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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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PUBLIC WORKSHOP
ON
TECHNICAL AND POLICY CONSIDERATIONS
FOR
NUCLEAR POWER PLANT LICENSE RENEWAL

- - - - -

Session 3
FLUID AND MECHANICAL SYSTEM

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Sheraton Resort Hotel
Conference Rooms A, B and C
11810 Sunrise Valley Drive
Reston, Virginia

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Monday, November 13, 1989

1:15 o'clock p.m.

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1 SESSION LEADERS:

2 Milton Vagins, Chief, Electrical and Mechanical
3 Engineering Branch, Division of Engineering
4 Jarad Wermiel, Plant Systems Branch, Division of
5 System Technology

6 PARTICIPANTS:

7 Joseph McCumber, Yankee Atomic
8 Bruce Snow, NUMARC
9 Richard Burke, EPRI
10 Owen Rothberg, NRC
11 Rhonda Doney, Combustion Engineering
12 Curt Cousins, NUMARC
13 Dan Leonard, Multiple Dynamics
14 Dave Eissenberg, Oak Ridge National Lab

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P R O C E E D I N G S

[1:11 p.m.]

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3 MR. VAGINS: Let me take care of some housekeeping
4 things first. First, let me introduce myself. My name is
5 Milton Vagins. I'm the Branch Chief of the Electrical and
6 Mechanical Engineering Branch, the Office of Research. My co-
7 chairman is Jarad Wermiel, with a "W" not a "V," from NRR.

8 Now, you'll see me speaking into this phantom mic,
9 and you won't hear anything on speakers. The reason for that
10 is that the mic is connected up to the court reporter. He'll
11 be wearing the earphones; he needs the mic to hear properly.
12 So all speakers will be asked to talk into this mic, even
13 though you won't hear anything.

14 Some more housekeeping. I want to remind everybody
15 that all the sessions, including this morning, are being
16 recorded. A transcription will be available from Ann Riley &
17 Associates, 1612, that's 1-6-1-2, K Street, Northwest, Suite
18 300, Washington, DC, 20006, and they'll be ready approximately
19 one week from today. You can send in your request earlier;
20 whenever they get them ready, they'll send them out to you.

21 I also ask that speakers later on give us a copy of
22 your overheads or whatever you have. The court reporter needs
23 them and so do we.

24 Okay. With that, I'll launch right into the session.
25 This is Session 3, called Fluid and Mechanical Systems of

1 Interest. I'll begin by just noting, first, something you
2 won't see on the board. I'm going to repeat the basic
3 underlying premise of NRC's purpose in license renewal. It's
4 put into four words: Assurance of continued safe operation.
5 The whole premise of license renewal is assurance of continued
6 safe operation, regardless of the licensing period. We are not
7 going to ask for enhanced safety, just continued safe
8 operation.

9 This will be repeated in several of the sessions.
10 It's basically four common items of approach to the scope of
11 technical issues.

12 One: The first element defines a proposed screening
13 process for equipment and structures to be reviewed. The
14 screening process is extremely important.

15 Two: Defines structure systems and components for
16 evaluation.

17 Three: Defines a specific ets of degradation
18 mechanisms for evaluation.

19 Four: Defines requirement for corrective action when
20 degradation is not being monitored. In other words, if we
21 define degradation as a continuing process, that's well within
22 our design envelope, and we can monitor it to a specific point
23 at which we will either refurbish or replace. That is a
24 perfectly acceptable procedure.

25 All right. Now, before I launch into the questions

1 themselves, I just want to have some commonality of
2 definitions.

3 Fluid mechanical systems of interest. Let's define
4 that. These fluid and mechanical systems relied upon for the
5 integrity of the reactor coolant pressure boundary, safe
6 shutdown, and accident prevention and mitigation. Anything
7 that does that is the first level of concern.

8 In this area, for example -- this is not an all-
9 inclusive list -- you might find, in a PWR, this list of items.
10 There might be more. Obviously, reactor coolant pressure
11 boundary, which is being covered next door; service water
12 system; component cooling water system; emergency core cooling
13 system; residual heat removal system; chemical volume and
14 control system; fuel pool structure and cooling system. That
15 should be P-O-R-Vs, not R-Vs. I don't know where that came
16 from. That's pressure operator relief valves; block valves;
17 and interconnected piping; seismic Category 1 piping; raceways;
18 hangars; supports; auxiliary feedwater systems; controlled rod
19 drive systems. Some of the obvious systems which may or may
20 not be subject to aging degradation.

