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OCTOBER 5, 2001

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2 NUCLEAR REGULATORY COMMISSION

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4 ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

5 486TH ACRS MEETING

6 + + + + +

7 FRIDAY

8 OCTOBER 5, 2001

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10 ROCKVILLE, MARYLAND

11 + + + + +

12 The Advisory Meeting met at the Nuclear  
13 Regulatory Commission, Two White Flint North, Room  
14 2B3, 11545 Rockville Pike, at 8:30 a.m., Dr. George E.  
15 Apostolakis, Chairman, presiding.

16 PRESENT:

17 DR. GEORGE E. APOSTOLAKIS, Chairman

18 DR. MARIO V. BONACA, Vice Chairman

19 DR. DANA A. POWERS, Member

20 DR. WILLIAM J. SHACK, Member

21 DR. THOMAS S. KRESS, Member at Large

22 DR. JOHN D. SIEBER, Member

23 DR. F. PETER FORD, Member

24 DR. GRAHAM B. WALLIS, Member

25 DR. STEVEN L. ROSEN, Member

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1     ALSO PRESENT:

2             DR. NOEL DUDLEY, Executive Secretary

3             SAM DURAISWAMY,

4             Designated Federal Official

5     ACRS STAFF:

6             DR. JOHN T. LARKINS, Executive Director

7             RAJ AULICK

8             CHRIS GRIMES

9             BARRY ELLIOT

10            LIZ THOMPSON

11            JACK SORENSEN

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

(8:30 a.m.)

1  
2  
3 CHAIRMAN APOSTOLAKIS: The meeting will  
4 now come to order. This is the second day of the  
5 486th meeting of the Advisory Committee on Reactor  
6 Safeguards.

7 During today's meeting the Committee will  
8 consider the following:

9 Interim Review of the License Renewal  
10 Application for the Turkey Point Nuclear Power Plant  
11 and Westinghouse Topical Reports Related to License  
12 Renewal.

13 The Report of the ACRS Subcommittee on  
14 Materials and Metallurgy; Draft Report on Safety  
15 Culture and Risk-Informing General Design Criteria;  
16 Future ACRS Activities/Report of the Planning and  
17 Procedures Subcommittee.

18 Reconciliation of ACRS Comments and  
19 Recommendations; Preparation for Meeting with the NRC  
20 Commissioners; and Proposed ACRS Reports.

21 This meeting is being conducted in  
22 accordance with the provisions of the Federal Advisory  
23 Committee Act. Mr. Sam Duraiswamy is the Designated  
24 Federal Official for the initial portion of the  
25 meeting.

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

9           I have an announcement. Ms. Jesse Delgado  
10 joined the ACRS/ACNW staff on September 10th, 2001.  
11 Jesse, would you stand up. Jesse has worked for the  
12 NRC for the past 13 years, and 7 years with the  
13 Division of Reactor Projects, and 6 years with the  
14 Events Assessments Generic Communications, and Non-  
15 Power Reactors Branch, NRR.

16           Due to national emergencies, she has been  
17 providing part-time support to the Incident Response  
18 Center. She is the newly elected Court Chair of the  
19 Hispanic Employee Program Advisory Committee, and on  
20 behalf of my colleagues, I welcome you to the staff.  
21 Now you can sit down, dear.

22           The first item on our agenda is the  
23 Interim Review of the License Renewal Application for  
24 the Turkey Point Nuclear Point Plant and Westinghouse  
25 Topical Reports related to license renewal, and our

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1 expert on the subject is Dr. Mario Bonaca. Mario,  
2 it's yours.

3 DR. BONACA: All right. Good morning. We  
4 met on September 25th to review -- the subcommittee on  
5 license renewal met on September 25th to review the  
6 application on Turkey Point and the SER, and we found  
7 the application quite complete and scrutable.

8 We directed the staff to come in and give  
9 us some specific insights on some points at the end of  
10 the presentation by the staff and the licensee.

11 I will also give you some perspectives on  
12 the subcommittee, and the recommendation for what we  
13 should be doing with the report, and whether or not we  
14 should have an interim report or just a final report.

15 And I can tell you right now that the  
16 recommendation from the Subcommittee was that we would  
17 not have an interim report now, but wait for all the  
18 open items to be closed, and then have a final letter  
19 there.

20 And the reason is that there are only four  
21 open items and we did not identify other issues that  
22 would cause for us to delay the SER. With that, I  
23 will pass it on to the staff so that we can hear a  
24 presentation from the staff.

25 MR. AULICK: Good morning. I am Raj

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1       Aulick, and I am the project manager for the Division  
2       of Application for License Renewal for Turkey Point.

3               I would like to make one point that Mr.  
4       Steve Koenick, who is not here, and he is my backup  
5       project manager, has been a great help in the  
6       preparation of this SER.

7               At this point I would like to briefly  
8       summarize the status of the staff's review of the  
9       Turkey Point License Renewal Application.

10              The application was received a little over  
11     a year ago, and this was the fifth application  
12     received by the NRC, and three applications have been  
13     approved so far.

14              This is the first Westinghouse BWR, and it  
15     is a two unit site, and each unit is designed for 2300  
16     megawatt thermal. The site is shared by two oil and  
17     gas fired engineering plants.

18              The plant is located in Florida City,  
19     about 25 miles from Miami, and about the same distance  
20     from the Florida Keys. The license for Unit 3 expires  
21     on July 19th, 2012, and for Unit 4, on April 10th,  
22     2013. The application was requesting a 20 year  
23     extension of the licenses.

24              DR. BONACA: One observation purely for  
25     information for the members. This is the first plant

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1 that has a turbine building. It does not have an  
2 external enclosure.

3 Now, that doesn't mean anything negative  
4 regarding the equipment, but simply that it is a  
5 different environment from what we have seen in  
6 previous applications, and it was interesting for us  
7 to look at it in that respect, and maybe the staff can  
8 comment on that at some point, and if that created any  
9 different environment for materials, and different  
10 kinds of aging mechanisms.

11 MR. AULICK: No, I think they have a  
12 design to address those things, and the equipment was  
13 designed for weather, for rain and weather conditions.

14 The review schedule is based on a 30 month  
15 schedule, and this was originally issued with an  
16 acceptance letter on this application in October of  
17 2000. As noted, the SER with open items was issued in  
18 --

19 DR. POWERS: Can you tell me how you set  
20 up these schedules?

21 MR. AULICK: Yes, please?

22 DR. POWERS: Can you explain to me how you  
23 set up these schedules?

24 MR. AULICK: Basically, when we received  
25 the application, we had certain templates based on our

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1 previous experience, and we sat down with the staff,  
2 and --

3 DR. POWERS: Well, where is your previous  
4 experience on license renewal for PWRs?

5 MR. AULICK: Mostly the experience has  
6 been done with -- you know, a little more extended,  
7 but previous ones have been 25 months with no hearing.  
8 But this was much shorter because of fewer open items.

9 And I was going to make a point that as  
10 you can see there are fewer open items, and the  
11 applicant has requested to move up the review schedule  
12 since it has been decided that there is no hearing on  
13 this plant.

14 So we are in the process of discussing  
15 with the applicant and with the internal staff  
16 internally that we will support the preparation of the  
17 final SER. So we hope to issue a revised schedule and  
18 a recommendation to the Commission in the next few  
19 weeks.

20 And as time goes and we gain more  
21 experience, we will look at the schedule and the staff  
22 loading, and --

23 DR. POWERS: Well, I just can't help but  
24 wondering if you were pressed to do these in record  
25 breaking time doesn't lead to perfunctory reviews, and

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1 that's why we have fewer and fewer open items and  
2 issues being raised.

3 MR. GRIMES: Dr. Powers, this is Chris  
4 Grimes. My observation is that we set out with the  
5 first application to use a 30 month review schedule  
6 with a hearing, and when the Commission denied a  
7 hearing, we went to a 25 month scheduled for Calvert  
8 Cliffs and Oconee, and we used all of that time.

9 And with the later reviews, we have found  
10 that we are using about the same amount of time for  
11 the body of the review, and so about the same level of  
12 effort is going in, and it is getting -- more  
13 attention is focused to the sensitive areas of the  
14 review, or the areas where the guidance has some  
15 controversy to it.

16 So I don't think that the review process  
17 is speeding up so much. We are seeing the improvement  
18 in the schedule as Raj mentioned at the back end,  
19 where with fewer open items to resolve there is less  
20 time required to address the open items.

21 But I don't think that the fewer open  
22 items are a reflection of any rush to finish the jobs.  
23 I would observe for the applications received in 2001  
24 that it has been largely a workload management problem  
25 because the applications came in closer together, and

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1 we have to do about the same amount of work overlaid  
2 on top of each other.

3 And so we are finding that moving  
4 milestones around in order to spread the work in a  
5 more effective way is our major challenge.

6 MR. AULICK: Any more questions on the  
7 schedule?

8 DR. BONACA: I have a question in general,  
9 and not so much specifically to Turkey Point, but it  
10 is apparent to me that from application to application  
11 every applicant seems to be very -- I mean, reviewing  
12 every request for additional information from previous  
13 applicants, and then trying to prevent an open item on  
14 some issues.

15 This process is happening and of course it  
16 will be expected. So do you have any projection if  
17 this is going to at some point -- you know, once  
18 applicants begin to use the GALL report as a reference  
19 document, and the SRP as a guidance for format, and  
20 then there is a lot of lessons learned that they can  
21 use, what is the optimal time that you can imagine  
22 that it will take for an application to be thoroughly  
23 reviewed?

24 MR. GRIMES: This is Chris Grimes. At  
25 this point, we have just -- we are nearing the

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1 completion of the demonstration project, where we have  
2 exercised a generic aging lessons learned, and we have  
3 tried to get some insights, in terms of further  
4 lessons to improve the guidance and the efficiency of  
5 the process.

6 And I am still inclined to stick with the  
7 20 month product schedule until we have gotten through  
8 at least the class of 2001, and perhaps even the 2002  
9 applications, before we have enough data to really get  
10 a good picture about the optimal review schedule.

11 As I mentioned before the review schedule  
12 seems to be driven more in terms of the proximity of  
13 applications, one to the other, than it does with the  
14 effectiveness of the guidance to perform the reviews.

15 And we would hope that we will get some  
16 feedback and experience from the recently completed  
17 standard review plan, and regulatory guide, that would  
18 help us to develop an optimum schedule for the future,  
19 but I still think that right now that 20 months for  
20 the product schedule looks like a good working model,  
21 at least for the initial plan.

22 One of the other things that we have  
23 considered is using the acceptance review as a basis  
24 to try and custom design review schedules based on an  
25 expectation about how much or the value of the

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1 application of the improved renewal guidance.

2 And right now we are concentrating on what  
3 we can do to optimize resource utilization more than  
4 timeliness.

5 DR. BONACA: Well, I asked the question  
6 with specific interest to the ARCS workload, because  
7 we see these applications coming, and in fact more  
8 effectively being formatted, and are more scrutable,  
9 and it is easier for us to review them, and we find  
10 less open items.

11 So I just was wondering what kind of  
12 impact there is. I am sure that Noel Dudley here is  
13 aware of that, and so what you are telling me right  
14 now for the foreseeable future is that the pace of  
15 reviews you expect to me pretty much the same as you  
16 have had in the past?

17 MR. GRIMES: Yes, sir.

18 DR. BONACA: Thank you.

19 MR. AULICK: The next slide. FPL has  
20 actively participated in industry groups on license  
21 renewal, including the Westinghouse Owners Group.  
22 Four reports were submitted by the Westinghouse Owners  
23 Group for staff review.

24 The safety evaluation on the staff topical  
25 reports are intended to be stand alone documents, but

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1 in the case of Turkey Point, they were not  
2 incorporated by reference in the application, because  
3 at the time of the Turkey Point application the staff  
4 review on these reports was not complete.

5 And Mr. Barry Elliot will speak on the  
6 staff's evaluation on these reports later on this  
7 morning.

8 DR. BONACA: I have a question on this.  
9 We reviewed four WCAPs, and they were the ones that  
10 are not referenced, but they are used in the  
11 application, or at least there is a discussion there  
12 about the applicability.

13 However, through the application there is  
14 some discussion of other WOG reports. For example,  
15 license renewal application procedure. Are there  
16 other Westinghouse Owners Group Reports that have been  
17 developed in support of license renewal? That is the  
18 question that I have.

19 MR. ELLIOT: Westinghouse developed an  
20 overall basis document for license renewal. We were  
21 not asked to review that. And also Westinghouse  
22 initially -- and specific to Turkey Point, they  
23 prepared a report on underclad cracking, and impact  
24 and fatigue crack growth.

25 Those are the two that I know about that

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1 we didn't discuss, but we discussed a little bit at  
2 the last meeting -- it was on the WCAP on underbleed  
3 cracking.

4 The general one is used by everybody in  
5 all of the Westinghouse-type plants as a basis for  
6 their integrated plan assessments.

7 DR. BONACA: Okay. I understand now  
8 because it wasn't clear, and I saw some reference to  
9 the document listed in the SER, I think, and so I was  
10 curious about that. We did not review that and you  
11 did not review that?

12 MR. ELLIOT: Right.

13 DR. BONACA: Okay. Thank you.

14 MR. AULICK: As part of our review the  
15 staff identified four items, four open items, and  
16 these are -- the first one is scoping of seismic II/I  
17 Piping Systems.

18 The staff reviewed the information  
19 provided in the application and responses to the  
20 staff's questions in this area. The staff did not  
21 agree with the applicant's scoping criteria for  
22 Seismic II/I Piping Systems.

23 The staff's position is and has always  
24 been that Seismic II/I piping systems should be within  
25 the scope of license renewal. This is the same issue

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1 which was an open item on Hatch, Plant Hatch.

2 And we had requested the applicant, the  
3 Florida Power and Light, to wait until a resolution is  
4 reached on that plant, and then we will pursue that.  
5 Now the resolution has been reached on the Plant  
6 Hatch, and so we have started discussions with the  
7 applicant to resolve this issue.

8 DR. BONACA: There are some differences,  
9 however, between Hatch and Turkey Point, right?

10 MR. AULICK: The way they approached the  
11 II/I issue, in the case of Turkey Point, what they  
12 have done is they have -- since the location of the  
13 non-safety system which could impact the safety of  
14 their system is depending on the locations.

15 So what they have done is they have gone  
16 with an area approach, and as a result, they came up  
17 with 8 or 9 areas where the systems are located, and  
18 then they are going to go and analyze the scoping and  
19 screen those structures which could impact.

20 So I think that Hatch addressed this issue  
21 a little differently, and so we are --

22 DR. BONACA: I thought Hatch has  
23 seismically qualified supports and Turkey Point does  
24 not?

25 MR. AULICK: No, Turkey Point also has

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1 seismic approval, but the piping portion is not  
2 included.

3 DR. BONACA: I think that in Turkey Point  
4 the seismic supports are in scope?

5 MR. AULICK: They are in scope.

6 DR. BONACA: All right. I understand.

7 MR. AULICK: So at this time now we have  
8 started discussions and they are going to look at the  
9 piping portion of the systems. The next issue is the  
10 Reactor Vessel Head Ally 600 Penetration Inspection  
11 Program.

12 In the LRA the applicant specified that  
13 this inspection program is designed to manage the  
14 aging effects of cracking due to stress corrosion in  
15 the reactor vessel head penetration nozzles.

16 Recently -- and I think earlier this year,  
17 the reactor coolant pressure boundary leakage from the  
18 vessel had penetration nozzles that were identified at  
19 a few plants.

20 And the staff has asked what is industry  
21 doing to resolve this current license issue, and  
22 consider this an emerging issue. The staff expects  
23 that the applicant will augment the scope and  
24 attributes of the inspection program consistent with  
25 the resolution reached by the industry group.

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1           Based on our discussions with the  
2 applicant, they will wait and agree with that. So  
3 once that commitment is made, I think we will consider  
4 this issue to be resolved.

5           DR. BONACA: Could you tell us just  
6 briefly what their plans are for inspections  
7 consistent with NEI activities? Are you going to do  
8 that later?

9           MR. ELLIOT: Well, I think that Turkey  
10 Point 3 -- and actually I am not the reviewer of the  
11 bulletin response, but I have some idea. I think that  
12 Turkey Point 3, the next outage is committed to do a  
13 head inspection, and I think --

14           MR. AULICK: It is this month.

15           MS. THOMPSON: Yes. This is Liz Thompson  
16 from FPL. Actually, Turkey Point Unit 3 shut down  
17 over this past weekend for a scheduled refueling  
18 outage, and we anticipate performing the head  
19 inspections, 100 percent visual, on Unit 3 this  
20 weekend, which it is scheduled for.

21           And then Turkey Point Unit 4 is scheduled  
22 for a refueling outage in the spring, and we will  
23 perform the same inspection there is what is planned.

