality assurance for the examination? Is that your  
9 regulatory tool for looking at these procedures?

10 MR. MURPHY: In general, in today's  
11 regulatory -- under today's regulatory requirements,  
12 the plants are not inspected relative to the  
13 guidelines. Their adherence to the guidelines is an  
14 industry initiative.

15 Now in a case such as Indian Point where  
16 it became clear that past inspections leading up to  
17 the failure at Indian Point were not as effective as  
18 we would like to have been, we certainly looked at  
19 utility actions with respect to industry guidelines  
20 prevailing at the time the last inspections were  
21 performed.

22 If one is making judgments about the  
23 reasonableness of licensee actions at any point time  
24 in time, you know, questions of how well they are  
25 adhering to available guidance may be relevant in that

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1 context.

2 Okay. We knew there were going to be  
3 issues with respect to the guidelines.

4 MR. BONACA: Could I ask just one thing?  
5 I know we already talked about Slide 8, and I want to  
6 go back to the criteria. As I reflect on this,  
7 clearly, a much higher burden is being placed on the  
8 criteria than ever before. Before you had intervals  
9 that were based on the prescriptive.

10 There was some relationship between, for  
11 example, the first criteria and the interval, but it  
12 really wasn't so tied together; because you had  
13 prescriptive intervals by which you were inspecting  
14 the plant.

15 Now you are performance based. Really, it  
16 seems to me that they are going to set the intervals,  
17 testing, inspection frequency based on these criteria.  
18 So I think it is very important for next week that we  
19 get a real understanding about the adequacy of the  
20 criteria -- So why do you feel they are acceptable? -  
21 - and adequacy of what you have to do to measure that  
22 to the criteria.

23 What I've seen for the past three or four  
24 slides is that they clearly will be able to set their  
25 pace for inspections based on some way in which they

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1 measure that they in fact exceed the 1.4 burst  
2 pressure for transients or -- There is a lot of burden  
3 placed on this criteria now. Formerly, there wasn't.

4 You know, I never thought of this criteria  
5 as a burden on them. I never felt that way, because  
6 they were like, yeah, the code says that. But really,  
7 you do the inspection at a given time, and that's all  
8 that's important.

9 Now everything is going to depend on these  
10 criteria. So how credible are they as criteria, and  
11 I'm sure they are, and what ways do they propose to  
12 measure to those criteria? Are they acceptable ways  
13 to measure or are we going to have other stuff coming  
14 to us without an understanding?

15 MR. RILEY: Can I say something to that?  
16 This is Jim Riley from NEI.

17 Maybe this might clarify it a little bit,  
18 and Mohamad is going to provide a lot more detail.  
19 Our guidelines have two ways of establishing the  
20 inspection rules. One is a prescriptive based method,  
21 and the second is performance based.

22 What we are discussing as part of the  
23 Generic License Change Package right now, and what the  
24 NRC has comments on are prescriptive based inspection  
25 intervals which do specify intervals. They are a

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1 little longer than what is currently in there, but  
2 they are still defined intervals. It's a function of  
3 the steam generator tubing materials.

4 They have to be supported at the same time  
5 by an operational assessment. So they lay out the  
6 specific lengths of time, but you have to be able to  
7 show by an OA that indeed you can make those -- that  
8 length of time.

9 Rev. 6 also includes a performance based  
10 inspection interval, which is along the lines of what  
11 you are discussing now. The length is purely  
12 determined by how good you can do at predicting where  
13 you will be at one time with respect to the  
14 performance criteria.

15 The initial version of the Generic License  
16 Change Package will not be adopting those performance  
17 based intervals. It will be the prescriptive based  
18 intervals that we are focusing on. We do want to use  
19 those performance based, but we recognize we have more  
20 work to do in terms of developing the justification  
21 with the NRC.

22 MR. BONACA: I appreciate you are doing it  
23 in a step-wise way, but since you are going in that  
24 direction, try to answer and focus the question next  
25 week. You know, a lot of burden is placed on these

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1 criteria, and it is going to be. All right.

2 MR. MURPHY: Okay.

3 MR. SHACK; Just a moment. You know, one  
4 of the things that's always puzzled me is that you  
5 guys have been doing these operational assessments,  
6 monitorings now for umpty-ump years, and we never see  
7 comparisons of how well you are doing. If you  
8 condition monitoring said that, you know, the largest  
9 crack was going to be something or other, your  
10 condition monitoring said --

11 MR. MURPHY: Well, Bill, actually, on one  
12 of the next few slides here, that very point is made.  
13 That is one of the issues that we have identified as  
14 being something where -- one area where the guidelines  
15 can be improved, a better benchmarking of operational  
16 assessment relative to what you actually find later on  
17 in revising -- you know, the feedback loop, and  
18 refining the models based on experience.

19 I was going to get into a lot of details  
20 of the issues that currently reside in the guidelines.  
21 Suffice it to say for purposes of this morning's  
22 discussion that we believe that there are a lot of  
23 areas where the guidelines can be improved and be made  
24 more effective. And I would just like to leave it at  
25 that and move on.

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1 CHAIRMAN FORD: When you say the  
2 guidelines, these are the ones that you are going to  
3 talk about? Okay. Since there are issues, I'm not  
4 too sure what order you should go. After you give  
5 your talk, Emmett, will you give a presentation on  
6 your issues of this Rev. 6?

7 MR. MURPHY: I was going to push on to --  
8 What was proposing to do now was to not get into a  
9 discussion as planned on issues relating to the  
10 guidelines that were more general than the Rev. 6  
11 issues.

12 I would rather at this point just move on  
13 to Rev. 6, and simply point out that, quite apart from  
14 Rev. 6, there are a number of issues that exist with  
15 respect to the industry guidelines that we need to  
16 work through the years in firming up, making it  
17 better and more effective.

18 (Slide change)

19 MR. MURPHY: During an NRC sponsored  
20 senior workshop in February of 2001, industry  
21 representatives made a presentation on work being done  
22 to prepare a Rev. 6 of the steam generator examination  
23 guidelines, and they caught our attention with their  
24 plans for revising the inspection criteria for the  
25 steam generator, particularly with respect to steam

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1 generators with Alloy 600 thermally treated and 690  
2 thermally treated tubing, primarily the tubing in  
3 replacement generators, that they anticipated  
4 substantially longer inspection intervals than what  
5 exist either in current regulatory requirements or in  
6 Rev. 5 of the guidelines.

7 At the time of the February meeting, the  
8 prescriptive criteria they were proposing would have  
9 provided for inspection intervals on the order of five  
10 to six effective full power years with respect to  
11 Alloy 600 thermally treated tubing and six to seven  
12 effective full power years for 690 tubing.

13 There's been considerable interaction of  
14 the NRC with the industry over the intervening time.  
15 More recently, the industry has revised this  
16 proposal, and now would include a two-cycle limitation  
17 with respect to inspection intervals for 600 thermally  
18 treated tubing and a three-cycle limitation, fuel  
19 cycle limitation, with respect to 690 tubing.

20 (Slide change)

21 MR. BONACA: How do you go to from five to  
22 six or six/seven to two or three. Seems such a  
23 disparity of opinion.

24 MR. MURPHY: Well, you know, this bears  
25 mentioning. A fuel cycle in this country generally

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1 ranges anywhere -- depends on the plant -- from 12  
2 effective full power months to 22 effective full power  
3 months.

4 So maybe 18 is -- One might say 18 is  
5 typical. So a two-cycle limitation for the 600  
6 thermally treated tubing is quite a bit less than the  
7 five to six effective full power years we're talking  
8 about here.