21 In a BWR, similar list, again reactor coolant
22 pressure boundary system; standby liquid control system;
23 reactor core isolation cooling system; high pressure cool and
24 injection system; residual heat removal system; emergency
25 equipment cooling; fuel pool structure and cooling system; and

1 control rod drive systems. Again, just an example of what we
2 mean by fluid and mechanical systems.

3 Again, let me emphasize, these may not be subject,
4 not all subject, to aging degradation, but I will say that they
5 all are subject of the aging research program being conducted
6 by the NRC.

7 All right. With that in mind, there is a second
8 category of systems of interest that you might think of as the
9 frontend, or those -- the failure of which may challenge the
10 system that we are interested in, and not normally come under
11 any regulatory process prior to license renewal.

12 These fluid and mechanical systems whose failure can
13 cause or adversely effect a transient or accident that
14 significantly challenges structures, systems, and components
15 which are relied upon for the integrity of the reactor coolant
16 pressure boundary system and safe shutdown or accident
17 mitigation.

18 In other words, we not only want to look at the
19 safety related system, or those systems necessary to cause a
20 safe shutdown, but we want to look at those systems which can
21 cause a challenge to these systems. The exact way we're going
22 to handle that is not completely defined just yet, but you'll
23 find most of these, of course, in balance of plant. And we
24 have the common state feedwater system, including reheat; the
25 turban; the main steam system; the condenser cooling system;

1 and systems on that note. Particular, we're looking again,
2 and I'll say it again, at balance of plant systems, which
3 normally are not regulated.

4 We put out a list of questions which was in the
5 Federal Register, and just summarizing them, or paraphrasing
6 them in very simple terms -- actually -- I'm sorry -- they
7 weren't in the Federal Register; they were in a letter we sent
8 out for this meeting. It was in a letter. Basically, we have
9 identified seven questions which we would like to have some
10 answers on.

11 The first one is: What additional criteria for
12 periodic surveillance and preventive maintenance to ensure
13 operability of mechanical equipment beyond initial design life?
14 In other words, are there areas that you can think of that
15 require additional either surveillance, monitoring trending, or
16 preventive maintenance programs identified as such?

17 Do we need, in certain areas, augmented inspections
18 and/or analysis to address aging mechanisms in pumps and
19 valves? Now, we all know we have problems with pumps and
20 valves today, and I'm not talking about today's problems.

21 This question itself may eventually be answered by
22 our attempts to update the ISTs. There's an industry-wide
23 effort going on. I don't have to identify those. You know it.
24 I know it. That may be taken care of, but the question is
25 still valid. Since we don't have the whole answer for ISTs,

1 that question remains up there.

2 This question came up over and over again in several
3 meetings: Should there be functional pretests for our systems
4 as a prerequisite for license renewal?

5 Remember, these are just questions to stir interest.
6 They're not really part of a rule-making now.

7 Fatigue. Well, we all know the problem with fatigue.
8 Those of us who do design structures, piping systems
9 particularly, know we started back at the end of life and
10 worked our way back. Things were designed to last 40 years.
11 Some items have fatigue problems.

12 Residual fatigue life for Class 2 and 3 components --
13 there was no fatigue analysis done on them. What do we do now
14 when we go into extended life?

15 Effects of water, environment, elevated temperatures,
16 or fatigue on life of piping components? There does exist
17 evidence that the so-called safety margins and the SM curves in
18 Section III have been eroded due to the high temperature water
19 environment. The question is, what do we do about that? Is
20 there time to do anything about it in the period we have now,
21 or do we note that, move on, and correct it when we have the
22 data available?

23 Proof testing and hot functional testing. Again,
24 this goes back to the question of -- these two are really tied
25 together: three and seven. Should we have another baseline

1 for all equipment? And you ain't going to get me to defend
2 that we should. I'm just asking the question rhetorically
3 because it has been raised.