24           DR. SHACK: Have you been performing  
25 visual inspections of the head?

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1 MS. THOMPSON: Visual inspections as  
2 accessible. We do have some insulation to remove, but  
3 being a Westinghouse plant, that is an easier task  
4 than what some of the CE plants are dealing with,  
5 where their insulation design is quite different.

6 So we are making some special preparations  
7 and we do have --

8 DR. SHACK: Your insulation design is  
9 what, reflective metal, or --

10 MS. THOMPSON: I am not familiar with the  
11 details of it. I am not handling that myself, but I  
12 understand that we are going to be able to get in  
13 there. We do have some remote equipment that can go  
14 in and help keep the doses down for performing the  
15 job.

16 DR. BONACA: Is this the first time that  
17 you inspected the head?

18 MS. THOMPSON: We have not inspected  
19 mechanical connections as part of our regular RCS  
20 leakage monitoring condition. And of course if  
21 anything is identified, it gives us the opportunity to  
22 look further. So that is really the starting point.

23 DR. SHACK: Do you have a history of  
24 canopy sealed weld leakage?

25 MS. THOMPSON: We have had canopy sealed

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1 welds leaking, yes, as well as Inconel leaks. And we  
2 have done substantial cleanup of the reactor heads.  
3 We did have a substantial leak in the mid-to-late  
4 '80ish time frame, and I think we have implemented  
5 substantial improvements to our program and our  
6 ability to detect.

7 And we are very, very sensitive to really  
8 any primary side, non-I-soluble, RCS leakage  
9 indications.

10 DR. BONACA: Okay. Thank you.

11 MR. AULICK: I will go to the next one of  
12 the open items, the reactor vessel underclad cracking.  
13 In Chapter 4 of the LRA the applicant stated that a  
14 generic evaluation of the underclad cracks has been  
15 extended to 60 years using fraction mechanics  
16 evaluation based on a set of design cycles and  
17 transients, with occurrences to cover 60 years of  
18 service.

19 They also stated that these design cycles  
20 and transients, which are contained in the  
21 Westinghouse Report 15238 -- and this is the one that  
22 you mentioned which is not part of the topical report  
23 -- bounds the Turkey Point Units 3 and 4.

24 Therefore, the conclusions of the WCAD and  
25 WCAP are applicable to Turkey Point. Now, this report

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1 is under staff review, and it is in the concurrence  
2 process, and we hope to issue the final safety  
3 evaluation sometime this month.

4 So once this report is issued, and as a  
5 result of the review, if there are any plant specific  
6 requirements identified, the applicant will need to  
7 meet those plant specific requirements to resolve this  
8 issue.

9 The last open item is acceptance criteria  
10 for field erected tanks internal inspection. This is  
11 a new program which is used for managing the aging  
12 effects of loss of material due to corrosion of tanks.

13 And the tanks in question are two  
14 condensate storage tanks, and two refueling water  
15 storage tanks, and one shared demineralized water  
16 storage tank.

17 DR. BONACA: The question that I have on  
18 this is that there are discussions -- I mean, as we  
19 discussed at the subcommittee meeting, there are five  
20 -- the applicant presented five, one-time inspections,  
21 and two periodic inspections as new programs.

22 Of those, there is a proposed one-time  
23 inspection of tanks, and now if I remember the CSD,  
24 the condensate storage tank, are exhibited before  
25 corrosion of some kind of welds and coating

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1 degradation of several areas.

2 And so the question I have is the open  
3 item regarding the justification for this being a one-  
4 time inspection?

5 MR. AULICK: Open-item. We asked that  
6 question and the response was that that degradation in  
7 the condensate storage tank was because of operating  
8 experience and poor workmanship to the fabrication.

9 And it was more flaking and so they have  
10 taken care of that problem, and we also asked that  
11 once this program is delivered what will be the  
12 acceptance criteria for a one-time inspection for the  
13 next follow-up.

14 DR. BONACA: Are you accepting that this  
15 not going to be happening again? I mean --

16 MR. AULICK: Well, that is an open item,  
17 except --

18 DR. BONACA: So the one-time inspection is  
19 an open item?

20 MR. AULICK: Yes, and what will trigger  
21 the follow-up action once degradation is noticed.

22 DR. BONACA: Okay. Because my sense from  
23 the open item was that this was more than this, and  
24 you wanted to have some programmatic elements, such as  
25 depth of -- well, some indications of what would

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1 prompt additional inspections.

2 MR. AULICK: That will be part of the  
3 acceptance criteria.

4 DR. BONACA: Well, why would you go for a  
5 one-time inspection when you already have corrosion in  
6 the past? I mean, you have to be sure that that has  
7 been taken care of forever, and I don't understand how  
8 you can do that.

9 MR. AULICK: Well, according to the  
10 applicant, it was not -- there were some operational  
11 history probably, and system errors, and some other  
12 water which added to the degradation of the paint.

13 They have analyzed it, and they believe  
14 that it is -- and they have inspected under the tank,  
15 and they did not find any corrosion or any  
16 degradation.

17 DR. BONACA: Well, I thought that the DWST  
18 and the RWST have never been inspected?

19 MR. AULICK: No, DWST has been inspected.  
20 I think it was maybe not complete information, but the  
21 RWST has not been inspected.

22 DR. BONACA: I think you should correct  
23 the SER. The SER says it was not inspected.

24 MR. AULICK: We can do that, yes.

25 DR. BONACA: And how can you then

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1 understand the basis for justifying a one-time  
2 inspection when some of the tanks have never been  
3 inspected, and that some have been inspected found  
4 some corrosion.

5 There may be some unique reasons why you  
6 have those, and I accept that, but still the basis for  
7 a one-time inspection is purely to confirm that  
8 something is not happening.

9 MR. AULICK: Well, that's it exactly,  
10 because we expect not to find anything. And maybe FPL  
11 wants to add on the reasons for the degradation on the  
12 storage tank?

13 MS. THOMPSON: I can do that. Liz  
14 Thompson again from FPL. The condensate storage tanks  
15 in the earlier years of operation had a situation  
16 where we actually recirculated some steam back into  
17 the tank, and the steam caused the coating  
18 degradation.

19 That was identified through an inspection,  
20 and the inside of both tanks basically have been  
21 stripped and recoated over the years to standards that  
22 meet our standards today.

23 And based on that we considered what  
24 occurred on the condensate storage tanks to be  
25 somewhat of a unique situation. The DWST, the

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1 demineralized water storage tanks, and the RWSTs, did  
2 not experience any similar type operating conditions.

3 Of course, we have also changed our  
4 operating practices. We don't allow that to occur  
5 anymore to protect the coatings on the inside of the  
6 condensate storage tanks.

7 And we have done an inspection as Raj has  
8 mentioned in the DWST. So based on that, we don't  
9 believe we are going to find degradation occurring,  
10 and the one-time inspection is basically to confirm  
11 that.

12 As with all of our programs, in the event  
13 that we do find something, then we apply our  
14 corrective action program, which would go back and  
15 assess whether or not we need to take further action  
16 other than just correcting any particular condition  
17 found.

18 DR. BONACA: So the plan is to inspect all  
19 the tanks once, and if you find something, then you  
20 would have to address it by changing the one-time  
21 inspection to a periodic?

22 MS. THOMPSON: Yes.

23 DR. BONACA: Okay. I have another  
24 question regarding these one-time inspections or new  
25 programs. If you look at the application, there are

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1 seven new programs.

2 When I read the correspondence between the  
3 staff and the applicant, I found that on -- I believe  
4 on the medium and low voltage cables that there was a  
5 concern with adverse localized effects of heat in  
6 containment, and that the applicant agreed to develop  
7 a new program for those.

8 MR. AULICK: Yes, that is correct.

9 DR. BONACA: Now, that program is not  
10 identified in the application, because the application  
11 made by the applicant did not have the program  
12 included in it.

13 And I have trouble in understanding -- I  
14 would have to go through the SER and all the  
15 correspondence to find how many new programs there are  
16 that are not in the application because they were  
17 developed as part of the RAI and negotiations between  
18 the staff and the applicant. Where am I going to find  
19 this information?

20 MR. AULICK: I think looking back that it  
21 probably would have been in the first chapter, and we  
22 could have stated that in addition to the new programs  
23 in Section 3.8, that another new program was  
24 developed. So up front and in the summary.

25 DR. BONACA: Yes, I would like that very

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1 much. I mean, I think it would be very helpful for a  
2 reviewer to understand what you have developed as a  
3 result of the interaction between the staff and the  
4 applicant so that one has a global perspective of what  
5 the new programs are.

6 I have seen only that one and that was not  
7 listed among the new programs in the application.  
8 There may be others, and --

9 MR. AULICK: No, this was the only one.  
10 I debated on this as well in doing it in Section 3.8,  
11 but since the questions were being asked on Section  
12 3.7, I decided to keep it there. But I think we could  
13 have highlighted in the Chapter 1 summary.

14 DR. BONACA: Well, certainly that is a  
15 recommendation that I would like to provide for  
16 completeness.

17 MR. AULICK: I think that helps.

18 DR. BONACA: Because after I read that, I  
19 was left with the question of what have I missed.  
20 There are additional programs that I haven't seen.  
21 All right. You are telling me that is the only new  
22 one?

23 MR. AULICK: That is the only new one,  
24 right, which is not in the sections.

25 DR. BONACA: Thank you.

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1 MR. AULICK: The next slide is on  
2 inspection activities. As part of the staff review,  
3 two team inspections and one audit were conducted on  
4 the Turkey Point site. The teams reviewed several  
5 scoping and screening documents, and the team also  
6 reviewed several AMR supporting documents for the new  
7 and existing programs.

8 The team concluded that these documents  
9 were complete and easy to follow. The team also  
10 walked down to a selected system to assess the overall  
11 condition of the plant. FPL prepared --

12 DR. BONACA: I thought you had a meeting  
13 also in 2000, the year before?

14 MR. AULICK: Yes, an audit was done and it  
15 was done in November.

16 DR. BONACA: An audit? Okay. So you had  
17 four visits.

18 MR. AULICK: Four visits, but the last  
19 visit was one, but we divided it into two weeks. But  
20 there were four visits, correct. To assist the staff  
21 in their review, the FPL staff, several documents were  
22 prepared, called "Quality Instructions."

23 These provided step-by-step instructions  
24 for the review of systems and structures applications,  
25 and specifically, QI Instruction 5.3, which identified

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1 those systems and structures which are within the  
2 scope of license renewal.

3 They also developed another document which  
4 tells you procedures for screening those components  
5 and structures that will require an AMR, and the  
6 screening methodology pretty much follows NEI 95-10.

7 And another document that was prepared was  
8 for procedures for guidance and performing aging  
9 management reviews. And another document which was  
10 prepared was instructions and guidance for identifying  
11 and evaluating TLAAs.

12 The teams looked at some of these  
13 documents and found them to be very useful. And the  
14 teams prepared these technical documents for their  
15 staff, and professional license renewal applications.  
16 FPL created a license renewal group. This is a group  
17 composed of about 30 members.

18 And all these staff members were given job  
19 specific training which was required and documented  
20 and this was all under the QA program. And all  
21 support engineering staff at the plant sites were also  
22 given training under the engineering training program,  
23 which is also documented.

24 And special presentations were made to the  
25 management and other staff personnel. Now, as part of

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1 their work, license renewal boundaries have been  
2 marked on the plant drawings, and design control  
3 procedures have been revised, including the checklist  
4 to include the license renewal to ensure that proposed  
5 changes do not impact the license renewal  
6 requirements.

7 And I mention this because this was raised  
8 at the subcommittee meeting on the training and  
9 qualification of the personnel preparing the  
10 application, and how they relate to the on-site  
11 personnel.

12 DR. BONACA: Is this the first application  
13 that was made available in this binder with the PNIDs  
14 attached to them?

15 MR. AULICK: No, all the data that are  
16 highlighted --

17 DR. BONACA: Because for the others they  
18 were not as accessible at this time. We have these  
19 convenient binders here with all the information.

20 DR. ROSEN: Is this the first application  
21 also to provide a CD-ROM or was that a typical thing?  
22 I found that very helpful.

23 DR. BONACA: We had them before, but this  
24 was --

25 MR. GRIMES: This is Chris Grimes.

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1 Arkansas was the first to provide it on a CD-ROM at  
2 the time of the application. Calvert and Ocone  
3 provided CD-ROMs, but that was at the conclusion of  
4 the review, because they had EPRI compile their  
5 application materials on CD-ROM for the industry to  
6 draw on.

7 But since then all of the applicants have  
8 provided CD-ROM material. They use different styles  
9 of packaging the information and using Hyper-Links,  
10 and all of the plants provided us with drawings.

11 Turkey Point did provide them in these  
12 convenient binders, and the rest of them provided  
13 essentially the usual D-Sized drawings marked up in  
14 various ways, depending on what their engineering  
15 practices are.

16 DR. BONACA: I understand, however, that -  
17 - Bill, you were telling me that you went through a  
18 CD-ROM and that was different from the previous one.

19 DR. SHACK: Yes, I thought this one was  
20 better organized. I really found it very helpful to  
21 be able to go from link to link. This is the first  
22 one where I really thought that the CD-ROM was a far  
23 better way to get through the application than the  
24 paper version.

25 MR. AULICK: And then a concern which was

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1 raised at last week's meeting, at the subcommittee  
2 meeting, was the visual testing, and we had one  
3 examination for reactor vessel internals, including  
4 baffle bolts.

5 It was determined that this type of  
6 examination may not detect cracks due to assisted  
7 stress corrosion. We discussed this with the  
8 applicant, and this issue was raised at the  
9 subcommittee, and so they are proposing that this be  
10 identified by ultrasonic examination of the baffle  
11 bolt, and then they will perform an enhanced VT-1  
12 inspection capable of detecting 1.5 mil.

13 DR. BONACA: I think an issue here was  
14 raised by Dr. Shack that the applicant had in fact  
15 included both VT-1 and ultrasonic for the baffle  
16 points. Therefore, that was adequate with that  
17 clarification, but the text in the SER implies --

18 DR. SHACK: Well, I am happy with this  
19 solution. If you are going to have VT-1 to look for  
20 cracks, you do have to set an acceptance standard with  
21 something like that.

22 DR. BONACA: Does it require clarification  
23 in the SER?

24 MR. ELLIOT: Barry Elliot, Materials and  
25 Chemical Engineering Branch. The ultrasonic

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1 inspection is part of an industry program developed  
2 for techniques for inspecting the baffle bolts. And  
3 enhanced VT-1, it isn't so much as a qualification,  
4 but that you have to be able to take a .5 mil wire,  
5 and that would qualify the inspection capability.

6 DR. BONACA: Well, there is no  
7 clarification in the SER. I mean, there was a  
8 misunderstanding, and I thought it was that the staff  
9 accepted VT-1.

10 MR. ELLIOT: We have changed our position  
11 to require --

12 MR. GRIMES: Dr. Bonaca, this is Chris  
13 Grimes. The answer is yes, we would expect to clarify  
14 the SER.

15 MR. AULICK: That will end my  
16 presentation. Are there any questions before Barry  
17 starts his presentation?

18 DR. FORD: I have a question. It is more  
19 a request than a demand. It would really be much more  
20 helpful to us -- because it would add some quantity to  
21 assessment during the SERs of the various programs  
22 that the licensee is using for the aging management  
23 program.

24 I get the impression that you correctly  
25 identified all the degradation modes, and then you

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1 essentially -- and what you didn't do or give the  
2 impression of is there a program to manage this from  
3 Westinghouse, or wherever else, and without any  
4 quantification as to how effective those programs are.

5 And as you go into the licensing renewal  
6 period will it still be adequate. So it is more a  
7 question of believability. I don't doubt that you  
8 have done it, but I haven't see it.

9 DR. BONACA: This is something that we  
10 have seen for about -- well, clearly license renewal  
11 depends so heavily on existing programs. So if you  
12 commit to an ASME umbrella program, et cetera, the  
13 licensee's application doesn't go to a description of  
14 the program because there is an expectation that  
15 current CLD places a requirement on the quality of  
16 those.

17 And there has been a significant  
18 interaction between the industry and the staff on  
19 industry wanting to have no discussion of the existing  
20 programs.

21 And I agree with you that for the reviewer  
22 --

23 DR. FORD: And since many of the aging  
24 management program deal with environmental  
25 degradation, and cracking specifically, rely on the

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1 ASME 11 approach, but who is to say that the ASME 11  
2 approach is adequate. In many cases it is not.

3 And yet by just having said that I taking  
4 the ASME 11 approach, that sort of is given the  
5 blessing on this approach. And unfortunately the  
6 environmental degradation doesn't always follow the  
7 rules.