9 CHAIRMAN FORD: Now this is what you will  
10 be talking about, the arguments for these?

11 MR. BEHRAVESH; Yes.

12 MR. MURPHY: And when will you be doing  
13 that, Mohamad?

14 CHAIRMAN FORD: After you.

15 MR. MURPHY: That's right. This is your -  
16 - Okay, I understand.

17 Okay. Under the performance based  
18 approach, the Rev. 6 would have dispensed with the  
19 two-cycle limitation and, basically, the inspection  
20 intervals could be as long as whatever could be  
21 supported with an operational assessment or  
22 degradation assessment.

23 Just based upon curves that are applicable  
24 to the anticipation of corrosion mechanisms, we were  
25 talking about inspection intervals potentially ranging

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1 up to 20 years or so, assuming that something like  
2 wear wasn't a more imminent concern.

3 So, clearly, here at this point, what we  
4 saw was that there were going to be future changes to  
5 the guidelines where there were going to be  
6 potentially substantially longer inspection intervals  
7 than we had contemplated up to that point. Then the  
8 question for us was is there sufficient guidance  
9 available to the industry to ensure that condition  
10 monitoring will take place frequently enough to  
11 promptly alert us to situations where we don't meet  
12 the performance criteria.

13 CHAIRMAN FORD: I'm a little bit confused  
14 by these two, both 20 and 21. Do I understand it,  
15 Rev. 6, there are two criteria, a prescriptive  
16 criteria and a performance based criteria?

17 MR. MURPHY: There are two different  
18 strategies, yes, for determining --

19 CHAIRMAN FORD: And you get your choice,  
20 or what?

21 MR. MURPHY: Yes. Well, I think what the  
22 industry had envisioned as they were developing these  
23 guidelines was that, you know, we are moving to a  
24 performance based regulatory framework, and that the  
25 implementation details in the guidelines ultimately

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1 should be performance based as well. I think that was  
2 the thinking.

3 Now they did have prescriptive criteria  
4 available, and you would still have to do condition  
5 monitoring and operational assessments to demonstrate  
6 that those prescriptive intervals were consistent with  
7 meeting the performance criteria. You would still  
8 have that obligation, but the performance based  
9 approach allowed you to actually set the inspection  
10 intervals consistent with -- to make it as long as you  
11 could, consistent with meeting the performance  
12 criteria.

13 CHAIRMAN FORD: And you will going through  
14 the realism as to why you would choose one over the  
15 other?

16 MR. BEHRAVESH: Yes.

17 CHAIRMAN FORD: And it will be plant  
18 specific?

19 MR. BEHRAVESH: Mohamad Behraves, EPRI.  
20 I will be touching on all of these, realizing that all  
21 of that will be done within the time span of ten  
22 minutes.

23 CHAIRMAN FORD: Okay.

24 MR. SHACK: Let me be clear now. Are the  
25 prescriptive criteria an option or they are a cap on

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1 the performance assessment?

2 MR. MURPHY: No, they are not a cap. The  
3 way the guidelines are written, utilities have a  
4 choice.

5 MR. SHACK: Oh, they have a choice.

6 MR. MURPHY: They can implement the  
7 prescriptive criteria or the performance based  
8 criteria.

9 MR. BONACA: When you talked about  
10 possibly ranging to 22 effective full power years --  
11 well, maybe you will be talking about that. So I'll  
12 withdraw my question and wait.

13 (Slide change.)

14 MR. MURPHY; Okay. Our concerns with  
15 respect to what is being proposed for Rev. 6: We  
16 believe that appropriate inspection/condition  
17 monitoring intervals are critical to ensuring the  
18 prompt detection of conditions not meeting performance  
19 criteria.

20 We are concerned that certain of the  
21 guidelines, the tube integrity assessment guidelines,  
22 aspects of the in situ test guidelines, and the  
23 examination guidelines, are not sufficiently well  
24 developed to support inspection intervals  
25 significantly longer than what is being implemented

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1 under current requirements or other acceptable  
2 alternatives, which I'll be talking about.

3 Further, industry may -- You know, the industry  
4 proposal in February kind of revealed a vulnerability  
5 we had of our regulatory framework -- of the proposed  
6 regulatory framework, namely, even if we reach  
7 agreement on what the guidelines say, industry may  
8 revise the guidelines down the road, and we are not  
9 going to review an approval loop on that.

10 Further, licensees themselves may not  
11 follow the guidelines. They may deviate from those  
12 guidelines. They can do that.

13 We need to be assured that the regulatory  
14 framework -- We need to be assured that condition  
15 monitoring will be capable of fulfilling its Appendix  
16 B obligation. Got to be able to promptly detect  
17 conditions that are not meeting the performance  
18 criteria, and we've got to be assured that that's the  
19 situation.

20 (Slide change.)

21 MR. MURPHY: Okay. I've talked about the  
22 fact that we have numerous issues relating to the  
23 guidelines that affect the tube integrity assessments.  
24 Further, we believe that the guidelines for  
25 operational assessment of active degradation

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1 mechanisms are not sufficiently developed to be used  
2 as a tool for directly determining acceptable  
3 inspection interval extensions.

4 Further, degradation assessment guidelines  
5 and the technical bases for these guidelines have not  
6 been developed for ensuring that the initial  
7 occurrence of new degradation mechanisms will not  
8 cause performance criteria to be exceeded.

9 Historically, degradation assessments have  
10 not really been -- People haven't been doing  
11 degradation assessments in this way. It is assumed --  
12 The current regulatory basis -- The current  
13 requirements, prescriptive requirements, assume that,  
14 if we have a new degradation mechanism, that the  
15 prescribed inspection interval will ensure a timely  
16 detection of that new mechanism, and it will be  
17 maintaining the appropriate margins.

18 If plants are to operate for many years  
19 between inspections, we now have to reckon with the  
20 potential that there may be a degradation mechanism  
21 about to initiate and to progress, and there will need  
22 to be some ability to determine when such degradation  
23 mechanisms might occur and over what period of time  
24 that might begin to challenge the performance  
25 criteria.

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1 Right now, the guidelines do not contain  
2 a lot of detail about how to do this, and there's not  
3 much in the way of a technical basis for what guidance  
4 is there at the present time.

5 Finally, the draft inspection interval  
6 strategies for Rev 6 of the examination guidelines are  
7 being -- they are still being finalized. They are  
8 still dealing with industry comments as well as NRC  
9 comments. They have lacked critical details, and the  
10 technical justification has not been provided to NRC  
11 staff.

12 MR. BONACA: When you say operational  
13 assessment and you are talking about condition  
14 monitoring inspections, tell me the difference. I  
15 mean, what is included in an operational assessment?

16 MR. MURPHY: An operational assessment is  
17 a forward look which, based upon what you know about  
18 the condition of the generators today and what you  
19 believe the corrosion rates are or the flaw growth  
20 rates are, where do you anticipate you will be  
21 relative to the performance criteria at the end of  
22 your inspection interval?

23 Condition monitoring is looking backwards:  
24 Did I -- Based upon the inspection results, did I  
25 succeed over the last cycle in maintaining adequate

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1 margin?

2 Both of these assessments are dealing  
3 with known mechanisms, active mechanisms. You project  
4 where you are going to be in an operational assessment  
5 with the degradation mechanisms that you know are  
6 taking place, and you don't account in an operational  
7 assessment for degradation mechanisms you haven't seen  
8 yet.

9 MR. BONACA: I was reflecting. On page 21  
10 where you have the 22 effective full power years, and  
11 now we are talking about operational assessment.  
12 Okay, we'll talk about it later.

13 (Slide change.)