4 Those are the basic summation of those questions
5 which were not in the letter, and any other questions will be
6 brought up and addressed. I'm perfectly willing to address any
7 and all of them. We have three speakers who are scheduled to
8 speak. Before I go on, do we have any speakers who would like
9 to speak now who are not listed?

10 [No response.]

11 MR. VAGINS: No? Well, it might be a short session.
12 All right. With that in mind, I'll go right into the first
13 speaker, though I will address any questions raised to my
14 little introduction.

15 MR. McCUMBER: I'm Joseph McCumber with Yankee
16 Atomic. Will we be given the opportunity to respond to the
17 questions following the presentation, or does that have to be
18 done now?

19 MR. VAGINS: No.

20 If you are following the three designated speakers,
21 you can speak as needed. Hopefully, it will be on the topic.

22 Okay. Let me get into the first speaker, then. It
23 is just identified as NUMARC. Who is speaking for NUMARC?

24 MR. SNOW: Good afternoon. My name is Bruce Snow.
25 And I am speaking to you today representing the NUMARC NUPLEX

1 working group. I am employed by the Rochester Gas & Electric
2 Corporation as its Chief Engineer with responsibility for
3 nuclear, fossil, hydro and facilities engineering. RG&E owns
4 and operates Ginna Station, which just completed its second ten
5 year ISI and 20 years of operation.

6 My purpose this afternoon is to provide the NUMARC
7 NUPLEX working group conclusions with regard to fluid systems,
8 fluid and mechanical systems.

9 In general, we have concluded that it is not
10 mandatory for a regulatory guide, for evaluation of fluid and
11 mechanical systems, to be developed.

12 Topical reports should be sufficient, we believe. I
13 will describe these topical reports in a moment.

14 However, it is our opinion that a regulatory guide
15 would be acceptable with the following conditions:

16 One, if a regulatory guide was developed, it would be
17 beneficial for the NRC to take advantage of the analyses and
18 conclusions which industry has developed in the NUMARC NUPLEX
19 working group industry reports;

20 These reports are currently submitted, or in a
21 process of being developed, on reactor pressure boundary
22 elements;

23 Two, the outlined conceptual rule presented in the
24 Federal Register is revised to reflect the philosophical
25 positions discussed in the Federal Register, that is, credit is

1 given for ongoing NRC requirements and/or license programs, and
2 that the guide only require addressing significant age-related
3 degradation issues; and

4 Three, that a regulatory guide not delay the lead
5 plant activities.

6 The specific topical reports for the fluid and
7 mechanical systems being developed are, BWR primary pressure
8 boundary, PWR reactor coolant system, PWR pressure vessel, BWR
9 reactor pressure vessel. These reports are currently scheduled
10 for completion by August of 1990.

11 The general outline of the industry reports provides
12 the following process: a determination of systems, structures,
13 components, and components that are safety-significant, a
14 description of all plausible aging degradation mechanisms, a
15 determination which age-related degradations are potentially
16 significant, and then, logically, for potentially significant
17 age-related degradation, a determination of the established
18 inspection, testing, or analysis procedures currently
19 implemented demonstrate that age-related degradation is bounded
20 within acceptable limits, and further, and again logically,
21 that for any significant age-related degradation beyond
22 established limits, degradation management activities are
23 required.

24 This process supports the philosophy that the current
25 licensing basis provides for the safe operation of our nuclear

1 plants.

2 The working group conclusions with regard to specific
3 aspects of fluid and mechanical systems are as follows:

4 Most mechanical systems do not have an explicit
5 design life, but proper maintenance allows achievement of
6 operating life. Typically, components are tested, inspected,
7 repaired, or refurbished at intervals less than the original
8 license term. In fact, many components are replaced within the
9 original license term.

10 Aging occurs at all times during equipment life.
11 Aging is not unique after a 40-year period. Most components
12 are currently addressed by NRC or license programs which are
13 effective now and will continue to be so during an extended
14 operating term.

15 With respect to fatigue, I may add that a NUMARC ad
16 hoc committee on fatigue has recently been formed and just met
17 with the first time last week in Orlando.