8 MR. GRIMES: This is Chris Grimes. The  
9 standard that we are using and the style guide that we  
10 developed for the safety evaluation was one that  
11 demands that the staff present the aging effect that  
12 is to be detected and managed, and then a conclusion  
13 that is built around why we believe that the aging  
14 management program is demonstrably affected.

15 And that was the whole point in developing  
16 the report on generic aging lessons learned. What  
17 evidence do we have that these programs are  
18 demonstrably affected.

19 And we have generally found that we find  
20 it difficult to quantify the effectiveness of the  
21 programs. Instead, what we rely on often is an  
22 articulation of what we have not found by virtue of  
23 the aging effect as being adequately managed by virtue  
24 of inspection techniques and repair techniques that  
25 identify and correct the condition.

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1 ASME, in particular, has been challenged  
2 by us to go back and reflect on those things that  
3 license renewal has caused as additional programs  
4 above and beyond ASME, because the ASME feels that the  
5 -- their view was that their programs are quite  
6 demonstrably affected at managing the applicable aging  
7 effects.

8 And so we have challenged them to try and  
9 build on our safety evaluation conclusions, which in  
10 the future we would refer to GALL, because we have  
11 gone through generically and described the basis upon  
12 which we have concluded that particular programs, and  
13 specifically ASME and EQ, and other standard programs.

14 But the whole style of our safety  
15 evaluation is built around what can we say about the  
16 effectiveness of the programs to manage the applicable  
17 aging.

18 And if you have any particular suggestions  
19 about how we can change the style of our writing guide  
20 for the staff so that they could more clearly  
21 articulate that, we would be happy to consider that.

22 DR. BONACA: Any other questions on the  
23 general application and the SER? You had some  
24 comments, Steve, regarding the documentation and  
25 training of the staff at the site.

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1 DR. ROSEN: Yes, I did at the  
2 subcommittee, and Raj referred to that in his remarks.  
3 I was satisfied I thought with his coverage of the  
4 issue.

5 In general, and just for the record, my  
6 feelings are that the engineering support personnel  
7 training program for the utilities needs to actively  
8 set requirements for the training of engineers to not  
9 only preserve the programs that are put in place for  
10 license renewal throughout the remaining license term,  
11 but also to train a whole new generation of engineers  
12 in this.

13 Because people who have been at these  
14 plants for all these years have not typically thought  
15 about license renewal in the context of a regulated  
16 program.

17 And my experience is that that is now just  
18 beginning to come into play in the utilities, and the  
19 infrastructure is in place for a very sound  
20 engineering support personnel training program. But  
21 it does not have this feature generally.

22 And I understand that INPO is working on  
23 changing the criteria for that, and I think that is  
24 going to be necessary.

25 MR. GRIMES: This is Chris Grimes again.

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1 I would like to build on that thought by pointing out  
2 that license renewal focuses specifically on aging  
3 management, and one of the penance that we try to  
4 build on is this concept that the ongoing regulatory  
5 process handles everything except for aging effects  
6 applicable to passive components.

7 We do not have a specific review feature  
8 that looks at qualification and training of personnel,  
9 because as you point out, we have a much broader view  
10 that the process for qualifying and maintaining a  
11 sound engineering staff, or reactor operators, or  
12 whoever, is something that transcends license renewal.

13 And that there are emerging technologies  
14 comparable to aging effects and aging management  
15 programs that need to be part of the routine of the  
16 training and qualification of personnel, operating  
17 experience, and changes in regulatory requirements,  
18 changes in the licensing basis, advancements in steam  
19 generator tube inspection techniques.

20 There is a whole suite of things for which  
21 you want to both capture the corporate memory and  
22 build on it, and have a future generation of staff  
23 that is going to have a sound foundation to maintain  
24 plant safety in the future.

25 DR. ROSEN: I think we are agreeing,

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1 Chris.

2 DR. BONACA: I would like to go back for  
3 just a second about the discussion that we had and  
4 that Dr. Ford raised. If in fact you have a program  
5 right now under ASME that is being used to inspect and  
6 qualify defects of some type, and the program is not  
7 adequate, how is it being accepted in an adequate  
8 program for the full licensing term?

9 I don't know if I used the right word here  
10 when I said inadequate, but you mentioned the  
11 difficulties.

12 DR. FORD: Well, the ASME code for  
13 corrosion and fatigue, and the environment affects on  
14 fatigue which is in the design basis is not adequate  
15 for some boiling water applications.

16 The ASME 11 code for crack growth, and in  
17 which you use the mean line of the data, is not  
18 adequate for the scatter of data that you see for the  
19 -- for instance, stress corrosion and cracking for  
20 missile head penetrations.

21 So if you just follow the ASME 11 code  
22 blindly, and without taking into account the scatter  
23 of data around the curves, you are going to have  
24 problems. That is what I would like to see being  
25 addressed by the licensee and the staff when they say

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1 that a program is good.

2 It is not good as you get more data coming  
3 out in the literature and the codes that were written  
4 a long time ago are no longer necessarily good.

5 DR. BONACA: But I would expect that given  
6 this insight, and evidently open knowledge, the staff  
7 today would inspect those licensees affected by this  
8 issue to use additional information to purely the  
9 application or the ASME-3 Code. I would expect that  
10 to happen. I mean, the staff can answer the question.

11 MR. ELLIOT: I have discussed this  
12 question before, and the NRC uses the ASME code as  
13 guidance and as its requirements. But when it sees  
14 that the requirements are not adequate, we set up  
15 additional requirements.

16 We put out generic letters, and we put out  
17 bulletins, and which requests people to do things  
18 differently, or not requested all the time, but  
19 provides them sufficient information that they may  
20 need to do things differently.

21 That is our process. Examples are the BWR  
22 internals program. I mean, inspections were not  
23 adequate based on the ASME code, and a separate  
24 program had to be developed.

25 Another example currently is the CRDM head

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1 cracking. I mean, the inspections of the ASME code  
2 don't appear to be adequate at the moment, and they  
3 may be, but we are still evaluating that.

4 And when we finish the evaluation, we may  
5 have recommendations to do other things. As far as  
6 the fatigue crack growth, that is recognized as a  
7 generic issue, and it is addressed in our SER.

8 The NRC has a process for handling  
9 situations that come up that the ASME code is not an  
10 acceptable method, and we implement that process.

11 DR. FORD: As I said in the very  
12 beginning, I don't doubt that that process goes on,  
13 but it is not scrutable. When you read the SER, it is  
14 not immediately apparent to you that you went through  
15 that detailed analysis and that has been taken into  
16 account.

17 All you see is, yes, so and so has a  
18 program, and it's all right. You didn't see the --  
19 the thought process that you just articulated, you  
20 don't see that set out. And you don't see a graph,  
21 and I have never seen a graph.

22 DR. SHACK: Well, I think that is a little  
23 unfair though. I mean, the inspection program for,  
24 say, stress corrosion and cracking in boiling water  
25 reactor piping was set out 20 years ago now, and it

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1 certainly is not an ASME code.

2 It is an accelerated, more aggressive  
3 inspection schedule, but you don't expect to see the  
4 justification for that in the inspection schedule. If  
5 the guy is following that, and just that aggressive  
6 inspection schedule, you don't have to rejustify that  
7 inspection schedule every time.

8 As Barry mentioned, the fatigue problem is  
9 a recognized one. Every one of the license renewal  
10 documents has to address the fact that the ASME 3  
11 code, environment fatigue curves, are known not to be  
12 conservative, and they address it.

13 But they refer to NUREG -- you know,  
14 documents, where it is discussed. But they don't  
15 reproduce that numerical basis in every report, and I  
16 think that would be unreasonable to expect.

17 DR. FORD: I put myself in the position of  
18 being an informed technical guy out in the public who  
19 is reading these documents on whatever the court  
20 reporter says, and he says, hey, it didn't take into  
21 account this or that. He doesn't have easy --

22 DR. SHACK: Well, there is certainly a  
23 section in the license renewal document that says that  
24 environmentally assisted fatigue, and how do I address  
25 it. And he goes through it. Now, admittedly, he

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1 doesn't show any graphs.

2 DR. FORD: Well, nor is there a statement  
3 of the problem.

4 DR. SHACK: I would disagree.

5 DR. BONACA: I think there are, yes. The  
6 reason why I am pursuing this --

7 DR. FORD: Well, a statement of the  
8 problem, the specifics, that such and such, et cetera.

9 DR. SHACK: I think it is, but you can't  
10 rely on your -- you know, just using the straight ASME  
11 code basis, and that you have to take into account  
12 environmentally assisted fatigue in a way that has  
13 been found acceptable by the NRC, which is basically  
14 a considerably enhanced augmented fatigue fact.

15 DR. BONACA: The point that I would like  
16 to make is that my thinking is that it would be 12  
17 years before we get into licensing renewal for this  
18 plant. We had better have adequate inspections  
19 between now and then, and the burden I am not placing  
20 on license renewal. I am placing it on the existing  
21 programs.

22 So my expectation is that the existing  
23 programs have in fact that burden now, and that the  
24 staff reviews that part of the licensing, with the  
25 knowledge that 12 years from now probably there are

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1 going to be additional problems that we find with  
2 these inspections, and modifications that we have to  
3 make, just as we have had on these CRDMs.

4 But again the point that I am making is  
5 that I always look for the burden in the existing  
6 problems because they have to serve us well for the  
7 next 12 years for this plant, for example, before we  
8 step into license renewal.

9 But I understand, and my sense was that  
10 the programs -- I mean, when you go on the site and  
11 you review these programs that are described in the  
12 back, are you looking at them in detail from scratch,  
13 or are you simply assuming that because they are  
14 accepted today they are okay?

15 I don't have a sense that you don't review  
16 them, because you have comments that you make  
17 regarding changes or commitments. For example, take  
18 the CRDM issue. That is one where they looked at it,  
19 and they said, well, the existing program is not good  
20 enough.

21 And they say you have to modify that to  
22 include inspections, commitments that you have through  
23 NEI, the programmatic steps, and inspections that you  
24 have for that kind of plant, and so on and so forth.

25 So to me that is an example that they are

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1 in fact looking at the adequacy of existing programs.

2 DR. FORD: I would start off by saying  
3 that I believe that. It is a question that somebody  
4 outside of this room, or that there is something about  
5 the topic on how does he feel, and I just got the  
6 feeling when I was reading things that you don't go  
7 into the depth that you did. You are selling yourself  
8 short.

9 MR. GRIMES: This is Chris Grimes, Dr.  
10 Bonaca. I am particularly sensitive to the concern  
11 that the staff evaluations are not scrutable. We  
12 constantly are challenged by trying to present safety  
13 evaluations that present a sufficient amount of detail  
14 to show the extent of the staff review.

15 But at the same time don't present so much  
16 detail that it ends up being overwhelming. We are  
17 currently going through an exercise with a  
18 communications specialist contractor to try and  
19 articulate generic aging lessons learned and aging  
20 management programs for the general public, and we are  
21 targeting the 11th grade level, because the standard  
22 is usually the 4th grade level.

23 And we have attempted to try and present  
24 enough information, but not too much information, and  
25 now we are going to go to the tri-fold brochure

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1 approach to condense it even further.

2 We do a lot of material incorporated by  
3 reference, which is a technique that has been used  
4 since engineers first picked up a slide rule, and then  
5 to the extent that we try to point to details in the  
6 graphs and the data, and all the material that it is  
7 drawn on.

8 And then Dr. Ford is presenting to us yet  
9 a new communication challenge in terms of the  
10 believability of a demonstrably effective aging  
11 management program, which as I said before, we are  
12 open to any and all suggestions on ways that we can  
13 improve the articulation of our evaluation basis.

14 But I agree with Dr. Shack. I think that  
15 if I were asked to point to one program for which we  
16 have done a very good job of explaining the nature of  
17 the problem, and the nature of the solution, it is the  
18 environmental effects of fatigue.

19 And so that is the best that we have got  
20 to offer right now, and if that one isn't scrutable,  
21 I don't know what of anything that we do or the ACRS  
22 does that is.

23 DR. BONACA: Well, it's interesting, you  
24 know. It is a question of communication, and maybe in  
25 the specific areas where it is a known fact that

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1 existing -- for example, the ASME programs, just be  
2 qualified or enhanced, or complimented or supplemented  
3 by additional inspections, one could maybe have an  
4 expanded discussion.

5 Again, not just for all of them, but for  
6 just a few, so that there is a better sense of the  
7 continuation, because this is a comment that is not  
8 new to this committee.

9 I mean, other members have expressed the  
10 same frustration at times in the past because this is  
11 a huge --

12 DR. SHACK: Well, I think GALL is an  
13 improvement there because it is referenced there, and  
14 many of the SERs do have that problem. You know, we  
15 found it acceptable. End of statement.

16 And in this one it is a GALL document, and  
17 you go back and there is a reference to a NUREG, and  
18 to a generic letter. I mean, it is a traceable kind  
19 of thing. Admittedly, it isn't all together, but you  
20 can pull the string.

21 DR. BONACA: Well, yes, but again it is a  
22 huge management program, and it is a huge umbrella of  
23 activities, and so I think with the communications, I  
24 think the feeling is to try and find some way in which  
25 you can put in some windows.

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1                   Now, there are some, and again the open  
2 items on the CRDM clearly goes to the heart of the  
3 issues, and in fact it is very specific in the way it  
4 is spelled out, and the concern with where the  
5 location of the crack growth is coming from and those  
6 elements. But anyway that is a suggestion that you  
7 want to consider.

8                   DR. FORD: And another calibration factor.  
9 As you know, I am a fairly new member to this group,  
10 and I am just becoming use to negotiating with this  
11 wealth of paper.

12                   And maybe I am calibrating myself to that,  
13 but equally I am also representative of a whole  
14 technical community out there who doesn't know these  
15 details. And maybe that is the community that maybe  
16 ultimately you may have to impress.

17                   MR. GRIMES: And the irony in all of this  
18 is that we do get a lot of that because we share these  
19 experiences internationally. And by the time that we  
20 have gone through and explained why we do what we do,  
21 and how we do it, then the recipient now understands  
22 and has learned, and so now they are calibrated.

23                   And then we say, yeah, but how can we  
24 avoid having to go through that with the next new  
25 introduction to the world of aging management, and we

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1 just have to continue the process of trying to learn  
2 how to communicate better.

3 But I do want to react to Dr. Shack's  
4 point, and that is we are always -- we are sensitive  
5 to and always looking for safety evaluations that say  
6 we have reviewed all of this stuff, and we find it  
7 acceptable.

8 And I look for those because I say, "and  
9 where did the because go."

10 DR. BONACA: One thing that I want to say  
11 is that certainly renewal or new applications which  
12 will have references to GALL will be more helpful.

13 A suggestion that I have also for all of  
14 the members for the next review is that we already  
15 have the final GALL. It is quite informative when you  
16 go through it, because it says what is acceptable, and  
17 what is not.

18 It does not go into extreme detail, but it  
19 has quite a level of detail, insofar as, for example,  
20 that this is not sufficient. Now, at times you are  
21 left with the question of, well, what do you want.

22 But it leads you through and explains  
23 typically what enhancements are expected.

24 DR. ROSEN: Let me assure you, Dr. Bonaca,  
25 that I also as a new member have been given my

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1 personal copy by the ACRS staff of the GALL report.

2 DR. BONACA: Yes, and it is much more  
3 manageable than it used to be. That's good. Okay.  
4 Any other questions or comments in general to the  
5 application? If not, then we have now a presentation  
6 regarding the WCAP.

7 MR. ELLIOT: I am Barry Elliot with the  
8 Materials and Chemical Engineering Branch of NRR.  
9 There are four WCAPS that we were requested to review.  
10 The license renewal rule requires each applicant for  
11 a license renewal to contain an integrated plant  
12 assessment.

13 In an integrated plant assessment,  
14 applicants must identify the aging effects for the  
15 components within the scope, the programs to manage  
16 the aging effects, and identify any time limiting  
17 aging analysis for the components.

18 And in these four WCAPS, that is the way  
19 the Westinghouse Owners Group organized the report and  
20 I am going to go through and go through the highlights  
21 that they have provided.

22 The first report deals with piping and its  
23 associated pressure boundary components, like valves,  
24 pumps, and bolting. The aging effects you see up  
25 there and you can read them.

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1                   What we would like to say is that to  
2 manage fatigue related cracking, this WCAP proposes  
3 analyses, methods, and inspection requirements, to  
4 manage corrosion of external surfaces caused by  
5 leakage of borated water.

6                   They propose a boric acid corrosion  
7 program in accordance with their commitments to  
8 Generic Letter 88-05. A loss of material by wear of  
9 RCP and valve bolted closures. The WCAP proposes to  
10 do in-service inspection to the ASME Code,  
11 Section 11, and ANSI OM standards.