14 MR. MURPHY: Okay. Staff has interacted  
15 extensively with the industry and proposed a  
16 resolution path. We believe that predictive  
17 methodologies for managing known degradation  
18 mechanisms and for anticipating the occurrence of new  
19 mechanisms need to be strengthened to support  
20 implementation of inspection intervals significantly  
21 exceeding current requirements or acceptable  
22 alternatives.

23 We plan to work with the industry in  
24 identifying the needed improvements to the guidelines.  
25 In the meantime, inspection intervals -- We believe

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1 that inspection intervals should be subject to  
2 appropriate limitations based on experience and  
3 consideration of the improved stress corrosion  
4 performance expected with the 600 thermally treated  
5 and 690 thermally treated tubing.

6 Such acceptable approaches might include,  
7 for example, limitations similar to what we currently  
8 have in tech specs in the way of operating intervals,  
9 or other potential alternatives such as perhaps the  
10 criteria that are being developed in the context of  
11 Revision 6 of the guidelines.

12 We have commented extensively on the early  
13 drafts of the guidelines. Industry is considering  
14 those comments as they work on Revision 6 of the  
15 guidelines with respect to inspection intervals, and  
16 we would hope that this work will lead to something  
17 that we think ensures that inspections -- that through  
18 the condition monitoring process we will be able to  
19 promptly detect conditions that are inconsistent with  
20 meeting the performance criteria.

21 (Slide change.)

22 MR. MURPHY: Apart from the technical  
23 issue as to what constitutes an appropriate inspection  
24 interval, the staff has concluded there must be  
25 appropriate regulatory controls with respect to

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1 inspection intervals to ensure that the performance  
2 criteria are maintained, that conditions failing to  
3 satisfy these criteria are promptly detected and  
4 corrected, and that risk is not increased.

5 (Slide change.)

6 MR. MURPHY: So staff proposed an  
7 additional criterion for inclusion in the admin tech  
8 specs, which would basically specify that no changes  
9 relative to a reference inspection interval criteria  
10 that we have reached a consensus on -- that no changes  
11 to such a criterion could be made without NRC review  
12 and approval.

13 So you know, as industry refines the  
14 guidelines, ultimately perhaps coming out with a  
15 rigorous performance based approach for determining  
16 how long inspection intervals can be, they would have  
17 to come at NRC with such a proposal and get our review  
18 and approval before licensees would be able to  
19 implement such a approach.

20 CHAIRMAN FORD: Could I suggest -- I've  
21 just been flipping through the remaining ones you have  
22 and looking at the time. It seems to me that your  
23 last four or five overviews are primarily just  
24 recording some of the history of the industry and the  
25 NRR responses to this.

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1 I think that should be given -- It's  
2 factual, but it doesn't add to the debate, technical  
3 debate, that we have going on, what the issues are,  
4 outstanding issues. As I understand it, we have re-  
5 raised the issue about the 1.4 and the factor of three  
6 for defective tubes. We are not too sure the depth --  
7 the technical basis behind that agreement.

8 The other one, the big outstanding one, is  
9 this whole question of the performance based  
10 inspection. Periodicity is the big, outstanding  
11 technical issue. Am I correct?

12 MR. MURPHY: No, we don't believe that the  
13 guidelines support as yet a performance based strategy  
14 for setting inspection intervals, but not only that.  
15 The guidelines are not yet able to support  
16 prescriptive criteria that are vastly different from  
17 what is being implemented today.

18 So it's both. We have concerns about some  
19 of the initial proposals that were made with respect  
20 to prescriptive criteria, as well as having concern  
21 about the performance based.

22 CHAIRMAN FORD: We've seen verbally on  
23 your overgraphs what some of your concerns were on  
24 those two issues, the prescriptive and the performance  
25 based inspection interval. Could I suggest, looking

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1 at the time, I want to leave at least -- We have one  
2 more hour. I want to leave at least quarter of an  
3 hour for subcommittee members just to give their  
4 opinions about how you can enhance the presentation  
5 for next week, and I want to have as much time as  
6 possible to hear your views on the really outstanding  
7 issue, which is the inspection.

8 So would you mine, Emmett, yielding the --  
9 I'm getting real good at this parliamentary language  
10 here -- yielding the podium to our friend to hear  
11 their arguments?

12 MR. SULLIVAN: Dr. Ford, I wonder if I  
13 could just add a minute or two. I'm not sure if this  
14 will be useful, but --

15 You know, I hear the comments that have  
16 been made by several members about your concern and  
17 interest in the adequacy of the performance criteria,  
18 and I don't think that comes as a complete surprise.  
19 I know Emmett and I over the years have had a number  
20 of conversations expecting interest in that area.

21 We didn't really come today prepared to  
22 talk about that in detail, and I think what I'd like  
23 to do is just try to shed a little bit of perspective  
24 on why.

25 I think that there are two points, one

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1 Emmett really wasn't able to get into because of the  
2 time crunch. He slipped over Slides 18 and 19, but  
3 those particular slides talk to performance standards  
4 for applying the performance criteria.

5 Performance criteria are -- You know, I  
6 think your point about the increased emphasis in the  
7 performance based approach on those criteria is very  
8 well taken. But there is also a lot of importance  
9 into what standards you use to apply those criteria.

10 I'm not an expert in talking about this.  
11 Emmett could explain more maybe this time or some  
12 other time, but depending on how you apply those  
13 performance criteria, you can get vastly different  
14 results, vastly different levels of assurance of tube  
15 probability -- tube burst probability.

16 So that's an important area of emphasis  
17 that we've placed in some of the comments that we have  
18 made to industry. We haven't focused on defending the  
19 criteria, but we have focused on what are the  
20 performance standards that you need to be assured that  
21 those criteria are even being met.

22 Then the other part, I think, that Emmett  
23 hit on quite well, although there are more details in  
24 the slides, there are a number of comments we have  
25 about the way the integrity assessments are being

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1 done.

2 So these are all connected or  
3 interconnected issues with the bottom line of the  
4 performance criteria, and I think what we are trying  
5 to say is we are looking at all of it. We will try to  
6 be prepared next week to talk to some of the issues  
7 you have specifically emphasized, but we think there's  
8 a lot of importance on looking at the entire picture  
9 of how are you actually going to do these assessments,  
10 what standards are you going to apply to show that you  
11 meet these criteria.

12 MR. BONACA: Okay. That was the question  
13 that I asked about. Clearly, the issues are what's  
14 the basis for the criteria, and that doesn't bother me  
15 as much. I mean, insofar as margin, we could discuss  
16 what margin you need, but it is margin there.

17 The main question is the one, how do you  
18 measure up to the margin? What do you have to do to  
19 demonstrate that you meet the performance criteria?

20 MR. SULLIVAN: Yes, I agree, and that's a  
21 lot of what we are focusing on.

22 CHAIRMAN FORD: Okay. Could I ask you to  
23 give your presentation. If you could take about half  
24 an hour, no longer, if possible, and then you could  
25 jump in with the relevant concerns you have.

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1 Emmett, you had a whole lot of verbal  
2 concerns. Maybe you could just jump in.

3 MR. SULLIVAN: We'll be glad to interrupt  
4 Mohamad.

5 MR. BEHRAVESH: It won't be the first  
6 time. I am Mohamad Behravesch from EPRI. I think the  
7 nature of my presentation probably would have to be  
8 changed a little bit based on everything that we have  
9 heard and the questions that were raised, but I'd like  
10 to set the stage very, very quickly for you as to what  
11 the issues are.

12 In all the discussions that went on this  
13 morning, you will find out that one topic comes up to  
14 the surface, and that is the inspection interval. It  
15 is not to say there aren't other issues, but that is  
16 the one that stands out as the primary one.