18 The few components subject to potential significant
19 age-related degradations that are not currently being managed
20 by effective programs can be shown to remain effective in the
21 extended term. However, it will require aging management
22 strategies to properly address the issue posed solely by the
23 extended operating life.

24 Aging management options addressing this limited set
25 of systems, structures, and components are detailed in the

1 methodology to evaluate plant equipment for license renewal
2 which has been submitted to the NRC by NUMARC or in the
3 industry reports which are currently being prepared by NUMARC.

4 Many plausible aging degradation mechanisms are not
5 significant. For example, general corrosion of primary coolant
6 pump and valve components are insignificant based on inherent
7 corrosion resistance material properties of stainless steel.

8 Also, fluid velocities within PWR reactor coolant
9 pumps are not sufficient to cause erosion of the surface
10 materials.

11 High alloy steels, nickel-based alloys, and stainless
12 steel alloys are considered to be quite resistant to erosion
13 corrosion, especially in a PWR environment.

14 We conclude that most potentially significant age-
15 related degradation mechanisms are currently managed by
16 effective programs. In-service testing programs are currently
17 performed at the plants in accordance with ASME pump and valve
18 provisions of IWP and IWL. Existing plant programs regarding
19 maintenance supplement these programs as well. And
20 furthermore, technical specifications mandate surveillance and
21 inspections which are governed by ANSI and ASME codes.

22 We believe there is no apparent need for imposing
23 additional surveillance maintenance inspections nor analysis of
24 functional tests as a prerequisite to license renewal. It is
25 the working group's conclusion that the outlined conceptual

1 rule needs to reflect the NRC philosophical position, that is,
2 credit is given for ongoing NRC requirements and/or license
3 programs, such as ISI, IST, and so forth.

4 The rule need only address significant age-related
5 degradation.

6 That concludes my remarks.

7 MR. VAGINS: Thank you.

8 I will entertain questions to the speaker's
9 presentation, if there are any.

10 Dr. Eisenberg?

11 MR. EISENBERG: When you mention IST, are you
12 referring to the results of the current ASME-IST effort that is
13 just starting or are you referring to existing IST as embodied
14 in IWV and IWP?

15 MR. SNOW: If I understand the question, the
16 question is whether we are referring to the existing IST
17 requirements or the ongoing development for new requirements.

18 I think I can respond to that by saying, the
19 philosophy of current licensing basis will be adequate to
20 provide safe operation will fit that development. So as things
21 are currently required, it is okay now. But if things are
22 required to be augmented, then that's okay, too.

23 So the whole philosophy of the current licensing
24 basis, I think, we support.

25 MR. VAGINS: Thank you.

1 I think this is a good time to re-emphasize again
2 that license renewal will not attack today's problems.

3 Today's problems are not an issue for license
4 renewal. We all know the weaknesses in the present IST program
5 for pumps and valves. We, the NRC, the industry, the
6 professional societies, we are all addressing this.

7 And hopefully, the IST upgrade will be in place, and
8 will apply.

9 So all the way through the concept of license
10 renewal, today's problems are to be solved today, even if they
11 are aging related. The NRC has a very extensive aging program.
12 And if I find something which is going to go defunct or belly-
13 up when it is 38 and a half years old, we will act under the
14 present licensing basis, and be corrected.

15 So again, understand that what we are looking for are
16 those things which are not covered by the present licensing
17 basis, particularly aging related. Today's problems will be
18 handled today, or within the relatively near future.

19 And that, I think, agrees with the speaker's
20 viewpoint.

21 Okay. The next speaker will be somebody from the
22 Northern States Power. Do we have a speaker? Decided not to
23 come. They said this piece this morning, right? Right.

24 Yankee Atomic. Okay. Good. I thought, for a
25 minute, it was going to turn out to be the shortest session in

1 history. Do you need someone to show your slides?

2 MR. McCUMBER: No, I'm all set.

3 Good afternoon. My name is Joe McCumber and I'm with
4 Yankee Atomic, and I'd like to give you a few key points that
5 I'd like to hit with respect to fluid systems. It has to do
6 with the focus of coverage, the actual scope, and then that I'd
7 like to see some flexibility in the method of implementing what
8 we do.