12                   For lost of bolting preload caused by  
13 stress relaxation, the WCAP proposes to do in-service  
14 inspection to ASME Code Section XI.

15                   The WCAP identifies two TLAAs for piping  
16 and other associated pressure boundary components,  
17 which are fatigue evaluation and leak-before-break.

18                   DR. ROSEN: Did you purposely avoid  
19 discussing the reduction in fracture toughness due to  
20 thermal aging?

21                   MR. ELLIOT: Oh, I'm sorry, I left that  
22 out. I missed it. They propose analysis methods and  
23 inspection requirements to manage reduction of  
24 fracture toughness due to thermal aging. That is what  
25 is in the WCAP.

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1 DR. BONACA: Now, looking at this WCAP, I  
2 did not look at this one. I was assigned to review  
3 the pressurizer, and I did that, but the format is  
4 identical for all of them. And you have the SER in  
5 front of it.

6 And then you have a number of areas where  
7 you disagree with --

8 MR. ELLIOT: Well, where we disagree, we  
9 have license renewal action items.

10 DR. BONACA: Exactly, and so could you  
11 expand on that? In certain cases where you disagree,  
12 you just go to closure, and typically those are areas  
13 where you have to go to plant specific, or your simply  
14 chose to ask the applicant to resolve the issue.

15 DR. SHACK: Well, the topical report  
16 wasn't adequate I think is the action in many cases.

17 DR. BONACA: Yes.

18 MR. ELLIOT: What happens is that when we  
19 have license renewal action items, the applicant  
20 missed an aging effect that we thought was  
21 appropriate, or the program that they proposed we  
22 thought was not sufficient, and therefore an applicant  
23 who wants references would have to address those  
24 specific issues, about whether or not the aging effect  
25 applies to their plant that we think might.

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1                   Or that the program should be supplemented  
2                   and then they would have to address whether the  
3                   program would need to be supplemented. That would be  
4                   the action items.

5                   MR. GRIMES: Dr. Bonaca, this is Chris  
6                   Grimes. I would like to back up one step and go back  
7                   to the review process that we go through.

8                   We get these topical reports in from the  
9                   owners groups, and the first thing that we do is issue  
10                  a draft safety evaluation report that identifies what  
11                  we believe are deficiencies in either the  
12                  identification of the scope, or the aging effects, or  
13                  the program attributes that are required to  
14                  demonstrably reflect that the aging effect can be  
15                  managed.

16                  We issue that in draft and then we give  
17                  the owners groups or the generic entity an opportunity  
18                  to try and resolve them on a generic basis. And so  
19                  they get a chance to challenge our challenges.

20                  And if we can't settle it on a generic  
21                  basis, but we agree to disagree, or they say we can't  
22                  do that generically, that ends up being an interface  
23                  requirement, that then is characterized in terms of  
24                  applicant action item.

25                  DR. BONACA: This is the reason why I am

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1 raising the question, is to understand the  
2 completeness of the review. For example, for the  
3 pressurizer, I believe in the pressurizer topical  
4 reports that there are nine applicant action items.

5 However, in the SER, there is only a  
6 requirement of a discussion of four. The reason is  
7 that the applicant in the application complied with or  
8 explained how they met all the requirements of the  
9 pressurizer topical report, but you found that four of  
10 them were not sufficient.

11 And so for those four, you set the  
12 additional applicant action items, and you resolve  
13 those through a request for additional information.

14 MR. ELLIOT: Right. We put out questions.  
15 As, for example, with respect to Turkey Point and the  
16 pressurizer for all these, we put questions that  
17 resulted from the review of the WCAP and applied them  
18 to Turkey Point.

19 MR. GRIMES: I would also like to point  
20 out that Raj mentioned earlier that as we started the  
21 review the staff SERs for the topical reports hadn't  
22 been completed, and so we didn't know what the  
23 complete set of applicant action items were.

24 And in Oconee and Arkansas, the safety  
25 evaluation goes through and addresses applicant action

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1 item by applicant action item. And that is a very  
2 easy thing to do when the topical report SER has been  
3 published and the list of action items is clear.

4 This review started off with the two  
5 running in parallel, and so I found that on both  
6 Turkey Point and Hatch the staff evaluation tends to  
7 generalize all the applicant action items that we are  
8 satisfied except for. And that was because the  
9 counting had not been done yet.

10 DR. BONACA: Okay. I understand now. All  
11 right. I understand.

12 MR. ELLIOT: The next WCAP was the WCAP  
13 for reactor vessel internals. The WCAP identifies the  
14 aging effects as shown up here; to manage the  
15 reduction of fracture toughness, and irradiation and  
16 stress corrosion cracking, and irradiation creep and  
17 void swelling due to neutron radiation.

18 The WCAP takes credit for the Section 11  
19 inspection, and then for the baffle/former bolts, and  
20 the barrel/former bolts, which we would propose  
21 augmented ultrasonic inspection over and above the  
22 code.

23 For managing the combination of stress  
24 relaxation and high-cycle fatigue for preloaded  
25 components. WCAP takes credit for Section 11

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1 inspection and a fatigue management program.

2 And then finally for wear, which would be  
3 wear of the bottom mounted flex thimble tubes, and the  
4 WCAP proposes to perform ultrasonic or eddy current  
5 examination per responses in conformance with licensee  
6 responses to I&E Bulletin 88-09. And there is one  
7 TLAA in here and that is for fatigue.

8 For the pressurizer WCAP, there are two  
9 aging effects, fatigue related cracking, and PWSCC of  
10 Inconel 82/182 weld metal and sensitized stainless  
11 steel safe ends.

12 The WCAP takes credit for managing PWSCC  
13 through its in-service inspection and Section XI  
14 Program, and for fatigue, it has Section XI, and also  
15 a fatigue management program similar to what was said  
16 for the internals. There is one TLAA here and that is  
17 for fatigue.

18 DR. WALLIS: What does a fatigue  
19 management program look like?

20 MR. ELLIOT: A fatigue management program  
21 is where they do in a fatigue study the number of  
22 transients proposed for the life of the plant are  
23 documented, and then the study does what is the effect  
24 on the usage factor for the plant or for the  
25 component.

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1                   And the fatigue management program would  
2 be where the licensee will count the number of cycles  
3 to ensure that they have not exceeded the limits of  
4 their analysis.

5                   DR. WALLIS:    So it is straight-forward  
6 bookkeeping in a sense?

7                   MR. ELLIOT:  It is bookkeeping and keeping  
8 track of transients that occur during the life of the  
9 plant.

10                  DR. WALLIS:  Is there any kind of check  
11 that this is on track?  How does the inspection feed  
12 into the -- well, you have a theory for fatigue, and  
13 you keep track of all these things, and is there some  
14 check that the theory conforms to the reality  
15 somewhere?

16                  MR. ELLIOT:  Well, the purpose of the  
17 fatigue management program is to count the actual  
18 transients.

19                  DR. WALLIS:  Well, how do you know that  
20 your theory is actually is appropriate for this?

21                  MR. ELLIOT:  Well, you actually go out  
22 then and inspect.

23                  DR. WALLIS:  So you check?  So there is a  
24 check to see if the theory is actually conforming to  
25 some reality?

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1 MR. ELLIOT: Yes.

2 DR. BONACA: And particularly in the  
3 inspection program they will take in the most  
4 susceptible components, right? You have an  
5 identification of what is the most susceptible  
6 components?

7 DR. WALLIS: So it guides your inspection  
8 in a way?

9 MR. ELLIOT: Yes.

10 DR. WALLIS: And you know when to look for  
11 what?

12 MR. ELLIOT: Yes.

13 DR. WALLIS: And I asked because there is  
14 a kind of litany here. You know, whenever you have  
15 something like X, you have a management program for X,  
16 and I would be interested in knowing sometimes what X  
17 is, and what the management program for X is.

18 DR. BONACA: We didn't get a word yet  
19 about how well he felt that all the issues were  
20 addressed and how comfortable you are with these  
21 reports.

22 MR. ELLIOT: Well, the management program  
23 for the fatigue program is the counting of the actual  
24 transients by the applicant, and keeping track of it.

25 The fourth WCAP deals with reactor coolant

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1 system support, and there are two aging effects; loss  
2 of material and a decrease of strength of steel  
3 component, and concrete embedments from aggressive  
4 chemical attack and corrosion; and then stress  
5 corrosion cracking of the bolting.

6 The WCAP for steel components is that they  
7 manage the loss of material and decrease in strength,  
8 and the WCAP takes credit for in-service inspections  
9 of ASME Code, Section XI.

10 And for the concrete embedment, it is an  
11 in-service inspection to ACI 349 Code, and leakage  
12 identification walkdowns. For the stress corrosion  
13 cracking of bolting, WCAP takes credit for in-service  
14 inspection to ASME Code, Section XI. And there was  
15 only one TLAA, and that was fatigue.

16 And this is our summary for the staff  
17 review, and we have gone through this before, and that  
18 is that where we found deficiencies either in the  
19 aging effects, the scope, or the aging management  
20 programs.

21 And we have identified license renewal  
22 action items, and the first part of this slide  
23 identifies how many action items were identified by  
24 the staff for each of the WCAPs.

25 I just want to give you some background

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1 here. Of course, anybody could go to these and -- we  
2 say in the SER that if you reference this and you  
3 follow these applicant action items that you could  
4 show that you could show that you have managed aging  
5 effects.

6 There is another thing that this is used  
7 for. When we wrote GALL and we went back to these  
8 programs, and made sure that we -- these were some of  
9 our basis for our programs in GALL in addition.

10 Anyway, in conclusion, upon completion of  
11 all renewal applicant action items, license renewal  
12 applicants who reference the WOG reports adequately  
13 demonstrate that the aging effects of the components  
14 in the scope of the WOG report can be managed so that  
15 there is reasonable assurance that the components will  
16 perform their intended functions in accordance with  
17 the current licensing basis during the period of  
18 extended operation, and that is our presentation.

19 DR. BONACA: Now the question that I had  
20 was some of these issues are plant specific, and  
21 therefore, you have to have an applicant action item.

22 MR. ELLIOT: Yes.

23 DR. BONACA: Some of them are generic and  
24 Westinghouse chose not to -- or WOGG chose not to  
25 address the concerns of the staff because they

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1 disagree with you?

2 MR. ELLIOT: Well, I can't speak for  
3 Westinghouse, but what our problem was that when we  
4 reviewed this we reviewed it late. It came in early  
5 and we reviewed it late, and so there wasn't the back  
6 and forth that we normally get with a review.

7 So a lot of places where we would have  
8 resolved it as part of the review process, because we  
9 were trying to get it for Turkey Point and we pushed  
10 ourselves, we didn't get it resolved in time, and we  
11 made those license renewal action items.

12 They would have been open items for the  
13 WOG report, but because of the review process we  
14 couldn't do that and we turned them into license  
15 renewal action items.

16 DR. BONACA: So from now on any  
17 Westinghouse Owners Group member that applies for a  
18 license renewal has to go through his applicant action  
19 items on a plant specific basis?

20 MR. ELLIOT: Yes. Right.

21 DR. ROSEN: Mario, I have a question about  
22 what happens next. Here the staff and the applicant  
23 have reached an agreement which will soon be  
24 documented in an SER about things that need to go on  
25 for the extended term of operation.

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1           How does the staff move those agreements  
2 into its inspection program? What are the features of  
3 the next set of actions that can give us confidence  
4 that now these things have been carefully evaluated  
5 and identified, and in fact the staff will be making  
6 the requisite number of checks to be sure that the  
7 applicant is carrying out these actions?

8           MR. GRIMES: This is Chris Grimes. There  
9 are two features to that. The first feature is that  
10 all of the program attributes for those things that  
11 are relied on to manage these aging effects are being  
12 captured and changed to the updated final safety  
13 analysis report.

14           So they reflect the change in the current  
15 licensing basis that will become a part of the staff's  
16 routine inspection program as driven by the reactor  
17 oversight process, and to the extent that there is  
18 particular safety significance associated with program  
19 findings, we gravitate towards those things in future  
20 inspections.

21           The second piece is that like the one-time  
22 inspections there are a number of things for  
23 commitments for things that will be done prior to  
24 entering the period of extended operation.

25           And when the process of developing an

1 inspection procedure now that will capture those  
2 things and provide for some future inspection to  
3 verify that all these commitments -- or to verify that  
4 not all of these commitments, but at least some of  
5 these commitments by sampling, as is our usual  
6 practice prior to entering the period of extended  
7 operation.

8 We are struggling with that concept right  
9 now because the applicants make commitments day in and  
10 day out to do things. Whenever they file a licensee  
11 event report, it has got an attachment, and it says we  
12 are going to do all these corrective actions.

13 We are trying to figure out right now how  
14 to fit in these commitments with that system so that  
15 the inspection program is going to effectively apply  
16 its sources to decide which of these things do we  
17 really want to verify prior to entering the period of  
18 extended operation.

19 But for our purpose right now, we have  
20 captured those two groups, and we are verifying that  
21 the updated safety analysis report has the requisite  
22 detail in it, and is a program summary that can be  
23 managed under 50-59 for the future.

24 And we are tracking the commitments for  
25 actions to be taken prior to entering a period of

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1 extended operation, and we will let our normal  
2 regulatory process decide what to do with those list  
3 of things in the future.

4 DR. ROSEN: I wonder if we could come back  
5 to that subject at some point, not in regard to any  
6 specific application, but in a longer generic question  
7 for the ACRS to ask the staff to come in and maybe  
8 give us after having given it a little more thought,  
9 to come in and talk to us about their ideas about how  
10 they can blend this into the inspection program, and if  
11 there is a new manual chapter required, or what all is  
12 needed.

13 DR. BONACA: That is a good suggestion.

14 MR. GRIMES: We are working on a draft  
15 inspection procedure that deals just with that  
16 specific issue. So when it is right, we will come  
17 back and discuss it with ACRS.

18 DR. BONACA: I just wanted to note  
19 regarding the issue we discussed before, and that is  
20 the form of the topical actions. It was not a  
21 criticism. I found them to be informative.

22 Typically you get a topical report which  
23 tells you what is being done, period. Here you had  
24 the SER in front of it, and all the points of  
25 disagreement with the additional licensee action,

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1 applicant action items.

2 In the back you had the RAIs, and it was  
3 helpful, because one would understand the kind of  
4 review that you did, and the kinds of questions that  
5 you asked and so on. They were quite informative.  
6 Any other questions from the members?

7 (No audible response.)

8 DR. BONACA: Any other comments? If not,  
9 I would like to thank you, and what I would like to do  
10 is simply brief quickly the committee in regards to  
11 the subcommittee meeting we had last week, and to  
12 provide you with a recommendation.

13 In summary, we felt that this was a good  
14 application, and was quite scrutable. I mean, I know  
15 that the staff at the beginning had some what we  
16 called navigational problems in finding all the items,  
17 but in general I thought it was quite clear, although  
18 I understand that some of the forms that were on the  
19 table I liked, and you recommended that not be the way  
20 in future applications, but that's okay. I can live  
21 with that.

22 We felt that there was a significant  
23 effort by the applicant to address the issues raised  
24 by the NRC. In fact, that really converged down to  
25 four open items, of which I view only the first one as

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1 one having no clear path -- I mean, in my mind -- on  
2 how it is going to be closed.

3 The others are more commitments than  
4 anything else, and we felt that the staff performed a  
5 significant review. You started with approximately  
6 150 requests for additional information for a pretty  
7 lengthy meeting and visits at the site.

8 And I believe what I see with respect to  
9 other SERs before is a complete discussion of the  
10 issues. And because of the fact that the SER has only  
11 four open items, the application is scrutable, and I  
12 would provide the Committee with the same  
13 recommendation that we had for Arkansas-1, which is  
14 not to write an interim report right now.

15 And the key reason is because we expect to  
16 have closure on these open items in the very short  
17 term, and I think we should write the final letter at  
18 that time.

19 DR. ROSEN: Does that include the closure  
20 of the II/I issue?

21 DR. BONACA: Yes.

22 DR. ROSEN: We will hear the resolution of  
23 that before we write our letter?

24 DR. BONACA: That's right. I sent you  
25 already about four pages in which I detail what the

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1 views of the subcommittee were, and I hope that I  
2 summarized them well, and for those of you who are on  
3 the subcommittee, please give me any comments if I  
4 mischaracterized someone's observations.

5 In general, we felt that their  
6 certification of components and scope was quite  
7 accurate. I mean, it was good. We raised a number of  
8 questions regarding specific components, and some of  
9 them identified by John Barton who is a consultant to  
10 us, that were not in scope, and we found that in all  
11 cases there were good reasons why they were not in  
12 scope, and consistent with the license renewal rule.