17 So this is the inspection interval, and  
18 within that there were two other issues kept coming up  
19 as the prescriptive inspection, as well as the  
20 performance based. Okay?

21 So I'll first put prescriptive based, and  
22 then I'll put performance based. Have these two  
23 things in mind. As we stand here as of now, the law  
24 of the land still is what is in everyone's technical  
25 specification as of now, regardless of everything that

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1 has been said, and that says that you do a three  
2 percent sampling of your steam generator tubes, and  
3 you make sure that no steam generator goes more than  
4 40 months without being looked at -- 40 months.

5 So as of now, this is the law of the land.  
6 This has been the case even 20 years ago; it was also  
7 the case. Clearly, as far back as late Seventies and  
8 early Eighties, it was recognized that this was  
9 clearly inadequate, clearly inadequate.

10 CHAIRMAN FORD: I guess my math must be  
11 rusty. If you inspect only three percent of your  
12 tubes, how can every tube be inspected in 40 months?

13 MR. BEHRAVESH: Good question. They  
14 won't. It won't, unless --

15 CHAIRMAN FORD: That's what you just said.

16 MR. BEHRAVESH: No, no, no. I said, if  
17 you do sampling, you do 30 percent, you are also  
18 obligated to make sure that steam generator doesn't go  
19 without being looked at in more than 40 months. If  
20 you don't find degradation, you may go for a long time  
21 and never see. And by the way, there is no  
22 stipulation in there that says this has to be a  
23 different three percent. You could be looking at the  
24 same three percent.

25 So, yes, the question is that it is

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1 possible that it would never get looked at all of  
2 them. Now this was -- has been the case all along, as  
3 early as late '79, early Eighties. And unlike the  
4 other components like pressure vessels and piping, you  
5 didn't have much guidance in the ASME either.

6 Now the ASME has lots of guidance on how  
7 to do the rest of the inspection, how to do piping,  
8 but has been kind of silent and inadequate on steam  
9 generator. So that brings me to the point of what  
10 industry started doing, recognizing that they started  
11 developing their own set of guidelines, help, for  
12 doing inspection.

13 The first one of it came out in 1981, was  
14 revised as a formal EPRI report in '84, had benefitted  
15 from a lot of industry support by 1988, getting  
16 support from and input from all the NSSS, and then we  
17 added the performance demonstration requirement,  
18 meaning qualification of techniques and personnel and  
19 so forth for '92, went to prescriptive sampling.

20 One of the reasons for going to  
21 prescriptive sampling was that, in the absence of a  
22 lot of information, how can you suggest something to  
23 a large group of people that covers all the issues and  
24 would be adequately conservative and still would keep  
25 you within a safe margin? So that was the impetus

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1 behind prescriptive sampling.

2 Then we went forward in 1997, and we put  
3 a very strong language in terms of all the so called  
4 guidance and recommendations which has made it into  
5 "shall's." So these set of documents really became de  
6 facto requirements as far as the industry was  
7 concerned.

8 It wasn't -- Although the name says  
9 guideline, in reality it is a requirement. This is  
10 what the industry has been living with for the last  
11 20-some years, and the point that I want to get across  
12 to you is that everything that goes in here is  
13 experienced based, time tested, field tested, and well  
14 rehearsed, and result has been used from one revision  
15 to the other revision to get us here. This is the so  
16 called Revision 5 that the industry is currently  
17 following now.

18 CHAIRMAN FORD: Is it all prescriptive?

19 MR. BEHRAVESH: All prescriptive. Also I  
20 should add that, even in this revision, we have  
21 allowed for performance based, recognizing that in  
22 order to do performance based examination, you need to  
23 have a lot of smarts to do performance based. You  
24 can't just go and predict something.

25 You have to have a lot of data from your

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1 past history that guides you into future to enable you  
2 to say that I can go this length of time without  
3 running to any problem, recognizing that to do  
4 performance based you need a lot of information. In  
5 practice, no one has picked this up in doing  
6 performance based. Everyone is doing prescriptive,  
7 because that's where their comfort zone has been.

8 Again, remember that the prescriptive  
9 based, by the nature of its name, is conservative as  
10 well in order to cover everyone.

11 Now the time frame is now late Nineties.  
12 These guidelines had a provision in them that they say  
13 that they need to be looked at in order to see whether  
14 they need to be revised every two years or not. But  
15 something else was happening along this time, not that  
16 this was inadequate.

17 The guideline has really served the  
18 industry quite well. What we came to recognize is  
19 that it was beginning to be very unfair to those  
20 utilities who had made multi-million dollar  
21 investments in going to new materials and new designs,  
22 and this document as it stood did not recognize that  
23 and did not allow that.

24 Now again something to remember, that all  
25 of this, regardless of what recommendations are in

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1 here, still must operate within this. Sure, you can  
2 exceed that. There is nothing to stop you from doing  
3 100 percent, 20 percent inspection. This cannot be  
4 violated even as of today. Cannot be violated.

5 The whole point of going to this license  
6 change package and to these guidelines and all that is  
7 that it is time to revise this, because this is unfair  
8 to the new generators. So this is the whole point of  
9 going through this revision and requesting the  
10 revision.

11 Now I mentioned to you the new materials.  
12 Surely, the new materials, they are not all the same,  
13 but in a nutshell the revision of this guideline,  
14 which is in the works now -- it has been in the works  
15 for over a year now and it is up for review.

16 In a nutshell, it is separating these  
17 materials, 600 mill annealed, 600 thermally treated,  
18 and 690, and saying that 600 mill annealed should be  
19 looked at every outage. This is no different than  
20 what is happening right now. This is no different  
21 than what we have in Rev 5.

22 It is allowing more leeway for 600  
23 thermally treated, saying they should be looked at  
24 every other outage at least, and for 600 thermally  
25 treated it says every third outage.

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1 In a nutshell, this is what is different  
2 in Revision 6 from all the things that has been in the  
3 past.

4 CHAIRMAN FORD: But that looks very  
5 arbitrary to me. I mean, 600 TT and 690 TT have  
6 failed at the mill. So why those multiples?

7 MR. BEHRAVESH; Let's go and see.

8 MR. BONACA: So the only change would be  
9 the third one, I guess, 690 TT.

10 MR. BEHRAVESH: And 600 thermally treated,  
11 right now.

12 MR. BONACA: Okay. So you went from  
13 prescriptive to prescriptive.

14 MR. BEHRAVESH: Prescriptive to  
15 prescriptive.

16 MR. BONACA: And the only change, really,  
17 was for the 690 TT.

18 MR. BEHRAVESH: That is correct. So if  
19 you go into a little bit more detail, things have now  
20 -- in Revision 6 have gotten more prescriptive in that  
21 in 600 mill annealed, 100 percent of the tubes in each  
22 steam generator must be completely inspected in 60  
23 effective full power months.

24 Remember, there is nothing of such here in  
25 tech specs. They should be inspected at every

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1 refueling outage, and in our -- it has been since our  
2 Revision 4 of the guideline. To us, you don't do  
3 sampling unless you do a minimum of 20 percent. Any  
4 sampling less than 20 percent is not meaningful.

5 So the industry from long time ago has  
6 abandoned this, and has turned this into a minimum of  
7 20 percent. So if you do sampling, you do 20 percent,  
8 and this is pretty much the same as we are finding in  
9 the revision, because this material really hasn't  
10 changed. It's the same.