9 Just responding to one of Mr. Vagins' comments
10 earlier on balance of plant coverage and what would be
11 included, it's our feeling that the only balance of plant that
12 would be covered within license renewal would be whatever meets
13 the requirements of the definition of "important to safety," to
14 number 1 and 2 that are in Section 9(c), I think it is.

15 Fluid systems in general, the way we look at it, have
16 two prime functions. One has to do with operability, and the
17 second with pressure boundary. From everything we've seen so
18 far, we feel that the operability function is being very well
19 handled right now by the several programs that are in place,
20 and, you know, that list is very long, going from test specs,
21 to surveillance, to disassembly of different components, to
22 MOVATS, to maintenance, vibration monitoring, leak tests. You
23 know, when you combine all those programs and how they're being
24 applied to the different components, we think they're doing a
25 very good now, and that'll continue for the renewal period.

1 As far as the pressure boundary concerns, we feel
2 that you are going to have to take a look at some of them as
3 far as how is degradation acting on them, and a lot of that
4 depends on the specific material, or environmental within which
5 it is. It'll differ, and I think that gets again into the
6 flexibility of the level of work and documentation that you'll
7 have to apply, because depending on which system you're dealing
8 with, you may have to go further in assuring that that level of
9 safety is continued.

10 I think I may be getting a little bit into some of
11 the philosophy and stuff that was said this morning, but I
12 think it's important to get into it in each of these sessions.

13 Reading the NRC philosophy that's expressed in the
14 document that we received, it's pretty clear that they do want
15 to limit what you look at and allow you to focus on what's
16 really important. It kind of embodies a screening process.
17 When you actually get into the proposed rule wording, I think
18 it's not really clear that they are picking that up.

19 As far as specifics, we can see that the rule does
20 require you to provide information for all components, both as
21 far as design functions, environmental conditions, the
22 degradation mechanisms, and also the programs that you have for
23 managing that degradation.

24 Now, that is then dependent on the fact of whether or
25 not there is a degradation, whether or not the component within

1 the system really is important. And, again, that's every
2 component -- that's not just components; they're asking you to
3 do this at the system level, the structural level. I'm not
4 quite sure that that's what it's intended, but that's the way
5 the wording is right now.

6 We feel that the scope right now is unnecessary, that
7 the degradation concerns do not, you know, exist for many
8 components, based on design conditions, benign environment,
9 inspection maintenance, and the fact that many of the
10 components are refurbished or replaced on a periodic basis.

11 We feel that the process needs to consider these
12 factors, and that you do the level of effort in documentation
13 that's required, again, as Mr. Vagins said, to show that
14 continued level of safety, and the big thing that we're trying
15 to do here is to focus our resources so that you can put it
16 into what really needs to be done.

17 Again, we feel the rule does have to embody a
18 screening process, again to try to focus that work, and to try
19 to just key in on where you do have unresolved degradation
20 issues that aren't being managed.

21 We feel the screening process and the rule itself
22 needs to be comprehensive, clear, and consistent to make sure
23 that anything we're dealing with, that there isn't going to be
24 ambiguity, and questions, and follow-up hearings, or whatever,
25 that everybody knows what we're talking about as far as

1 definitions and everything else. We want it to be efficient
2 and flexible, flexible mainly in how you implement it, and then
3 also to require just the level of information that you need to
4 support the determination that you made.

5 Just a little bit of talk on degradation mechanisms.
6 You know, I think we all recognize that the mechanisms that do
7 go after fluid and mechanical systems, they have been
8 recognized over the years, and, you know, we do have a pretty
9 good handle on what they are, and that understanding is
10 increasing with time and experience.

11 Some examples are erosion/corrosion, where right now
12 the code is addressing it, and we're putting, you know, more
13 inspections into erosion/corrosion right now because it's
14 needed now. It has nothing to do with the fact that license
15 renewal is happening; it's erosion/corrosion is happening now.

16 Thermal fatigue is another issue that, again, it's a
17 license renewal issue, because if it's not resolved and you're
18 not doing things, it's going to effect you. But we're taking
19 care of it now, and appropriate actions are taking place now
20 because that's when it's happening.

21 Again, existing programs that we have in place right
22 now are doing a good job. They're monitoring; they're
23 maintaining or refurbishing; refurbishing or replacing
24 components when they need to be. They've been proven during
25 the original licensing term, and, again, they're being

1 continuously updated as we gain experience.