13 We raised some questions regarding the  
14 spent fuel pool, and that still puzzles me in many  
15 ways, because Turkey Point identified multiple  
16 functions that put passive components in scope, and  
17 the functions were pressure boundary integrity, heat  
18 transfer, and that brought in scope a number of  
19 components, including the cooling system that I did  
20 not see in scope for Oconee, and for other previous  
21 applicants, which troubled me at that time.

22 So we raised questions regarding why if we  
23 needed something from previous applicants, and I  
24 recognized that the answer was accurate, which is  
25 still that they can perform the functions of license

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1 renewal with the equipment that they have in scope,  
2 which is essentially an emergency make-up system  
3 coming from the high pressure injection system, which  
4 is centigrade, and the proper line item.

5 Still I am not very happy about the  
6 response of their coolant system is in scope, and so  
7 I am troubled somewhat about the narrow definitions  
8 provided by the rule and that set the stage for older  
9 plants not to have what I view as important equipment  
10 in scope.

11 So we discussed that issue and the answer  
12 that we received were adequate to not pursue it any  
13 further. I thought the aging effects went quite well,  
14 and were well described.

15 I think that in general that they were  
16 very consistent with what we see in applications, with  
17 the exception of those which are unique to Turkey  
18 Point.

19 And we had quite a number of discussions  
20 regarding the aging management programs, one-time  
21 inspections, and we found them to be generally  
22 appropriate, although again we were lacking the level  
23 of understanding of some of the existing problems that  
24 Dr. Ford was talking about, and so therefore there was  
25 some frustration by some of us that from our

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1 perspective that unless we get back to the kind of  
2 level of review, we can make a judgment oftentimes.

3 We found the Westinghouse Owners Group  
4 topical report quite understandable because of the  
5 combination of SER in front of it, and applicant open  
6 items, and then the RAIs in the back.

7 So you can understand what took place, and  
8 you can go to almost a checklist of what we believe  
9 has been covered and maybe what has not been covered.

10 And I could not figure out what had not  
11 been covered. So I just reviewed the pressurizer, and  
12 the other members reviewed the other documents.  
13 And so I thought the documents were appropriate to  
14 support an application.

15 And finally we looked at the TLAA's, and  
16 there was a complete set, and Mr. Rosen here raised  
17 some concern regarding the proclivity of the RT PTS,  
18 which is 197 degrees Fahrenheit, to the criterion,  
19 which is 300, and so we had a discussion there  
20 regarding what does the criterion mean.

21 And the sense was that the criterion is  
22 really a very conservative, almost lying in the sand,  
23 and you don't have to go into plant specific, but  
24 maybe you want to rest assured, because some plants  
25 are closer to that criterion than others.

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1 DR. ROSEN: Well, I don't know how you  
2 could get any closer to that criterion than Turkey  
3 Point. They are 2.6 degrees away.

4 DR. BONACA: That's right.

5 DR. ROSEN: And Fahrenheit degrees, and if  
6 you think about it in absolute terms, it is so close  
7 you can't get any closer. So I was concerned and I  
8 started raising questions about uncertainty, which I  
9 expect Dr. Kress to pat me on the back for.

10 But I was assured by the other members and  
11 the staff that while it is true that that is very  
12 close, there is an enormous amount of margin in  
13 setting up the 300 degree fahrenheit criterion.

14 DR. SHACK: And that is one case where  
15 uncertainty is explicitly included.

16 DR. ROSEN: In the acceptance criterion,  
17 yes. I didn't go away happy, but I went away.

18 DR. BONACA: Anyway, we will discuss  
19 whatever we put in our letter when we come to the  
20 final report.

21 DR. KRESS: There is still a question of  
22 whether the actual uncertainty in the determination of  
23 that value still exceeds the uncertainty you think was  
24 in the margin itself.

25 There is two uncertainties, and there are

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1 two margins, and so you really need to do the  
2 uncertainty --

3 DR. SHACK: And actually the Reg Guide  
4 1999, you include an uncertainty in your evaluation of  
5 the embrittlement, as well as the -- you know, it is  
6 actually one of the more thought out than most of the  
7 limits that we have for these things.

8 DR. ROSEN: Could I, Mario, go back to one  
9 of my earlier comments, and not this one, but the  
10 question about two over one piping, Raj, you did say  
11 that this matter has been resolved on the Hatch  
12 application?

13 MR. AULICK: Yes.

14 DR. ROSEN: And that that resolution is  
15 now being discussed with the Florida Power and Light?

16 MR. AULICK: Well, every plant is  
17 different, but I think the end result is that they  
18 need to include all non-safety systems and components  
19 which could impact safety related systems, and  
20 structures, and components.

21 DR. ROSEN: Well, my question is whether  
22 that issue still a point of contention between the  
23 staff and the applicant, or has there been a  
24 resolution?

25 MR. AULICK: Between Turkey Point and the

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1 staff?

2 DR. ROSEN: Yes.

3 MR. AULICK: We just started discussions  
4 with them, and they are going to prepare the sponsor  
5 and I think we are going to go again. I don't see any  
6 problems.

7 DR. ROSEN: Well, we have a representative  
8 from Turkey Point here. Would you want to comment on  
9 it? You don't have to.

10 MS. THOMPSON: Well, I can do that. Liz  
11 Thompson again from FPL. We met yesterday in a  
12 noticed meeting to go over a draft response, and  
13 included in that was our two-over-one response.

14 Based on our understanding of the staff's  
15 considerations, and I think in our original  
16 application we had addressed -- if I could just round  
17 it off -- maybe half of the items that the staff  
18 expected to be included under the overall context of  
19 non-safety related which could affect safety related.

20 In our revised or in our draft response  
21 that we provided to the staff for review, we had  
22 gained an understanding from the Hatch interaction of  
23 another type of consideration that we needed to  
24 address.

25 And we had provided that in that proposed

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1 response, which after yesterdays's discussion I think  
2 we found out that instead of that being the other 50  
3 percent, that that was actually maybe another quarter,  
4 and that there was yet a quarter more that we needed  
5 to address.

6 We definitely benefited a lot I think by  
7 having that discussion yesterday and the staff was  
8 very good at going through and trying to identify the  
9 problem statement, and what we needed to address and  
10 so forth.

11 And I think we have the action right now  
12 to go back and revise our proposed response. We would  
13 like the staff members again to take a quick look at  
14 it before we submit it formally so that when it  
15 actually does come in formally here in the short term,  
16 the staff members can sit down and put pen to paper  
17 and write it off, and the issue will be resolved.

18 But I think that we are very close, and we  
19 had a very good interaction yesterday with a number of  
20 the staff members on that particular issue. And it is  
21 a matter of gaining an understanding of the issue, and  
22 being able to communicate that so that we understand  
23 really what is to be addressed.

24 DR. ROSEN: Well, that is all very good,  
25 and as I said before -- and you answered in the

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1 affirmative, Mario, that we would have a chance when  
2 we write the final letter to see how those  
3 interactions all played out.

4 DR. BONACA: Yes, and in fact, in the  
5 review, we are going to assign reviews of all the open  
6 items so you can see how the closure is.

7 MR. AULICK: And I think the schedule to  
8 submit all responses is at the end of this month, or  
9 early next month.

10 DR. BONACA: And from what I hear from the  
11 presentation here, it seems to me that they are trying  
12 to converge the closure and not necessarily to  
13 challenge the basis for the decision there. So that  
14 should be a reasonably easy closure.

15 And with that are there any more questions  
16 or comments by any of the members? If not, I think  
17 the staff for the presentation, and so this part of  
18 the meeting is closed.

19 And then I think we have to wait until 10  
20 of 11:00 to start the meeting, and we will give you a  
21 long break, and we will recess until 10 of 11:00.

22 (Whereupon, the meeting was recessed at  
23 10:07 a.m., and resumed at 10:55 a.m.)

24 DR. BONACA: The meeting is called back to  
25 order. We are scheduled to have a presentation from

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1 Dr. Ford regarding the report from the ACRS  
2 Subcommittee on Materials and Metallurgy regarding the  
3 results of the Steam Generator Action Plan. Peter.

4 DR. FORD: I am really just talking  
5 primarily for Steve Grimes benefit, because everybody  
6 else was at that meeting last week of the Materials  
7 Subcommittee.

8 It was a half-day meeting and the topic  
9 was to do with the steam generator action plan, which  
10 had several parts to it. But before that meeting or  
11 rather since that meeting Noel has kindly arranged a  
12 meeting or arranged for a meeting yesterday between  
13 myself and Ted Sullivan and his staff, just to bring  
14 me further up to date as to where are all these  
15 different parts fit together, because I was getting  
16 completely lost with all the various bits of  
17 information that were being given.

18 And so I made up this flow diagram which  
19 is primarily for my benefit, and I share it because I  
20 will be reporting on the outcome from that Materials  
21 Subcommittee with reference to this diagram.

22 Down on the left-hand side, I have got the  
23 evolution of the NEI 97-06 project or program coming  
24 from the utilities, and as you can see it forms three  
25 conjoint parts; guidelines, performance criteria, and

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1 then the program, which itself is based on EPRI  
2 inspection criteria and Board of Chemistry guidelines.

3 And I understand that you all have been --  
4 that ACRS has been fully informed about that  
5 97-06. Where that stands right now, and this was  
6 discussed at the meeting last week, is that that  
7 program is scheduled by April 2002 to undergo an NRR  
8 SER.

9 Already, however, there are issues seen,  
10 many in the area of the performance criteria, the  
11 question of Pis, and the question of condition  
12 monitoring, and the inspection intervals.

13 Since 1997, the NEI have come out with a  
14 draft generic change package, and in fact there have  
15 been two versions; one in February of 2000 and one in  
16 December of 2000. And as far as I know, this  
17 committee has not seen that. Is that correct?

18 DR. SHACK: That's correct.

19 DR. FORD: Well, that modification of NEI  
20 97-06, some of it was presented at the meeting last  
21 week, and in high level areas, but in talking go the  
22 staff, they are willing to essentially accept that in  
23 place of 97-06.

24 However, they say that it will take  
25 several years to in fact review it, are the words that

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1 they used at the committee meeting. But ultimately  
2 the way they are seeing this package going is that  
3 sometime in April 2002, they will have a joint NRR-NEI  
4 working version of a steam generator change package,  
5 which could then be implemented.

6 Now, this all seems so vague to me, and I  
7 stress that is to me, and it may not be to you. But  
8 I asked the staff that in conjunction with NEI to give  
9 the Materials Subcommittee a breakdown of what this  
10 is, and where we stand on the SER for the 97-06  
11 document, and the generic change document.

12 DR. SHACK: That is the generic tech spec  
13 change document.

14 DR. FORD: That is correct. As to what it  
15 specifically entails, and what the current concerns  
16 that the staff have on those packages. So that is  
17 scheduled for November of next year.

18 I'm sorry, November of this year, with a  
19 presentation to the full committee at the December  
20 full-committee meeting, and on the right-hand side,  
21 you see that the whole issue emanating --

22 DR. ROSEN: When are they going to present  
23 that to us?

24 DR. FORD: They are going to present it in  
25 a half-day meeting; the question of the NRR and NEI --

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1 DR. SHACK: The generic tech spec change  
2 package.

3 DR. FORD: Well, not only the issues that  
4 the NRR have on 97-06, but also the details of the  
5 generic change package. They are going to discuss  
6 both. Both entities are going to come to discuss both  
7 packages.

8 DR. SHACK: With us?

9 DR. FORD: With us, at the end of  
10 November. They are meeting at the beginning of  
11 November -- NEI and NRR -- to discuss those packages,  
12 and they are going to report to us at the end of  
13 November.

14 DR. ROSEN: Meaning the subcommittee?

15 DR. FORD: Subcommittee. And we will  
16 report to the full committee in December. The reason  
17 why I wanted to push this was two things. This thing  
18 has been dragging on for one heck of a long time.

19 The utilities are essentially running the  
20 show. They are self-assessing themselves on the basis  
21 of 97-06. There seems to be very little leadership --  
22 and maybe that is too powerful a word from the start -  
23 - and I just wanted to push the whole process forward.

24 And at the same time to make sure that we  
25 were on board with this thing as it moves forward,

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1 rather than me coming in at the last minute with  
2 objections.

3 DR. SHACK: You have to realize that  
4 doesn't exactly put the utilities in charge, because  
5 they get to do 97-06, and plus they get to live with  
6 their current tech specs.

7 DR. FORD: Yes.

8 DR. ROSEN: Unless they have asked for  
9 modifications.

10 DR. SHACK: Unless they have asked for  
11 modifications, and so they in fact have a double-  
12 regulatory package to live with.

13 DR. ROSEN: Which many of them have.

14 DR. FORD: Yes.

15 DR. SHACK: Yes.

16 DR. FORD: Well, put down that the  
17 regulatory guidelines --

18 DR. SHACK: But you make it sound as if  
19 they are in charge.

20 DR. FORD: No, I'm sorry, but they are  
21 pushing technically the whole --

22 DR. POWERS: Well, why shouldn't they be  
23 the ones to do that to the ones with the problem.

24 DR. ROSEN: Exactly.

25 DR. FORD: Well, I am new to this, and

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1 where regulators come into this whole decision making  
2 process, but I would have thought that the regulators  
3 should at least have some sort of leadership role in  
4 this whole issue.

5 DR. POWERS: The regulator has a  
6 requirement to maintain the integrity of the reactor  
7 coolant system, and his investigation of phenomenology  
8 is done simply so he can understand what the licensee  
9 is proposing to maintain that integrity.

10 So in this area, particularly this area,  
11 it has always struck me as useful for the NRC to join  
12 in the partnership for the research with the industry,  
13 but it is predominantly the industry dime that ought  
14 to be spent.

15 Now, it happens that we have got a lot of  
16 personalities leaning forward in the trenches at the  
17 NRC, but as far as who should be spending the bulk of  
18 the money and the bulk of the effort, it is an  
19 industry problem.

20 DR. FORD: I am not talking about  
21 resources, monetary resources, or dollars spent --

22 DR. SHACK: But they are leading them. I  
23 mean, they said plug or detect on detection unless you  
24 can demonstrate to us that it is safe to operate some  
25 other way.

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1 DR. ROSEN: As far as industry leadership  
2 and NRC leadership, you have to understand this whole  
3 thing in context. This is not a new issue. It has  
4 been going on now for 20 years.

5 DR. POWERS: Since they put the first  
6 steam generator in.

7 DR. ROSEN: And the formation of the first  
8 steam generator owners group one, and then steam  
9 generator owners group two, and now it is called  
10 something, and now it has got 97-06. This is the end  
11 of a very long trail you are seeing.

12 DR. FORD: But is no one worried?

13 DR. ROSEN: Well, in the sense that we  
14 hope that the steam generators will be replaced.

15 DR. FORD: No, you didn't let me finish  
16 the sentence. Is no one concerned that this thing  
17 came out in 1997, and the NRR has not even given an  
18 SER yet, and they don't plan to until April of next  
19 year? Does that concern you?

20 DR. SHACK: Not as long as they are  
21 plugging on detection.

22 DR. DUDLEY: No, the staff has reviewed  
23 it, and what they are in is a negotiating phase now,  
24 and they are not satisfied with the ramifications of  
25 the present version.

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1 DR. FORD: Because now they have  
2 transferred some of those things to the evaluating and  
3 generic change package. NEI has come out with a  
4 generic change package in February and December of  
5 2000.

6 DR. SHACK: Well, the generic change  
7 package is what really let's them implement these  
8 alternate repair criterion. Otherwise, they have to  
9 live -- I mean, the current tech specs says basically  
10 plug on detection.

11 So if you are going to get away from that,  
12 you need a new text spec that somehow implements it,  
13 and the real question is how much freedom do you give  
14 the licensee to manage that, and how much do you  
15 micromanage what he is doing with that, and that  
16 really is the kind of arm twisting that goes on.

17 As it is at the moment, NRR is in sort of  
18 complete charge. You know, you plug on detection,  
19 unless you come in and make a case that we don't have  
20 to.

21 DR. FORD: Maybe I am being very  
22 simplistic here, but I find that this is supposed to  
23 be a partnership, in terms of the regulators and the  
24 utilities working together, and arguing, and making  
25 their cases?

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1 DR. POWERS: No.

2 DR. FORD: You don't think that is wrong?

3 DR. POWERS: It shouldn't be a  
4 partnership.

5 DR. SIEBER: It is the regulator and the  
6 regulated.

7 DR. POWERS: This is a confrontational  
8 system.

9 DR. FORD: Well, it is not a very  
10 constructive confrontational system.

11 DR. POWERS: Well, that may be true.

12 DR. FORD: Well, let me ask the question,  
13 do you think it is necessary that the Materials  
14 Subcommittee review where we stand technically on the  
15 review of 97-06 and the generic change package?