11 Now this is where things change a little.  
12 If you have a 600 thermally treated, and this material  
13 is free from cracking -- if it is free from cracking,  
14 then you can inspect 100 percent of the tubes in first  
15 go-round in 120 effective full power months, in the  
16 second go-round in 90, and 60, 60, 60.

17 The reason behind this is that these  
18 materials have a better performance in early life than  
19 in later life, such that your best chance of being  
20 trouble free is at the beginning, and then we are  
21 being conservative, dropping it to 90, for the  
22 conservative bringing it to 60.

23 Again remember, this takes you into many  
24 years in the future. This is speculation at this time  
25 whether you would get to all of these things. These

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1 guidelines get revised every two years.

2 CHAIRMAN FORD: But what's the factual  
3 basis for choosing those numbers?

4 MR. BEHRAVESH: Factual basis for choosing  
5 these numbers are that -- a series of things. There  
6 are plants with these materials that are operating,  
7 and they have not found cracks.

8 CHAIRMAN FORD: But there are plants that  
9 are operating that have found cracks.

10 MR. BEHRAVESH: Where?

11 CHAIRMAN FORD: Byron.

12 MR. BEHRAVESH: That is not true. That is  
13 not -- They haven't found cracks in the 600 thermally  
14 treated.

15 CHAIRMAN FORD: Well, they haven't done a  
16 destructive examination.

17 MR. BEHRAVESH: Well, yes, there may be  
18 times -- There may be times that someone may decide  
19 that it is more efficient or to my advantage to call  
20 this crack and plug it and move on, as opposed to  
21 taking it out.

22 CHAIRMAN FORD: My point is that you are  
23 using very different -- Turkey Point, Byron are both  
24 incidences where they've got 600 PTQs, but using  
25 current NDE techniques indicates that you've got

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1 cracking. So --

2 MR. BEHRAVESH: That is not our  
3 information.

4 MR. HENRY: Gary Henry with EPRI. With  
5 response to the Byron they did pull tubes, and they  
6 were found to be benign. There was a little groove on  
7 the OD.

8 With Turkey Point, I think it was Unit 4,  
9 they found indications for which they had identified  
10 in Unit 3 that were very similar. In Unit 4 they did  
11 ultrasonic testing on those, which are qualified  
12 techniques. They also found that those indications  
13 were benign and were not present, and they have since  
14 submitted a letter disputing or basically retracting  
15 the fact that they found indications in Turkey 3.

16 CHAIRMAN FORD: Those are facts. That's  
17 good.

18 MR. BONACA: I mean, if that was my plan,  
19 I would never go ten years without looking at those.  
20 You know, I would have to trust what you are telling  
21 me, that there is no degradation mechanism that  
22 happened, is true. Then what am I going to do if  
23 there is, in fact, something new after 120 months. Do  
24 I sue you?

25 All I'm trying to say is that it seems to

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1       defy a little bit -- I understand what you are saying.  
2       No, we haven't seen something.   So you go for ten  
3       years without looking.

4               MR. BEHRAVESH:   But, no, there's a catch  
5       to all of this.   No, I didn't say going ten years  
6       without looking at it.   You must -- First time around  
7       you do 100 percent in ten years.   You do 100 percent  
8       in ten years, and you must look at every steam  
9       generator at least every other outage.

10              MR. BONACA:   All right.   All right.

11              MR. BEHRAVESH:   Every outage.   Now these  
12       are the conditions.   You must do a sample of 20  
13       percent at each inspection.   Even this 120 and 90, any  
14       of these, require supporting degradation assessment  
15       and operational assessment.

16              What       does       supporting       degradation  
17       assessment mean?   Means that you look at yourself.  
18       You look at your sister plants, and if anything has  
19       happened to them, that has to come into play in your  
20       degradation assessment.   If there's an indication out  
21       there that some other 600 thermally treated plant has  
22       cracking, you no longer can do this.

23              MR. BONACA:   So the 120 only refers to 100  
24       percent of the tubes?

25              MR. BEHRAVESH:   One hundred percent of the

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1 tubes being crack free.

2 MR. BONACA: All right. Go on. You have  
3 to inspect, but you have to do it every other year.

4 MR. BEHRAVESH: You inspect, and then  
5 there's more --

6 MR. BONACA: You can choose how many, as  
7 long as they make 100 percent.

8 MR. BEHRAVESH: Minimum 20 percent, and  
9 then additional condition. Furthermore, we go there  
10 and say you can't go and do all of them at the  
11 beginning or all of them at the end. You must make  
12 sure that you do such sampling that you are done with  
13 about 50 percent of them by about mid-point.

14 This is the point of this. Examine at  
15 least 50 percent of the tubes in each steam generator  
16 by the refueling audit nearest to the mid-point, and  
17 the other 50 percent by the end, which means that it  
18 has to be spread throughout that period.

19 CHAIRMAN FORD: Is there some statistical  
20 rationale for your choice of all these numbers based  
21 on existing data?

22 MR. BEHRAVESH: Well, yes, there is.

23 CHAIRMAN FORD: Existing data will,  
24 obviously, be mostly laboratory data.

25 MR. BEHRAVESH: Well, yes, there is

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1 rationale for 20 percent sampling, where you do more  
2 or depending on what you can expect to find. Then  
3 these 50 percent and the length fuel cycle and this no  
4 steam generator can operate for more than two -- If  
5 you put these on a time scale, you would begin to see  
6 how they fit, gives you a uniform inspection schedule  
7 throughout.

8 CHAIRMAN FORD: But what you are saying,  
9 not seeing the actual data itself and the statistical  
10 rationale -- It presumably exists, but it has been  
11 given to the staff so that they can do an independent  
12 assessment of that approach? Is that correct?

13 MR. BEHRAVESH: Well, let me be clear as  
14 to my understanding of your question. Rationale for  
15 which of these things?

16 CHAIRMAN FORD: Well, you are giving a  
17 whole lot of numbers there, 600 TT and, I guess we are  
18 talking about 690. It's presumably based on some  
19 facts and statistical interpretations.

20 MR. BEHRAVESH: Yes. Two answers. One is  
21 that those numbers, those length of times are  
22 currently supported by laboratory studies of these  
23 type of materials, and what it takes to crack them in  
24 the laboratory. They are supported by experience of  
25 the current plants that are operating with these

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1 materials.

2           Additionally, we are doing other surveys  
3 of everyone else who has these materials throughout  
4 the world to find out what their experiences are, even  
5 doing some cases that are not like the U.S. plants.

6           So additional information is being  
7 collected as we speak, although it's not available to  
8 us today. We are trying to put additional information  
9 together to support these numbers.

10           CHAIRMAN FORD: Is this the sort of things  
11 that Roger Staehle is doing?

12           MR. BEHRAVESH: Probably. It could be,  
13 could be related. Specifically, I don't think he is  
14 addressing this, but all of his corrosion studies --

15           CHAIRMAN FORD: Well, he probably is.

16           MR. BEHRAVESH: Yes. All of his corrosion  
17 studies would have a bearing on this.

18           CHAIRMAN FORD: My point is that, as we  
19 try to resolve some of these issues -- I'm trying to  
20 be helpful here -- all these analyses where you've  
21 come out with these numbers and the rationale behind  
22 them, the data has been given to the staff so they can  
23 come up with a factual evaluation of that data?

24           MR. BEHRAVESH: Not all of it and, as I  
25 understand, not to their satisfaction.

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1 MR. BONACA: This is the prescriptive.

2 MR. BEHRAVESH: This is still  
3 prescriptive.

4 MR. BONACA: Okay.

5 MR. BEHRAVESH: And then the final --

6 MR. RILEY: Jim Riley from NEI again. I  
7 would just like to add a little bit more to what you  
8 asked. These are part of the comments that Emmett has  
9 given us on these guidelines, and we are developing  
10 documentation to get back to Emmett on a response to  
11 these things.