16 DR. POWERS: Yes, I think so.

17 DR. SHACK: I think it is. It would be  
18 very interesting to know exactly where the hard spots  
19 are.

20 DR. DUDLEY: There is one hard spot, is  
21 the inspection frequency. Right now with the package  
22 as it is written, licensees could go to -- let me get  
23 this right -- 20 effective full power years between  
24 steam generator tube inspections.

25 DR. POWERS: So, 20 years without

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1 inspecting the suckers.

2 DR. DUDLEY: That's right, and that's why  
3 the staff has pause about approving it.

4 DR. SHACK: Now, that one you sort of have  
5 to wonder if they are really serious.

6 DR. KRESS: There has to be something  
7 wrong with that.

8 DR. SHACK: You must be jesting here.

9 DR. POWERS: What we really want are two  
10 cycles. So let's propose 10 and see if they will fit  
11 us down to only two instead of every half-cycle.

12 DR. FORD: This report is going to be what  
13 happened last week, and essentially we went over the  
14 essences of that whole program, including the DPO  
15 issues. There are no issues at all with the right-  
16 hand side.

17 The other issue that came up yesterday and  
18 today, and in talking to Joe Muscara, is that it has  
19 been my understanding that the outputs from the NRR  
20 research action plan to which we had input are going  
21 to be then mellowed in to various revisions of the  
22 generator change package as it comes out, and as it is  
23 used and revised.

24 DR. WALLIS: That may delay it even  
25 longer, because they won't do all this stuff on the

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1 right-hand side in time for that to come up in April  
2 2002.

3 DR. DUDLEY: Well, they have been waiting  
4 5 years now.

5 DR. FORD: Well, that is how long it will  
6 take for the action plan number three.

7 DR. WALLIS: Well, it seems that there is  
8 no sense of urgency whatsoever.

9 DR. SHACK: Well, I have no urgency to  
10 approve an inspection program that will let them go 20  
11 years.

12 DR. WALLIS: Well, what is the problem  
13 with --

14 DR. FORD: Of course you are not going to  
15 approve that, but you are going to approve something.

16 DR. WALLIS: What is the problem here if  
17 you go back to the beginning? Is the problem that  
18 there is some threat to safety from steam generator  
19 tube integrity? Is it too much of a burden on the  
20 industry, or what sort of bases was the problem?

21 DR. POWERS: It is a burden on the  
22 industry and it is a risk dominant accident.

23 DR. DUDLEY: It is a burden on the  
24 industry because with the plug criteria the way it  
25 presently exists, is that any defect that you find in

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1 a tube, you plug, and licensees were finding that they  
2 were running into a number of tubes that would be  
3 continued to be allowed to operate.

4 DR. WALLIS: So maybe by 20 years they  
5 will all be plugged or not enough of them will be  
6 plugged.

7 DR. POWERS: Some plants are already  
8 having to de-power right now because they are running  
9 out of tubes. And the answer to that is replace your  
10 damn steam generators.

11 DR. DUDLEY: And what we are seeing now is  
12 the voltage based criteria allows them to leave some  
13 of those tubes in service to get an extra year or  
14 year-and-a-half before they are replaced and Dr.  
15 Hofenfeldt said is this the safest thing to do based  
16 on our present knowledge base.

17 DR. FORD: Just to finish going down this  
18 diagram, my assumption was that data from the NRR  
19 research program would be fed into this generator  
20 change package as the revisions come out.

21 Based on the discussion with the staff  
22 yesterday, it is not at all clear that that is the  
23 plan. After talking to Joe Muscara, that is also his  
24 perspective, but it is certainly not the stated plan  
25 of the NRR.

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1           So that is why I am suggesting in the  
2 letter that Dana authored yesterday that there should  
3 be a specific item in there on the ACRS and that it  
4 would be expected that it would be part of the  
5 evolution of the various modifications.

6           DR. WALLIS: Is there something down the  
7 road where if you could put in a new steam generator  
8 that they won't have all these problems with tubes?  
9 Has there been actually an advance in the technology  
10 of steam generators so you don't have these?

11          DR. POWERS: Not as long as Westinghouse  
12 is allowed to exist on the face of the planet.

13          DR. FORD: A technical reason is that you  
14 can't guarantee it. 690 will crack.

15          DR. WALLIS: And there are so many tubes.

16          DR. FORD: It will take longer to crack.

17          DR. SHACK: I think the fairer statement  
18 is that it is an open issue. The experience with 600  
19 thermally treated and 690, with 600 thermally treated,  
20 you have 20 years of experience that indicates that it  
21 is much better than 600 mill annealed, which is the  
22 one that solved the problem.

23                 With 690, you have 10 years of experience  
24 and laboratory data that indicates it is much better.  
25 Whether it is good for 60 years is a very different

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1 question. So you have to have an inspection program  
2 that can detect degradation of 690 if it occurs. So  
3 then you argue over what the details of that  
4 inspection program should be.

5 DR. FORD: And as far as the meeting last  
6 week, I want to go five minutes more. There was a lot  
7 of discussion on the right-hand side, and we have  
8 already dealt with that, with the letters going out  
9 tomorrow.

10 On the left-hand side, there were very  
11 high level discussions, and some small action items  
12 which haven't been completed, but they were merely in  
13 terms of communications items, such as workshops, and  
14 clarified guidance documents, et cetera, but nothing  
15 substantial in terms of technical discussion and  
16 answers.

17 That is why they are having a meeting in  
18 November to discuss those specific items. The other  
19 item that was talked about in a very full morning was  
20 the South Texas project.

21 DR. ROSEN: I have to recuse myself from  
22 these discussions. I can listen to generic parts, but  
23 I won't take part in any discussion of the South Texas  
24 specifically.

25 DR. FORD: Remember that the problem that

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1 arose out of this is that at the end of Cycle 8 that  
2 it was observed that out of four steam generators  
3 there was 35 total gallons per day leakage.

4 And what surprised me was that this was  
5 the first domestic plant leaking from ODSCC, and I  
6 didn't realize that it was the first one to show  
7 leakage. The unusual aspect about this particular  
8 plant is that it had stainless steel support plates,  
9 and the significance of that is that there is less  
10 crud in the crevice of the tube support plate, and  
11 allows more leakage than the carbon steel support  
12 plate, where there is a lot of crud.

13 However, we do know that even with the  
14 stainless steel tube support plate that there is crud  
15 in that crevice. At the end of Cycle 8, they had  
16 projected that there would be 3,522 crack indications;  
17 whereas, there were in fact 3,579 actual indications,  
18 otherwise under-predicting.

19 And then when they looked at an  
20 examination of the actual indications of Cycles 5, 6,  
21 7, and 8, it indicated that there was a steadily  
22 increasing rate of indications. In other words, the  
23 problem is accelerating.

24 Now, coincidentally at the same time, it  
25 had made a request for an amendment to GL 95-05 for

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1 Cycle 9 to increase the voltage from 1 volt to 3 volts  
2 for those tube support plates which had an expanded  
3 tube in it in order to keep the tube support plates in  
4 one place should there be an accident.

5 However, in view of the leakage during  
6 Cycle 8, they went back to an effective 1.5 volt, and  
7 they have not incorporated the 3 volt limit. And at  
8 the end of this current cycle now there has been no  
9 particular change.

10 Now, there is one interesting item of  
11 interest which was not given out at the meeting last  
12 week, and that was in the memo from Travers to Meserve  
13 in the first CPO situation.

14 South Texas took one of those tubes and  
15 pressurized it. They were getting one gallon per day  
16 before pressurizing, and when they pressurized it to  
17 simulate an accident situation, they increased it to  
18 one gallon from that one shoe.

19 That from my memory is the salient point  
20 that came out of both days. It was a fairly brief  
21 presentation last week. But they are not operating at  
22 3 volts. They are currently operating at 1.5.

23 DR. WALLIS: What do you mean operating at  
24 a certain voltage?

25 DR. FORD: The voltage that they would use

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1 during the eddy examinations.

2 DR. WALLIS: And the higher voltage  
3 reduces --

4 DR. FORD: Allows them to operate.

5 DR. SHACK: It allows more damage in the  
6 tube before you have to plug it.

7 DR. WALLIS: Is there a rule about what  
8 they are allowed to use?

9 DR. SHACK: Yes.

10 DR. FORD: 95.05 is the rule for big  
11 quarter-inch tubes, and --

12 DR. WALLIS: So how did they go to the 3  
13 volt?

14 DR. SHACK: They got an exemption.

15 DR. WALLIS: Got an exemption, and that is  
16 the whole thing that we were talking about.

17 DR. SHACK: They got an exemption because  
18 they went through a process to lock their tube support  
19 plate into place by expanding tubes

20 DR. SIEBER: That's right, but that causes  
21 additional problems

22 DR. POWERS: It probably increases short  
23 term cracking.

24 DR. SIEBER: Yes. It is a short term fix,  
25 and at the end of that short term, it is guaranteed

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1 replacement.

2 DR. POWERS: And the point is that the  
3 plants in Texas are all falling apart anyway.

4 DR. SIEBER: They are not unique.

5 DR. WALLIS: What might be the ACRS role  
6 in all of this except to keep track of what is going  
7 on?

8 DR. SIEBER: Right.

9 DR. DUDLEY: I would say to review and  
10 comment on the present version of NEI 97-06, and  
11 understand why the staff has not approved it.

12 DR. POWERS: I think I was not joking when  
13 I said people coming in and proposing 20 year  
14 inspection frequencies are doing so with the objective  
15 of getting bid down to five.

16 And I would think that the ACRS review  
17 would say that this is all nonsense and you are going  
18 to inspect every damn time or something like that.

19 DR. FORD: But they won't know that until  
20 we have a presentation.

21 DR. POWERS: Well, you can't do that until  
22 you have got the facts, and what the technical bases  
23 is for -- well, in fact, everybody is going to go to  
24 a two year fuel cycle. So you are going to go two  
25 years.

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1           There is a substandard question in my mind  
2 fore the plants with known flaws, and whether two  
3 years is too long. Now, those with the better  
4 materials, where you have an induction period that we  
5 know from laboratory tests do we give them the  
6 induction period for the inspections as well?

7           And it is a little hard to do that in the  
8 absence of more definitive evidence than we derive  
9 from laboratory tests. But maybe if we have a lead  
10 plant, which we do, you can find a justification, and  
11 then how frequently do you do it after the induction  
12 period?

13           DR. FORD: Well, it was to get that  
14 technical information behind the generator change  
15 package of 97-06, and we needed it in order to be  
16 constructive.

17           DR. POWERS: What we can do actually if we  
18 thought about it carefully, we could assign colors to  
19 these things and have an action matrix.

20           CHAIRMAN APOSTOLAKIS: Maybe this is a  
21 signal that we should close this part of the review.

22           DR. FORD: That was my final comment.

23           CHAIRMAN APOSTOLAKIS: Thank you, Peter.  
24 Okay. The next item is that we will hear from our  
25 Fellow, Jack Sorensen. He has presented to us his

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1 work at least a couple of times that I remember on  
2 safety culture and risk-informing general design  
3 criteria.

4 The reason for the presentation is just to  
5 refresh our memory I understand. You are not going to  
6 go back and present the whole thing.

7 And to present the essence of the reports  
8 are saying, and the hope is that the committee will  
9 bless the reports, which we assume you have read.

10 DR. POWERS: If you haven't read them, the  
11 report on safety culture especially is just superb.

12 CHAIRMAN APOSTOLAKIS: Yes, very good  
13 documents. We want to send them up to the Commission,  
14 especially the safety culture report, which has been  
15 sitting there for a while now.

16 And the GDC as you recall was requested by  
17 Commissioner Diaz when he came here, and on top of  
18 everything else, Jack's tenure is coming to an end.  
19 I understand that your employment has been extended to  
20 the end of December?

21 MR. SORENSEN: I understand that is being  
22 considered.

23 CHAIRMAN APOSTOLAKIS: All right. Why  
24 don't we let Jack go through his prepared comments,  
25 and then we will maybe have a discussion.

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1 MR. SORENSEN: Actually, what I thought I  
2 would do is focus more on where the Committee might go  
3 with this issue, and then with the safety culture  
4 report itself, the rationale being that there have  
5 been several presentations on the contents of the  
6 report.

7 CHAIRMAN APOSTOLAKIS: But when you pose  
8 questions as to where the Committee should go,  
9 presumably there is some technical basis behind the  
10 argument if we can find the report.

11 MR. SORENSEN: Presumably.

12 CHAIRMAN APOSTOLAKIS: Presumably.

13 MR. SORENSEN: Starting with the safety  
14 culture issue first. The three questions that were  
15 posed when I started out on this work a couple of  
16 years ago were what is safety culture, and why is it  
17 important, and what can the NRC do about it.

18 And a couple of possible answers to the  
19 latter two questions are indicated here, and that  
20 those came out of the work. The perception of the  
21 safety culture is important as related to improving  
22 human performance and reducing latent errors, and  
23 those issues come up in a good bit of the work that  
24 has been done.

25 What can the NRC do about it. Well, the

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1 two things that are probably non-controversial are  
2 fostering development of strong safety culture among  
3 licensees, and identifying performance indicators for  
4 human performance or safety culture. With respect to  
5 --

6 CHAIRMAN APOSTOLAKIS: Well, I have a  
7 comment on this. I think a very important result of  
8 your work that is in the report that is very relevant  
9 to the last question is your finding, which I think is  
10 from the U.K. committee, that no matter what we do  
11 here, we do affect the safety culture of the  
12 licensees.

13 It is not like we can sit back and say,  
14 no, it is their job. I mean, if we regulate too much,  
15 then we have a certain influence. If we regulate too  
16 little, then we have a certain influence.

17 I think it is very important for the  
18 Commissioners to understand that the way we do  
19 business is an influence on the safety culture of the  
20 licensees, because that is a different perspective  
21 from saying as the Commission says right now that, no,  
22 safety culture is the exclusive domain of licensee  
23 management, and we don't want to get involved.

24 You are already involved de facto, and so  
25 the question now is how do you do your regulation to

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1 foster the development. I think that is a very  
2 important point or message to send to the Commission.

3 MR. SORENSEN: I would certainly agree  
4 with that, and as we get to the end of my remarks  
5 here, I had planned to highlight the fact that my  
6 personal concern in looking at interactions between  
7 the NRC and the licensees on this issue, that the NRC  
8 understand that the regulator, the NRC, understand  
9 that it can have a negative impact on safety culture,  
10 and there is probably things that it should avoid  
11 doing.

12 CHAIRMAN APOSTOLAKIS: In fact, I remember  
13 your report that the British are using us as an  
14 example of a bad influence.

15 MR. SORENSEN: They regard the U.S. system  
16 as being overly prescriptive from that standpoint.

17 CHAIRMAN APOSTOLAKIS: Overly  
18 prescriptive, and that we are having a negative impact  
19 on the safety culture.

20 DR. WALLIS: Overly confrontational, too.

21 CHAIRMAN APOSTOLAKIS: I don't know  
22 whether that is a valid technical comment, or is it  
23 because they lost the colonies.

24 DR. WALLIS: I think most European nations  
25 are less confrontational and there is more cooperation

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1 between the regulator and the --

2 MR. SORENSEN: Yes, the regulatory  
3 structure is quite different here compared to  
4 virtually anyplace else you look.

5 CHAIRMAN APOSTOLAKIS: And another factor  
6 that one might bring up is that the period after  
7 Northeast Utilities that the NRC intensified certain  
8 things, and if you talk to the utility people, they  
9 will tell you that the impact was negative on the  
10 cultural of the industry.

11 MR. SORENSEN: Speaking as a non-  
12 practitioner of human factors in general, I would  
13 suspect that if you look at the historical impact of  
14 the NRC's enforcement program that it has had a lot of  
15 negative effects on licensee effectiveness in  
16 promoting safety culture.

17 CHAIRMAN APOSTOLAKIS: I think that is one  
18 of the more important findings, because I think it may  
19 affect the Commissioners' thinking on the subject,  
20 which right now is hands off.

21 DR. BONACA: Your report also, I thought,  
22 specifically under why is it important, is that it  
23 fosters safe decisions. The outcomes are typically  
24 human performance, and actual latent errors, but there  
25 are also other decisions that really don't or can

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1 measure directly to just specific outcomes.

2 But they give a full direction to the way  
3 that the power plant makes its decisions regarding so  
4 many different issues. I think the report talks about  
5 that.

6 MR. SORENSEN: Yes, clearly one of the  
7 things that is not understood well is exactly how  
8 something called safety culture -- well, what is the  
9 mechanism by which it improves safety of operations.

10 DR. BONACA: The ultimate results are  
11 those, of course, but I think it is an important  
12 intermediate step, particularly when it comes to  
13 monitoring.

14 CHAIRMAN APOSTOLAKIS: Okay. The signs  
15 are not good that you will be done in 20 minutes.

16 MR. SORENSEN: I thought it might be  
17 worthwhile just to look at what formal recognition  
18 there is of safety culture in the current NRC  
19 regulatory program. And it comes up basically in  
20 three places.

21 There is a policy statement on conduct of  
22 operations, which says among other things that utility  
23 management has a responsibility to foster strong  
24 safety culture.

25 And that policy statement uses the INSAG

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1 definition of safety culture and in fact that is  
2 embedded in the policy statement. There is a second  
3 policy statement on safety conscious work environment,  
4 and that very narrowly focuses on the issue of the  
5 freedom of employees to raise safety issues without  
6 fear of retaliation.

7 And the phrase "safety culture" does not  
8 appear in the policy statement. I think it appears  
9 once in the Federal Register Notice in response to a  
10 question, but safety culture is not part of it.

11 And a third place where safety culture  
12 comes in is in the identification of cross-cutting  
13 issues and the reactor oversight program, and they  
14 identified three, and they are human performance,  
15 safety conscious, work environment, and problem  
16 identification.

17 And then the staff paper makes almost a  
18 parenthetical reference to safety conscious, work  
19 environment, as also being called safety culture and  
20 sometimes called safety culture.

21 I think it is clear that that equation,  
22 equating safety conscious working environment, and  
23 with safety cultural, is a much, much narrower  
24 definition of safety culture than virtually everybody  
25 else uses.

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1 DR. ROSEN: And in particular I would  
2 point out that the INPO performance objectives and  
3 criteria in its most recent revision as a specific  
4 performance objective on safety culture, along with  
5 criteria, for their inspectors to look at.

6 So this issue is being dealt with head on  
7 by the utilities under Info leadership.

8 MR. SORENSEN: That is not to say that  
9 they don't have a role, and I will have a view on that  
10 separately. But I just wanted the committee to know  
11 that that is a fact.

12 DR. POWERS: It seems to me that the  
13 question that is going to come peculating up as we  
14 progress through here is closely there is a safety  
15 culture within the nuclear community, and the  
16 regulator has a role in it only if he that that safety  
17 culture is inadequate or is vulnerable to degradation.

18 CHAIRMAN APOSTOLAKIS: But if a regulator  
19 is under the wrong impression but his actions do not  
20 affect safety culture, it seems to me that is an issue  
21 though.

22 DR. POWERS: I think the question the  
23 commission keep posing, I don't think they disagree  
24 with you. They have their actions as a regulator of  
25 it, and effect on the safety and culture is do they

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1 want to explicitly involve themselves in safety  
2 culture.

3 And you are saying, well, your actions  
4 affect the safety culture and they are going to go,  
5 yes, of course. Now, that doesn't mean that I have to  
6 get involved explicitly.

7 CHAIRMAN APOSTOLAKIS: It means that I  
8 have to understand how I do that.

9 DR. POWERS: No, I don't think so. Why do  
10 I have to understand that?

11 CHAIRMAN APOSTOLAKIS: Because I may be  
12 doing something wrong, and I don't realize it, and  
13 that is not a very healthy state of affairs.

14 DR. POWERS: But you may not be and so why  
15 involve a lot of --

16 CHAIRMAN APOSTOLAKIS: I may not, that's  
17 true. Now, there is a statement in a recent document  
18 from the reactor oversight process that there is  
19 evidence from the first year of publication that the  
20 performance indicators do indeed tell the staff  
21 something about the safety cultures.

22 In other words, their regional assumption  
23 is that they don't have to do anything about these  
24 because if they are not good, we will see it in the  
25 performance indicators is beginning to be validated.

1 MR. SORENSEN: I am not sure of the rating  
2 that you are referring to, but my own sense of it is  
3 that if you are using hardware performance indicators  
4 as a measure of human performance, those are still  
5 going to be lagging indicators.

6 And I think the real interest in  
7 indicators of human performance or safety performance  
8 indicators for human performance or safety culture is  
9 that they would -- is the hope that they would indeed  
10 be leading indicators, and that they would indicate  
11 that something is happening before you started having  
12 hardware failures.

13 DR. POWERS: If you look for some results  
14 coming out of the reactor oversight process that are  
15 indicative of the level of safety culture at a plant.  
16 I think we need only look at the longevity of  
17 corrective actions with respect to fire protection on  
18 the corrective action list.

19 I think you will universally find that the  
20 items with the longest lifetime on corrective action  
21 lists are fire protection issues. And what you know  
22 is that fire protection does not generate kilowatts,  
23 and consequently it gets the tail end of the resource  
24 base.

25 CHAIRMAN APOSTOLAKIS: In general the

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1 whole corrective action program and whatever comes  
2 with that end of it is an amazing window on the health  
3 of safety culture in many ways, because it talks about  
4 the resources assigned to the program, and the  
5 priorities and the interests, and the willingness to  
6 clear the issues, the quality of the closure of  
7 issues, the repeats.

8 DR. ROSEN: I would say that the fire  
9 protection program is one slice of it, but the most  
10 direct indicator that you have, the most integrated  
11 indicator of safety culture, is the performance of the  
12 corrective action system.

13 DR. BONACA: In a global sense,  
14 absolutely.

15 DR. ROSEN: Which includes fire  
16 protection.

17 DR. BONACA: And I want to say that the  
18 NRC knows that very well. When Millstone was in  
19 recovery, they had tremendous focus, and everybody at  
20 the company finally understood, and that is really  
21 where you have to look, because it told you if you had  
22 enough resources, and it told you where the attention  
23 of the management was.

24 It told you all those things, and at the  
25 end you were not looking at anything else but that.

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1 That was really such a focus of the whole nuclear  
2 review board, the whole management of the NRC,  
3 everybody.

4 DR. ROSEN: And it told you about the  
5 willingness of the staff to bring issues up and the  
6 receptiveness of management to the fact that the staff  
7 has brought issues up across the board, even including  
8 fire protection issues.

9 So the window on the future is always the  
10 corrective action system. INSAG says that the  
11 effectiveness of the organization safety culture  
12 should be reflected in the performance of the  
13 facility, coming back to what we talked about before,  
14 and that is absolutely true.

15 But it is also true that if you look at  
16 the performance of the facility that it is telling you  
17 how the corrective action system worked six months  
18 ago, or a year ago, or two years ago.

19 If it worked very well two years ago, the  
20 performance of the facility will be good today. So  
21 looking at plant Pis today is a lagging indicator as  
22 you said of the safety culture, which includes at the  
23 heart of it the corrective action system, and which  
24 can be a leading indicator.

25 MR. SORENSEN: If one wants to go beyond

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1 where we are at the moment, I think it is worth  
2 recognizing that outside the NRC's regulatory program  
3 there is a school of thought evolving and being  
4 articulated in a number of places that fostering  
5 safety culture is the third stage, or the most evolved  
6 way of implementing a safety management or safety  
7 regulation program.

8 The early view is that -- I'm sorry, but  
9 the initial basis for a safety program was  
10 concentrating on outcomes. You prohibit outcomes or  
11 consequences that you think are unacceptable and  
12 punish people if they don't avoid those outcomes.

13 The second stage is prescribing actions  
14 which is basically the philosophy that is underlying  
15 our current regulatory scheme in the United States;  
16 and the third stage of evolution is fostering safety  
17 culture, and basically letting the licensee's do what  
18 they need to do to run their business as long as they  
19 meet whatever safety goals you set for them.

20 I would point out that with respect to the  
21 changes that are going in within the NRC reactor  
22 oversight program in particular, the underlying  
23 regulations have still not changed.

24 I mean, the regulations that are being  
25 enforced are still basically the same regulations that

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1 we have had for the last number of years, and the  
2 issues are still compliance issues in the final  
3 analysis.

4 I guess the question that one might pose  
5 for the committee is whether you want to at some point  
6 recommend that the NRC do more with respect to  
7 encouraging the development of strong safety cultures,  
8 or evaluating that the strength or impact of licensee  
9 safety cultures.

10 And I suggested three possible answers  
11 here. Dana came up with a fourth one. There is  
12 probably as many possible answers as there are people  
13 in the room.

14 The first possibility is yes, and as  
15 George pointed out a few moments ago it is too  
16 important to ignore and the agency is already dealing  
17 with it in some form anyway.

18 The second, which I suspect might be an  
19 answer from many of our industry friends, is that  
20 basically the issue is too important for the regulator  
21 to get too closely involved in. It comes too close to  
22 the heart of managing the facility.

23 And you could also decide no because we  
24 really don't understand how a safety culture affects  
25 the safety of operations, even if we believe strongly

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1 that it does.

2 If one starts down that path the first  
3 thing you will run into is the SRM --

4 DR. ROSEN: Which path do you mean by  
5 "start down that path?"

6 MR. SORENSEN: Of doing something, sorry.  
7 If you start down the path of yes, you would like to  
8 see the agency do more than it is doing now. The  
9 first thing you run into is the staff requirements  
10 memo from SECY 98-059, which basically says efforts to  
11 develop leading indicators of performance should not  
12 use licensee management performance or confidency as  
13 an input.

14 And concludes by saying that the  
15 Commission approved the elimination of any Fiscal Year  
16 '98 funds and subsequent years as well. Research  
17 expenditures specifically directed at developing a  
18 systematic method of inferring management performance.

19 And when you discuss the issue of safety  
20 culture, and particularly with the human factors  
21 people here at the agency, they invariably point to  
22 this memorandum as prohibiting them from looking into  
23 safety culture issues.

24 And I think it has had a significant  
25 effect on the planning in the human performance area.

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1 I would suggest that there in fact is room to explore  
2 what that memo actually says and what it was intended  
3 to say.

4 And what if anything you can do in terms  
5 of research or development without impinging on the  
6 Commission's intent here. And I think it might be  
7 useful to view the challenge for the staff as being  
8 one of framing the issue of safety culture in such a  
9 way that they can look at it without impinging on  
10 licensing management prerogatives. And I think there  
11 should be a way of doing that.

12 DR. WALLIS: How would you look at it  
13 then?

14 MR. SORENSEN: Well, I am not a human  
15 factors person. I'm not sure, but it just seems  
16 possible to me. And I am probably looking beyond the  
17 intent of the Commission in this SRM. This was a  
18 response to a paper -- and I have forgotten the  
19 precise title of it, but it was options for evaluating  
20 the confidency of licensee management.

21 And having worked as a technical assistant  
22 for a Commissioner for a few years, I can assure you  
23 that the wording of the options in that memo were  
24 phrased in such a way that it would inevitably draw  
25 not only a no, but a hell no, from any Commissioner

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1 that voted on it. And that is exactly what happened.

2 DR. POWERS: You suspect that it was --  
3 that the titling was deliberate to ensure that they  
4 would get that response?

5 MR. SORENSEN: I expect -- well, I can't  
6 put myself in the mind of the people who wrote it, but  
7 I would be surprised given the way the paper was  
8 worded if the staff expected any other outcome.

9 I think what may have been a surprise was  
10 this wording probably went further than the staff  
11 expected. I don't think that as fallout that they  
12 expected that the Socrates work at Idaho National  
13 Engineering Laboratory would be canceled, which is  
14 what that last paragraph refers to.

15 DR. POWERS: They may have had additional  
16 help.

17 MR. SORENSEN: Possibly. So I think this  
18 is something that might well be worth a look. In a  
19 somewhat broader sense, the areas that appear to be  
20 possibly interesting for additional human factors  
21 research are the ones that I have listed here.

22 And independent on this paper of safety  
23 culture, I did a critique of the human factors program  
24 for Dr. Powers as input to the ACRS report on the  
25 research program at the end of last year.

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1           Most of you have probably not read that,  
2 but it is probably worth reading in conjunction with  
3 the safety culture paper, because if you are going to  
4 somehow influence the human performance agenda here at  
5 the agency, you need to go back to the research folks  
6 with some kinds of suggestions.

7           DR. ROSEN: But with all due respect, why  
8 do we think we need to do more research on the issue?  
9 My take is that it is as important as you suggest to  
10 the ultimate safety of this enterprise, but that we  
11 understand in some fairly good detail how safety  
12 culture impacts the safety of operations.

13           And we don't need to research that any  
14 more. What we need to understand as a regulating  
15 community is how we cannot have or at least do no harm  
16 and potentially help.

17           MR. SORENSEN: Well, one of the things  
18 that strikes you in going through the literature or  
19 struck me is the lack of empirical information in the  
20 nuclear power generation business that relates safety  
21 culture to safety of operations that have been good  
22 statistically strong studies done in transportation of  
23 chemicals and so forth.

24           Those have simply not be done in the  
25 nuclear business. If the committee, for example, is

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1 willing to mentally translate the results from the  
2 chemical industry into the nuclear business, then I  
3 think the case is made if that is sufficient evidence,  
4 but it hasn't occurred in the nuclear business.

5 DR. ROSEN: I will grant you that, but I  
6 will also say that there are some of us on the  
7 committee who feel they have lived this issue for the  
8 last 30 years of a life and have a fairly good feel  
9 for how it works.

10 So I don't see it personally that research  
11 is the issue or is needed. I think we need to grapple  
12 with what we do about it.

13 DR. BONACA: I think one of the focuses of  
14 the research has been to try to find the connection  
15 between the safety culture and equipment performance,  
16 for example. That is very difficult to measure.

17 That is very difficult. There are a lot  
18 of assumptions that are being made there, but there  
19 are areas where one could look and find some  
20 dependence. The other is one area that we were  
21 discussing before about the impact of the regulator on  
22 the safety code.

23 And this is very significant. If you look  
24 at right now the new ROP, the ROP has in it a  
25 significant examination process, and really assesses

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1 risk significance. But if you look at the focus, for  
2 example, in some of the recovery actions for power  
3 plants, it drives the operator of the plant to focus  
4 on compliance.

5 The whole issue then becomes compliance,  
6 irrespective of whether or not that becomes safety  
7 significant, because the licensee is so worried about  
8 performance as measured by the regulator that he just  
9 looks at compliance.

10 And you go back to the guys and say wait  
11 a minute now. Is this safety significant or not, and  
12 they say what do you mean. Compliance becomes their  
13 preoccupation.

14 CHAIRMAN APOSTOLAKIS: In that context,  
15 you remember that some leaders of industry wrote a  
16 letter to the Commission complaining about the  
17 initiating event performance indicator, and which  
18 includes all sorts of SCRAMs, and they said such a  
19 regulatory requirement would have a negative impact on  
20 the operator.

21 DR. BONACA: So this issue is an example  
22 of a regulatory requirement that might have a negative  
23 impact.

24 CHAIRMAN APOSTOLAKIS: And this committee  
25 has also commented on the shutdown DIs, and where they

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1 said, look, it normally takes 6 hours to do this job  
2 and so the performance indicator would be how many  
3 extra hours did you spend.

4 And the industry comes back and says wait  
5 a minute now, we wanted to be cautious, and it was the  
6 right thing to do, and you are telling us that you are  
7 going to punish us. So, you see, all these things  
8 inadvertently affect safety culture.

9 DR. BONACA: Well, the point you were  
10 making in the beginning is that would be an important  
11 communication point to the Commission for the  
12 understanding of how the staff itself and the  
13 Commission is influencing the safety culture.

14 CHAIRMAN APOSTOLAKIS: And coming back to  
15 the point that Steve made reminded me of something,  
16 and that may require some research. I don't know if  
17 research is the right word.

18 I have heard from many people with  
19 experience in the utility business that you, and Jack,  
20 and Mario have, that they can walk into a plant and  
21 have never been there before, and in 5 or 10 minutes  
22 they can tell whether this is a good, well run plant,  
23 or not.

24 DR. SIEBER: A little longer than that.

25 CHAIRMAN APOSTOLAKIS: 15 minutes then.

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1 DR. ROSEN: Spend a day.

2 DR. SIEBER: A week is better.

3 DR. ROSEN: And it is not just about  
4 looking at the equipment. It involves a lot of  
5 talking to people.

6 CHAIRMAN APOSTOLAKIS: Let me complete my  
7 thought. And I remember that I was also impressed  
8 many years ago when we were doing PRAs down in  
9 Southern California when one of the engineers for the  
10 first time, a very experienced guy, went to  
11 Switzerland because they had just won a contract to do  
12 a PRA for a Swiss plant.

13 The guy came back after a few days of  
14 visiting there and he was ecstatic. I can't believe  
15 how these guys run their plants. It is beautiful. I  
16 said how do you know, and he says, well, you know, you  
17 walk in there and you talk to people, and you observe  
18 things, and you know that they are doing a good job.

19 Now, what is missing is capturing that  
20 empirical knowledge. Now, Jack mentioned once that if  
21 I see Pepsi cans left here and there, and is that a  
22 performance indicator? Is there something else? What  
23 is it that you are looking for?

24 DR. WALLIS: Safety culture is only part  
25 of the question if this is a well run plant. You

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1 can't equate the two.