12 This information was here to provide a  
13 basis, as Emmett has described. We are basically  
14 writing a white paper to provide this additional  
15 documentation.

16 MR. BEHRAVESH: But the message I want you  
17 to get from this is that a lot of safety things are  
18 sort of embedded in here, particularly at the end that  
19 says, if this material at anytime is found to be  
20 cracking anywhere, then you have to go back to the  
21 rules for the 600 mill annealed, which means that all  
22 of these things are okay so long as you remain crack  
23 free and everybody else remains crack free.

24 The very first time that someone finds a  
25 crack, all of this changes, and there is always the

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1 rules for 600 mill annealed.

2 MR. BONACA: If it is discovered anywhere.

3 MR. BEHRAVESH: Yes. Now for 690 alloy,  
4 it's pretty much like 600 thermally treated. These  
5 periods -- The only difference is that these periods  
6 have been extended. It's good, better, better-est.

7 CHAIRMAN FORD: Are there any tubes of 690  
8 that have been in for any extended period of time?

9 MR. BEHRAVESH: 690? In service, about 12  
10 calendar years in the service with about close to  
11 eight effective full power years. There are a couple  
12 of them running neck to neck now. There is Indian  
13 Point, and there is DC Cook.

14 CHAIRMAN FORD: So exactly the same thing,  
15 but there is presumably data of some sort to justify  
16 those numbers?

17 MR. BEHRAVESH: Data to justify those  
18 numbers, more data to be collected to satisfy NRC's  
19 comments. Again, all of these are predicated in these  
20 things remaining crack free with all these safeguards  
21 built into them to make sure that, if anyone comes up  
22 with information that says that's not the case, these  
23 things no longer apply.

24 So jumping to the basis is that you -- One  
25 raises the question, are these cycle lengths too long

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1 or why are we going this way, what justification we  
2 have.

3 This notion of collective experience is  
4 very, very important. Although you have all these  
5 individual utilities, individual plants that are  
6 autonomous and operate by themselves, but once as they  
7 keep changing these plants and have new materials,  
8 they are all part of a big aggregate.

9 I mean, if you look at EdF, EdF looks at  
10 their whole fleet of plants, and that's how they  
11 collect their experience in terms of what is happening  
12 to one unit and use that information in the other  
13 units.

14 What is happening here is that, if even  
15 though someone may say that, oh, you are going too  
16 long without looking at it, in any given spring or  
17 fall outage, although you are not looking at a 690,  
18 someone there, someone there, someone, somebody else  
19 is looking at 690, and based on what is written in our  
20 guideline, it is the requirement of the guideline that  
21 when you do your degradation assessment, you not only  
22 look at yourself, you look at everyone else and what  
23 has happened to them, and you take that into account.  
24 And should you still have reason to support these long  
25 intervals, you continue. Otherwise, you cannot

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1 continue with those extended intervals.

2 CHAIRMAN FORD: Most of these phenomena  
3 have got fairly high activation enthalpies. Is there  
4 any temperature correction?

5 MR. BEHRAVESH: I am sure that they are  
6 temperature dependent. I cannot speak to that, but  
7 I'm sure that that has to be taken into account.

8 CHAIRMAN FORD: And I don't know the  
9 physics of the PWR. Now would the PWR steam generator  
10 change with a power upgrade? And if it did -- If it  
11 did, and I don't know physically if it does, would  
12 that affect your arguments?

13 MR. BEHRAVESH: I think some of these  
14 differences would have to be taken into account, but  
15 because of the fact that on the increasing guidance on  
16 chemistry, everyone is doing the best chemistry that  
17 they know how to, and chances of very severe outliers  
18 that would produce an anomaly is, I think, decreasing.

19 If it was 20 years ago, I would be more  
20 inclined to think that chemistries may be very  
21 different in different places. Now temperatures --  
22 they may be operating at different temperatures, but  
23 chemistries -- I think everyone is availing themselves  
24 of the best chemistry.

25 Now so this collective, this aggregate

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1 experience is a very strong support for these long  
2 cycles, knowing that something is happening here will  
3 affect all others, and that will be taken into account  
4 by the requirement of the guideline.

5 The other thing is this so called  
6 compensatory measure which that, if cracking is  
7 detected, all bets are off. You will revert back to  
8 600 mill annealed, and that's understood. Besides,  
9 there is additional assurance that secondary side  
10 requirements also address foreign objects, and they  
11 have to be met.

12 Really, furthermore, you have to realize  
13 that this is an immense improvement over the current  
14 requirement that we have now. I mean, this is the law  
15 of the land as of now, and there's lots of improvement  
16 that this program is providing.

17 Now there are other issues that are being  
18 addressed. I don't want to belabor those. There are  
19 matters of data quality ,and all of those are being  
20 addressed.

21 So now I missed one point for you, going  
22 back to these two. Going back to these two.  
23 Everything that I said was on the prescriptive basis.  
24 In Revision 6 we also have right of performance based.

25 This is the dilemma with the performance

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1 based. People criticize prescriptive based, because  
2 they say that it may not be -- because it's not  
3 performance based. They encourage you to go  
4 performance based.

5 You go and do performance based on the  
6 basis of the information you have. You come up with  
7 numbers that are huge and, all of a sudden, everybody  
8 says, well, that can't be, I can't go for 22 years.  
9 But that's what falls out. We have had research  
10 project that has addressed this, and has produced  
11 reports where there have been examples that said in a  
12 given situation somebody could go 22 years.

13 Now whether that person, that utility,  
14 will follow that, it's to be seen. But that's what  
15 falls out of the data. What I want to get across to  
16 you is that performance based relies very heavily on  
17 good data. On this, you have good data from your past  
18 history. It's hard to predict the future.

19 In absence of good data, I don't think  
20 people would be too anxious to run to do performance  
21 based. Most everyone is comfortable with doing  
22 prescriptive.

23 Now NRC has had issues with performance  
24 based, based on the numbers that it throws out. One  
25 example that we have followed -- and some of our own

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1 clients, the utility sponsors, have issues with that,  
2 too. They are sort of uncomfortable with this. They  
3 say, I see what these numbers say, but I'm not sure,  
4 I want to go there.

5 So this is something that I think we will  
6 learn more about, and until we have good data, I think  
7 there would be reluctance on everyone's part to jump  
8 into performance based, although this is the final --  
9 this is a real objective and a real goal that  
10 everyone recognizes that needs to be pursued.

11 So to make sure that you understand that  
12 we have something in Revision 6. We have had the same  
13 thing in current revision, in Revision 5, but in  
14 absence of good data, nobody is following that.

15 I am going to jump to my final slide.

16 MR. RILEY: Mohamad, can I say one thing  
17 here? Jim Riley again, NEI. I just want to make it  
18 clear. I think we stated this before.

19 The issue on performance based is a little  
20 academic right now, because the way that we are  
21 approaching the regulatory controls doesn't allow for  
22 these performance based methodologies unless the NRC  
23 gives their approval of an interval determining  
24 methodology.

25 So what we are really talking about from

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1 the purposes of regulatory controls now is directed at  
2 prescriptive, not performance based. Like Mohamad  
3 says, we want to get there, but we know there is more  
4 work that has to be done before we are there.

5 MR. BEHRAVESH: This is my last slide.  
6 The latest draft is currently in review by the  
7 industry. In the previous draft that we sent out a  
8 few months ago, we had several hundred comments,  
9 including those from NRC. Those have been addressed.  
10 We have gone out with a new draft. We expect  
11 responses by mid-December. We will start addressing  
12 those comments by mid-January.