2 DR. SIEBER: It is a big part though.

3 DR. BONACA: And then it goes into every  
4 aspect. When you go into a Swiss plant, and it is  
5 like a ghost town, and you are in the parking lot and  
6 where are the people, and there is like 40 cars. It  
7 is in the middle of nowhere and there is nothing else.  
8 What is happening in this plant.

9 Well, one-fourth of the plant is being  
10 down for maintenance, and you walk in the plant and  
11 everything is quiet, and you go in the control room  
12 and there are no alarms, and it's like is this plant  
13 running right now.

14 I mean, there are so many quick indicators  
15 telling you that things are being taken care of.

16 CHAIRMAN APOSTOLAKIS: And how about Coca  
17 Cola?

18 DR. BONACA: And they offer you a glass of  
19 wine at the end of the tour.

20 DR. ROSEN: You posed the question,  
21 George, and the answer -- and it is a long answer, but  
22 I am reminded of being in a plant many years ago and  
23 asking one question, which set the tone for the rest  
24 of it.

25 I asked a maintenance person or manager

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1       how much -- what percent of your preventive  
2       maintenance is deferred, and he looked at me like I  
3       had just arrived from Mars, and he said we do  
4       preventive maintenance on schedule. We don't defer  
5       any preventive maintenance.

6                 Preventive maintenance is something that  
7       you know is coming and it is on the schedule, and your  
8       people are trained, and your procedures are in place.

9                 And the plant's condition is set so that  
10       you can take the components out of service, and you  
11       have the spare parts, and you go in and you do it. So  
12       we have none, zero, point zero, and I thought to  
13       myself that was the right answer.

14                And yet at that time in the industry there  
15       was a lot of preventive maintenance being deferred.

16                DR. SIEBER:   About 10 years ago there  
17       wasn't.

18                DR. BONACA:   The other issue is  
19       recognizing problems. If you go inside and you see  
20       stuff, and it is not even being brought up as a  
21       problem to the corrective action program because we  
22       always run it that way, or that valve is that way and  
23       it is no problem because we always did it that way.

24                That is an indicator that you need to look  
25       at, because it means that the threshold is there for

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1 identifying something as a problem is very high.  
2 People are just used to doing things like that  
3 forever.

4 DR. FORD: If I could make an analogy. At  
5 GE, they have a thing called GE Values. Now, people  
6 laugh at it, and I bring it up in this context because  
7 if you are talking about something that is not easily  
8 quantified, the way this came about was that Jack  
9 Welsh wanted to introduce something new into the  
10 company, but he didn't know what it was.

11 So he went around and asked all his senior  
12 A player people what they thought had been successful,  
13 including safety. And they ingested that into a  
14 series of 10 items, which would be non-quantifiable,  
15 but they were examinable.

16 And maybe this is a way of approaching  
17 this, and is to have a set of experts go around and  
18 say what does your brain tell you is a good run plant.

19 CHAIRMAN APOSTOLAKIS: It should be a  
20 combination. I think we are getting off on a tangent  
21 now, but it should be a combination of smart  
22 questions, like the one that Steve just gave us, and  
23 I am sure that Jack Welsh had similar questions, plus  
24 observations.

25 And I will give you an example of the

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1 wrong way of doing it. Someone sent me a paper or a  
2 report several weeks ago from Europe, where they said  
3 we are going to do questionnaires to define the safety  
4 culture.

5 So they go to the plant and asked are you  
6 putting safety first, among other things. So the  
7 results come out with 99 percent certainty, yes, we  
8 put safety first.

9 Then they have a meeting and they announce  
10 the results, and the management of the plant says this  
11 is the greatest study we have ever seen. It  
12 represents us exactly the way we are around this  
13 facility. I mean, is that a question to ask? What  
14 would you expect the guy to say? No, I don't put  
15 safety first? Anyway, let's go on.

16 MR. SORENSEN: Okay. This is as far as I  
17 had planned to go with the safety culture paper.  
18 These last three items are the ones that I would  
19 recommend attention to, as opposed to the first three.

20 CHAIRMAN APOSTOLAKIS: Can we move on to  
21 the GDCs?

22 MR. SORENSEN: Surely.

23 DR. ROSEN: And we will come back to  
24 deciding what we will do with this as a committee?

25 CHAIRMAN APOSTOLAKIS: Yes.

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1 DR. ROSEN: We can't just leave it here.  
2 We either have to say yes, no, or maybe.

3 CHAIRMAN APOSTOLAKIS: That's right. But  
4 maybe not right now. Maybe in the afternoon sometime.

5 MR. SORENSEN: Just to spend a couple of  
6 minutes on the general design criteria paper. This  
7 was something that I put together at Dr. Apostolakis'  
8 request, which I think grew out of a conversation that  
9 he had with Commissioner Diaz.

10 CHAIRMAN APOSTOLAKIS: He asked us here  
11 when he came here.

12 MR. SORENSEN: Actually, I went back and  
13 looked at the transcript and I couldn't find it.

14 CHAIRMAN APOSTOLAKIS: Then maybe you are  
15 right. It came from Commissioner Diaz. He was here,  
16 but he also talked to me privately.

17 MR. SORENSEN: In any event, the idea was  
18 to take a look at the general design criteria,  
19 essentially in isolation and see to what degree they  
20 were an impediment or might be an impediment to risk  
21 informed regulation and how one might change them.

22 The underlying objective is clearly when  
23 you read them to reduce probability and consequences  
24 of reactor accidents. But the regulatory standard  
25 that is applied is embedded in Appendix A as

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1 reasonable assurance that the facility can be operated  
2 without undue risk.

3 And this of course is an adequate  
4 protection standard. It is not a risk metric. There  
5 are basically three ways that one can go about  
6 changing the GDC to make them more risk informed. One  
7 is to modify the scope.

8 This is essentially the approach the staff  
9 I believe is still taking with Option 2 of the  
10 development of risk informed regulation. And the idea  
11 here would be to change the scope from important to  
12 safety which is an adequate protection issue, to  
13 important to risk, and you can define risk however you  
14 want to.

15 But that could be a fairly sweeping  
16 change, and change it in a couple of places and it  
17 would have a major impact.

18 The second way you could deal with the GDC  
19 is to modify individual requirements, and this is  
20 essentially what the staff should be doing under  
21 Option 3, is developing risk informed regulation.

22 I don't know where either Option 2 or  
23 Option 3 are going to come out on recommending changes  
24 to the GDC.

25 And the third option is to replace them

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1 completely with safety goals or risk acceptance  
2 criteria, which is Dr. Kress' proposal, which is in  
3 the appendix to the report.

4 CHAIRMAN APOSTOLAKIS: I remember that Dr.  
5 Powers had problems with that.

6 MR. SORENSEN: Well, somebody is going to  
7 have to write design criteria that relate to whatever  
8 fundamental design goals you have, including risk  
9 goals.

10 I think the question is whether such  
11 criteria should appear as part of the regulations,  
12 which they do now in Appendix A to Part 50; or whether  
13 they should be in some other document.

14 If you are dealing with light water  
15 reactor technology as we are right now, somebody is  
16 going to write down something very similar to these  
17 general criteria if they are going to design a new  
18 plant with this technology. And I think the question  
19 is just where might that guidance appear.

20 CHAIRMAN APOSTOLAKIS: Dana's question  
21 some time ago was if you replace a GDC with safety  
22 codes or risk acceptance criteria, where would you ask  
23 the licensees to have a negative coefficient to the  
24 reactivity?

25 MR. SORENSEN: It could be in a regulatory

1 guide.

2 CHAIRMAN APOSTOLAKIS: But why? If  
3 everything is safety goals oriented, how would that  
4 come about? I believe that was your point, Dana,  
5 wasn't it?

6 DR. POWERS: Right.

7 DR. KRESS: Well, you don't have to make  
8 it exclusively saying you shall meet a risk acceptance  
9 criteria to give it a confidence level, and go off and  
10 do it. You can say you must do it, but you must also  
11 pay attention to specific things. Like you must have  
12 a good negative power coefficient.

13 DR. POWERS: Yes, and you have a bunch of  
14 general design criteria.

15 DR. KRESS: But they would not be so  
16 specific and descriptive. It would be that you must  
17 have an effective and acceptable negative power  
18 coefficient, and you must deal with shutting down the  
19 reactor other than by power coefficient.

20 You must have ways to cool it after you  
21 shut it down. You could specify these kind of design  
22 criteria, and then say after you have met the specific  
23 needs of the reactor, then you could say and by the  
24 way you must meet our safety goal at a given  
25 confidence level.

1                   And that would take the general design  
2 type areas and squeeze them down to this, and make  
3 them applicable to any reactor.

4                   DR. POWERS: I bet you if you sat down and  
5 said, okay, agency, here are the new standards and  
6 GDCs, but the number of GDCs you would have would be  
7 no smaller than the current inventory.

8                   DR. KRESS: Well, I bet you could. How  
9 many have we got?

10                   MR. SORENSEN: We have 55 GDCs.

11                   DR. KRESS: I can't even envision 55 to  
12 capture the concept that I had in mind.

13                   DR. POWERS: Gosh, I can.

14                   CHAIRMAN APOSTOLAKIS: So maybe the word  
15 replace should be replaced, because I think even in  
16 Tom's --

17                   DR. KRESS: Yes, even in my concept, I  
18 would have some of this structural specification --

19                   CHAIRMAN APOSTOLAKIS: You what? I  
20 thought that was on your side.

21                   MR. SORENSEN: Okay. The next list is  
22 just a recounting of the kinds of changes one might  
23 make to make the GDC more risk informed or I phrased  
24 it in terms of impediments.

25                   Current scope is important to safety, and

1 Appendix A includes the definition of a large break  
2 LOCA as the design basis accident, a double-ended  
3 guillotine break of the largest pipe.

4 The requirements for redundancy,  
5 diversity, and independence in the individual criteria  
6 are highly specific, and undoubtedly more specific  
7 than they need to be or just any in a risk metric of  
8 some sort.

9 Defense-in-depth requirements are not  
10 differentiated from reliability requirements if you  
11 read one of the criteria or any one criteria.  
12 Sometimes it is obvious that it is defense-in-depth  
13 and a lot of times it is not. Was the author looking  
14 for high reliability or was he looking for defense-in-  
15 depth.

16 Requirements to provide a system or a  
17 function are not tied to risk reduction. There is no  
18 nexus between the requirement for a particular system  
19 and meeting a risk metric. And the same is true of  
20 the inspection and test requirements.

21 DR. WALLIS: I guess that is what I was  
22 getting at with my last point, is that there has to be  
23 some cross-correlation or there has to be some kind of  
24 coefficient showing how much does this requirement  
25 influence risk reduction so that you can have some

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1 idea of the interplay between these requirements and  
2 what you are trying to achieve.

3 MR. SORENSEN: From a designer standpoint,  
4 at some point in the design process you have got to  
5 allocate the risk of various scenarios against your  
6 total risk goal. That allocation happens.

7 Generally, people have tried to avoid  
8 specifying what the allocation is, but if the  
9 regulator doesn't do it, the designer is going to, and  
10 it will happen in the design process.

11 And if you have a design that does not  
12 meet your risk metric, then you end up going back and  
13 changing it.

14 DR. WALLIS: Well, I would go back to what  
15 I said before. I think it is really all cost benefit.  
16 I mean, requirements pose some costs and there is some  
17 benefit in terms of reduced risk, and that is the  
18 equation you would love to make if you could.

19 MR. SORENSEN: Okay. The final comment I  
20 guess on the GDCs is the conclusion that I came to,  
21 and --

22 DR. ROSEN: Why did you skip the  
23 absolutist language?

24 MR. SORENSEN: Oh, I'm sorry. I keep  
25 trying to make sure that Dana doesn't get a chance to

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1 say anything about that. This was an issue that Dana  
2 had raised fairly early, and I ended up not seeing it  
3 as not a problem, which I think he still disagrees  
4 with.

5 How do you decide, for example, in  
6 providing protection against natural phenomena, and  
7 how do you decide how severe that phenomena should be,  
8 and what time scale do you use.

9 And his point I think was that if you look  
10 at something like criterion, too, that it really is  
11 not clear whether you have to look at a 50 year flood  
12 or a hundred year flood, or a flood that might have  
13 occurred on a geological time scale.

14 And I think that Dr. Powers saw several of  
15 the criteria that needed improvement in that area. I  
16 didn't see a problem with the way that they are worded  
17 right now from that standpoint.

18 DR. POWERS: What I see when I look at  
19 them is the same problem that we had with 50-59. They  
20 come along and say thou shalt not create a  
21 vulnerability with this change.

22 Well, there is always some risk associated  
23 with something, and there was no way to accommodate  
24 can you increase the probability of an accident.

25 Well, if I increase it from 10 to the

1 minus 13th, to 10 to the minus 11th, that is a two  
2 orders of magnitude increase, but it is minuscule no  
3 matter what. But within the languages interpreted by  
4 the lawyers that is still an increase and therefore a  
5 violation, and you couldn't do 50-59.

6 And we had to go and correct 50-59 to get  
7 it out of that problem. And the problem came about  
8 simply because the level of precision with which we  
9 handle probablistic and risk language is so much  
10 higher now than at the time that the regulations were  
11 written.

12 And that things that were just not a  
13 problem before, and when you only calculate risk to  
14 within two orders of magnitude that it does not move  
15 you from one risk category to the next. And now when  
16 you put decimal points on the risk numbers, you could  
17 see a change that big. And I think the general design  
18 criteria suffer from those things.

19 Jack seems to be very clever at finding it  
20 out every time I bring one up, and says, oh, but this  
21 clause up here lets you out of this thing. I persist  
22 in my belief that these things are going to go along  
23 and some day somebody is going to come along and will  
24 run a foul of the same language difficulties with the  
25 lawyers that we did with 50-59 and we are going to

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1 have to fix it at that point.

2 And we might as well fix them in some sort  
3 of a rational fashion than just to go through and fix  
4 them.

5 MR. SORENSEN: And the last point, and  
6 sort of the overall conclusion. I think that the GDC  
7 are very important and an important element in risk-  
8 informed Part 50, but if you change the GDC without  
9 changing anything else, you probably haven't gained  
10 very much.

11 And in particular I note that there is 129  
12 regulatory guides that address one or more aspects of  
13 the general design criteria. Part 50 incorporates the  
14 ASME code, at least Sections III and XI. And there is  
15 a Section VIII now, too, I think.

16 DR. POWERS: And the truth of the matter  
17 is that it works the other way. You go in risk-  
18 informed with Part 50 with respect to the ASME code,  
19 you probably are going to file other GDCs. You can't  
20 change the other things without having to change  
21 everything.

22 It always struck me that it is easiest to  
23 go back and risk inform the GDCs and then move to the  
24 regulations, rather than doing the regulations and  
25 then moving to the GDCs.

1 DR. ROSEN: I think you stuck up a straw  
2 man and knocked him down here, Jack. The whole idea  
3 is that if you risk-inform the GDCs, then you have to  
4 risk-inform all the Revision One regulatory guides.

5 I mean, it is a system. You can't just go  
6 in and do this, and not see what else it affects.  
7 You go ahead and do it, and you follow each of these  
8 trails down to the conforming standards or Reg Guides  
9 and fix them, too.

10 MR. SORENSEN: I had understood the  
11 question posed by Commissioner Diaz as implying  
12 strongly that the GDC were a key in some sense.

13 CHAIRMAN APOSTOLAKIS: Yes, they are an  
14 impediment to risk-informing Part 50.

15 MR. SORENSEN: I guess I had understood  
16 the implication to include the belief that a huge step  
17 forward could be made by risk-informing the general  
18 design criteria, and I am just saying you have to do  
19 all of them.

20 DR. ROSEN: All of it.

21 CHAIRMAN APOSTOLAKIS: All of it meaning?

22 MR. SORENSEN: The GDCs, as well as the  
23 supporting regulations.

24 DR. POWERS: Nobody is going to argue with  
25 over that. Again, everybody is going to say you have

1 to do everything, but that's not what they are doing.

2 CHAIRMAN APOSTOLAKIS: Okay. Is there  
3 anything else?

4 MR. SORENSEN: No, that's all I had.

5 CHAIRMAN APOSTOLAKIS: So does the  
6 Committee want to decide what to do with the reports  
7 now?

8 DR. ROSEN: I would like to have some time  
9 to discuss it with the Committee.

10 CHAIRMAN APOSTOLAKIS: Then let's do it  
11 after lunch then. We will reconvene at 1:20.

12 (Whereupon, the meeting was recessed at  
13 12:20 p.m.)

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CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission in the matter of:

Name of Proceeding: 486<sup>th</sup> ACRS Meeting

Docket Number: (Not Applicable)

Location: Rockville, Maryland

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken by me and, thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings.



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Paul Intravia  
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