13 The important point again to emphasize is  
14 that consensus will be achieved. We have 20 years of  
15 history doing these guidelines, and we have had more  
16 contentious issues among the industry themselves to  
17 come to a consensus, and that has happened. So  
18 consensus will be achieved as for the past revision,  
19 and we have a goal of putting this document out by  
20 mid-year.

21 CHAIRMAN FORD: Thank you very much  
22 indeed. We've got 25 minutes left. Could I ask -- Ed  
23 is going to ask us for advice for next week. Does  
24 anyone have any comments before we give specific  
25 advice?

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1 MR. BONACA: Well, I think that this  
2 presentation gave me a real feeling for what is being  
3 on the table, and it shed a lot of light on the  
4 previous presentations, which were very good. But I  
5 think they were more general. So we are left with  
6 some questions regarding the specifics.

7 So if I had to choose an order in which I  
8 would bring the presentations, it would be maybe NEI,  
9 but this information, I think, is better to help us.

10 CHAIRMAN FORD: Bear in mind that the  
11 members have not heard anything about this since April  
12 1999. Do you think that there should be an opening  
13 segment to bring them up to date as to what the  
14 objective of this was, plus the overall problems?

15 MR. KRESS: Yes, but very short.

16 CHAIRMAN FORD: Very short, but also  
17 there's regulatory concerns as well as technical  
18 concerns. I think we agreed early on, without us  
19 hearing about the details, that there are no  
20 regulatory concerns currently on the table. Is that  
21 correct? That's not correct?

22 MR. SULLIVAN: No. I think that is what  
23 we said. I think what we said was that -- We didn't  
24 belabor this, but we had some exchange over recent  
25 months of the regulatory controls issue. We've

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1 settled that as of yesterday.

2 CHAIRMAN FORD: Bear in mind, at the end  
3 of the day you are requesting that we write a letter -  
4 - ACRS writes a letter essentially saying, hey, you're  
5 going in the right direction, guys. It's another ten  
6 years before we hear about this particular topic, and  
7 that the technical issues that you have honed in on  
8 are the correct ones to be resolved by the time your  
9 write your SR and safety evaluation report.

10 That's what your expectations are. I  
11 guess I'm asking the subcommittee here for advice to  
12 them as to what they should be hitting.

13 MR. BONACA: When I looked at their  
14 presentation, I see a lot of reasonable steps. I  
15 think it's a responsible program. I'm sure that there  
16 are plenty of issues that you have to hammer out, but  
17 I think that you are going in the right directions,  
18 has improvements definitely over the current problem.  
19 It takes into consideration certain assumptions  
20 regarding improved materials.

21 On the other hand, it takes into account  
22 the possibility that cracks are being identified and,  
23 therefore, steps back the program. I think it's a  
24 very responsible approach, and I think once we see  
25 that, then the concerns of the NRC come more in

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1 perspective.

2 I mean, they are looking more at the  
3 details, the specifics, and so if you go into those,  
4 I think that they will be more clear for the  
5 committee. I would have a brief introduction  
6 definitely in the beginning to put the whole thing in  
7 perspective, but I think it's important that in a  
8 couple of years -- Again, I view the program as  
9 responsible.

10 MR. KRESS: I would like to hear more  
11 about that the issues on Slide 18 and 19 strike me as  
12 fairly important ones. That is one of the things that  
13 disappeared from the integrity guidelines. There was  
14 a probabilistic statement in the earlier guideline  
15 that seems to have vanished.

16 I mean, you not only had to demonstrate  
17 the factor of three and 1.4, you had to demonstrate a  
18 probability of cracking also. There were two  
19 requirements, as I recall, in the earlier version. Is  
20 that an option?

21 MR. MURPHY: The guidelines address a  
22 situation where you are taking a statistical approach  
23 to assessing where you are relative to the 3 delta P  
24 criteria, for example. And it states that each tube  
25 should have a relatively high probability of meeting

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1 the 3 delta P criterion.

2 In addition, there's a criterion that  
3 basically states that there should be a relatively  
4 high probability that the population of tubes will be  
5 capable of meeting the 3 delta P criterion.

6 The major failing of the guideline is that  
7 that second criterion is not consistently carried  
8 through the tube integrity assessment guidelines or  
9 the other guidelines either. What that means is that  
10 where you are dealing with degradation mechanisms  
11 where there's a sizable number of flaws, which is  
12 often the case, you may well have a number of tubes  
13 which each individually has a high likelihood of  
14 satisfying the criteria, but when you look at the  
15 population, there's actually a relatively low  
16 likelihood that you are going to have all tube  
17 satisfying the criteria.

18 So that clearly is a pretty fundamental  
19 issue I think that the guidelines need to do a better  
20 job of addressing.

21 MR. KRESS: I guess my comment was in the  
22 draft Reg guide -- and I thought in the first version  
23 of NEI 97-06 -- that requirement was actually a high  
24 level requirement. It wasn't down in the guideline.  
25 It was given equal weight, in fact, with 3 and 1.4, or

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1 am I wrong?

2 MR. BEHRAVESH: I think you are confusing  
3 the probabilistic criteria with the deterministic one.

4 MR. MERILO: I'm Mati Merilo from EPRI.  
5 I think we are talking about two separate  
6 requirements. We originally had a probabilistic  
7 requirement which the NRC said that they didn't really  
8 like, because they weren't able to tie that back to  
9 the deterministic criteria.

10 So we do have it in the guidelines, but  
11 said you require NRC approval before you can use that.

12 MR. KRESS: I see. So you didn't have to  
13 satisfy both then?

14 MR. MURPHY: Well, I think we are talking  
15 -- A lot of us are talking past each other at this  
16 point. I think Mati was referring to a probabilistic  
17 criteria that applied to probability of failure during  
18 main steam line break, as opposed to the likelihood or  
19 the probability that you are going to satisfy a 3  
20 delta P criteria or the 1.4.

21 MR. KRESS: Okay, I see. I understand  
22 now.

23 MR. MURPHY: Yes. We have entertained in  
24 the context of the ODSCC arc the notion that there  
25 should be an acceptance criteria with respect to the

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1 probability of burying a tube under steam line break  
2 conditions where no credit is taken for the presence  
3 of the support plate. But in general, we haven't  
4 agreed to such a criterion in any other application.

5 Rather, we are looking for a high degree  
6 of assurance that you are meeting 3 Delta P or, you  
7 know, the 1.4.

8 MR. BONACA: By the way, this is a very  
9 important issue, too, and we need to talk about it.  
10 But it is interesting how two presentations really are  
11 going by each other. I mean, what we heard from EPRI  
12 today was about the prescriptive approach. We didn't  
13 hear anything about the performance based.

14 The main issue we had when you had your  
15 presentation was on the performance based. So you  
16 know, we need to hear from EPRI of when you are coming  
17 out with the revision. You said that you already have  
18 a revision in place with some performance based  
19 criteria.

20 MR. BEHRAVESH: Really, no criteria in any  
21 form of detail. It's a hint of things to come. It's  
22 saying that, yes, there is another avenue to pursue,  
23 but in absence of data, in absence of well tested  
24 methodology, really we can't say anything more. It's  
25 mostly expressed as a goal to achieve as opposed to a

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1 path to follow.

2 MR. BONACA: I got kind of thinking,  
3 because I thought that we would see in front of us  
4 soon enough an approach that is performance based. So  
5 I was kind of alarmed, and I wanted to know what's the  
6 basis for this. But from what I hear now, it's not an  
7 imminent bet.

8 MR. SULLIVAN: I don't think it is  
9 imminent, but I think our presentation -- It's always  
10 really difficult to figure out what is the best way to  
11 present this material. There's a lot of it.

12 I think our presentation grew out of the  
13 perspective that as recently as the beginning of this  
14 year, we have been heading in the direction of a  
15 performance based approach. We've gone down a  
16 different avenue, at least for the more near term.

17 I think we agreed with NEI and the  
18 industry that that's a success path for the near term  
19 for getting into place a new regulatory framework, but  
20 all of these issues are still going to be there when  
21 we devote our attention to the performance based  
22 approach.

23 So it kind of came out of a historical  
24 perspective that we wanted to let you know that we  
25 have a number of issues. We have identified them to

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1 industry, and then we have taken another avenue to  
2 getting the regulatory framework on board.

3 MR. BONACA: I would just say, that was  
4 more reflecting on the shorter time we have next week  
5 and we got -- I was sidetracked somewhat, and I think  
6 we want to prevent that from happening in the meeting.

7 MR. SULLIVAN: So you are recommending  
8 that next week we basically try to focus on the  
9 direction we are going in and not try to present  
10 information on both avenues, which may turn out to be  
11 confusing.

12 MR. BONACA: I would just focus on the  
13 most imminent approach.

14 MR. SULLIVAN: The inspection interval  
15 approach?

16 MR. BONACA: Right.

17 CHAIRMAN FORD: Tom, do you have anything?

18 MR. KRESS: Yes, I agree with what he  
19 said. I would like to see more data based.

20 CHAIRMAN FORD: I think what you are  
21 hearing is that we've got one and a half hours. The  
22 traditional one is 45 minutes, therefore. Out of that  
23 45 minutes, I would suggest that, contrary to what you  
24 are saying -- we can re-debate this, Mario -- that you  
25 give a very short background on the regulatory

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1 situation, how we want to go toward ultimately  
2 performance based criteria --

3 MR. SULLIVAN: But don't belabor it.

4 CHAIRMAN FORD: -- the whole background to  
5 the 97-06, and then now Rev 1 and the Generic Change  
6 Package, just a very -- two minutes, five minutes,  
7 short.

8 MR. SHACK: No, I think it's important to  
9 get in what the regulatory requirements that you now  
10 currently plan to impose are. I'm not worried about  
11 historically you thought you were going to have to do  
12 without this, but the notion -- Mohamad stated that,  
13 if they do go to a performance based approach, you are  
14 going to have to approve the methodology for doing  
15 that.

16 I think that is an important regulatory  
17 statement, and the slide that sort of got buried in  
18 Emmett's thing, that if they are going to change these  
19 maximum intervals, that's again something you have to  
20 do.

21 I wouldn't be too concerned about, again,  
22 you know, historically you were heading one way, and  
23 now you have changed directions. Just tell us what  
24 the current plan is.

25 MR. BONACA: I think, if you do that, at

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1       least we don't get hung up pursuing just how do you  
2       justify these criteria and how do you measure up to  
3       those, because that could take the whole Committee in  
4       that direction.

5               CHAIRMAN FORD:   And I also advise that,  
6       bearing in mind the Committee is being submerged in  
7       all these DPO issues in the last year, that it would  
8       be worthwhile -- it would behoove you to at least  
9       mention Jim's comment, that the EPRI guidelines are  
10      living documents, and they will take into account  
11      lessons learned from the DPO action plan, etcetera.

12             Everything I've said is literally within  
13      ten minutes to start.   The rest of the time, I think,  
14      should be focused on the technical issues, what has --  
15      I guess one slide, everything that's being taken into  
16      account that has been addressed.

17             I think you should be prepared -- and  
18      result.   You should be prepared to back up the  
19      statements about the 1.4 and the 3 safety factors with  
20      some data.   There's a performance issue that Bill just  
21      brought up on your Slides 18 and 19.   I think those  
22      are important.   But the majority of time should be  
23      spent on the inspection to those and, if I could  
24      suggest, that maybe you start off with your viewpoint.  
25      Then you end up with -- and Emmett had some good

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1 slides, word slides.

2 In all of these, I really urge, use data,  
3 please, to make your points.

4 MR. KRESS: With respect to Slide 18, that  
5 was very interesting how they would do the analysis to  
6 provide those assurance, the 90 percent assurance.

7 CHAIRMAN FORD: Yes.

8 MR. KRESS: I don't -- I have to sit down  
9 and try to figure out how I would do this. It's not  
10 easy.

11 CHAIRMAN FORD: Bear in mind, your  
12 expectation is that we will write a letter saying that  
13 you have covered all the technical issues, and those  
14 are the appropriate outstanding ones. That's what you  
15 want us to do, and so we need the information to write  
16 that.

17 It would also be interesting to finish up  
18 with Emmett's time things of work: When is this all  
19 going to all finish, i.e., completely finished by  
20 December 31st of next year.

21 MR. SULLIVAN; One thing that we didn't  
22 get into, I think because we were wanting to focus  
23 across the board on all of the issues, were the  
24 specific questions and so forth that we have raised on  
25 the proposed inspection intervals.

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1           Now that came out in the course of  
2 Mohamad's presentation. I think somebody offered  
3 that. I don't know whether it was Jim or Emmett, but  
4 we have a number of questions that are similar to the  
5 ones that you were raising.

6           I guess what I'm hearing you say is we  
7 should probably steer toward those issues that we have  
8 raised and that are being worked on, rather than the  
9 ones that have to do with the performance based  
10 approach.

11           CHAIRMAN FORD: I've got another question  
12 to my colleagues here. It's not my area of expertise.  
13 Bill, you brought up the question of severe accident.  
14 I know Dana is also worried about iodine, etcetera.  
15 Is this an issue that should be even brought up here  
16 or not? Is it going to be asked? Should they be  
17 fore-armed?

18           MR. KRESS: I suspect that the issues will  
19 take the form of these new inspection intervals plus  
20 the associated increase in risk. Steve addressed that  
21 to some extent. I don't think the iodine spiking  
22 issue is likely to come up.

23           CHAIRMAN FORD: Okay. Let that be  
24 forewarned, fore-armed. Any other comments? Well, I  
25 hope you found it useful rather than destructive. We

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1 did give you a hard time, Emmett. I apologize.

2 Are there any other comments, questions?

3 MR. SULLIVAN: I guess I have a question.  
4 Maybe it's for the other side. But I think what I  
5 hear you recommending is that you would -- from the  
6 second presentation coming from NEI, or industry, you  
7 would like the details that Mohamad presented more  
8 than the background that Jim presented. Is that what  
9 you were saying?

10 CHAIRMAN FORD: On that aspect, that  
11 helped me personally, because I'm new to this game.  
12 But to the rest of the guys, they know this left,  
13 right and center, I suspect.

14 I think you that you all should start out  
15 with the regulatory background and the technical  
16 issues that you have examined relative to the Generic  
17 Change Package and NEI 97-06.

18 Just state that you are prepared to defend  
19 all those that you agree with that are no longer  
20 issues, and let Mohamad take the majority of the  
21 technical discussion, I think, on inspection, because  
22 that is, as I hear it, the main thing on the table.

23 Then you finish off and respond to make  
24 your rebuttals or your concerns which you put down in  
25 words, because I do urge everybody to come along with

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1 data to back up the statements.

2 Okay.

3 (Whereupon, the foregoing matter went off  
4 the record at 11:54 a.m.)

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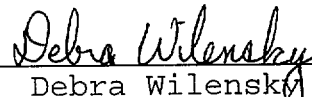
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