2 The conclusion is that the law should allow for
3 credit for these programs to continue throughout the rest of
4 this license and on into the future.

5 One thing that I think we've got to think about,
6 though, is we don't want to let -- also, we don't want to let
7 the licensing renewal issue be a cause of making you go too
8 much further in areas that aren't needed. We don't want
9 license renewal to be the tool that forces a maintenance rule
10 down your throat. You know, maintenance changes should come as
11 appropriate because of maintenance, not necessarily because of
12 license renewal.

13 Getting to the flexibility and implementation, we
14 feel there are many ways of demonstrating that a component is
15 adequately being managed. One is to show that the component,
16 based just on its own design, is adequate for the continued
17 service. The other one is all the existing programs that are
18 in place are doing a good job, and will continue to. There may
19 be a need for procedural enhancement -- for instance, trending
20 -- but again, only where appropriate and when it's appropriate,
21 not necessarily tied to the licensing renewal schedule.

22 Another area could be to change operating practices.
23 If, for some reason, what we're doing right now is effecting a
24 compound or causing it to degrade, that's another way that
25 maybe you can stop it, or replacement or refurbishment.

1 Going a little bit further on trending, in the
2 wording of the rule right now, trending seems to be pushed
3 pretty strongly. Again, we see a need for trending in certain
4 circumstances where we see a benefit, but, again, not in all
5 cases is it required. For instance, if there are programs that
6 replace the component, or if there's just no need, based on the
7 fact that it's not degrading. So trending doesn't make
8 everything go away, but it is, you know, it is a benefit in
9 certain circumstances.

10 Another issue that has come up is how do you
11 administratively control in the future that any enhancements or
12 improvements that you make to the program stay that way
13 throughout the license renewal period? We feel that if there
14 is a special action required to manage age-related degradation
15 to support licensing renewal, that yes, you know, that should
16 be controlled administratively, and that those will become
17 commitments for the license renewal term. However, we do not
18 feel that we should be overburdening text specs, or anything
19 like that, that there are other administrative methods to make
20 sure that you keep up with that commitment.

21 In summary, we feel that Section 9, or XX.9, does
22 need to embody a screening process that allows you to focus on
23 what's really important, and that is safety -- important to
24 safety components for which unresolved aging degradation issues
25 have been identified; and that we feel that it's very important

1 to allow flexibility in the method, that you actually show or
2 demonstrate that you're adequately managing that aging.

3 That's it.

4 MR. VAGINS: Thank you. I'd like to throw the floor
5 open again to any questions to the speaker. I'm a little
6 surprised by the -- I got the feeling that you didn't think we
7 were urging or trying to develop a very important part of the
8 rule which is the screening procedure. Is that the feeling you
9 got; that the NRC was not trying to develop or have part of the
10 rule as screening procedure?

11 MR. McCUMBER: No, the feeling that I have,
12 especially through the philosophy, is that it's very strongly
13 built into it. It's just the wording of the rule that does not
14 come across clearly at all.

15 MR. VAGINS: It's quite clear that our wording may
16 need some clarification. Certainly, it's like everything I
17 do. I'm the world's worst proof reader. I can't catch my own
18 mistakes. So that's the purpose of this workshop. We want
19 your feedback, but I want to make very clear that the key to
20 the license renewal is the screening procedure.

21 We are not going to ask you to do work that is
22 already in place. We're not going to ask you to repeat
23 anything that is part of your present adequate safety basis.

24 MR. McCUMBER: If it could just add this: This is
25 Joe McCumber again. I opened up with a definition of the scope

1 and what would be the balance of plant components that would be
2 included. Is that consistent with what you are saying, or are
3 you going beyond that?

4 MR. VAGINS: I'm not quite sure. I want to make sure
5 of what we said. We said that anything -- any equipment
6 failure in balance of plant that challenges your safety systems
7 must be looked at. Now, let me give you an example from prior
8 history.

9 You are all familiar with the pressurized thermal
10 shock issue. When we broke that to the industry in March of
11 1981, we presented 14 actual scenarios of thermohydraulic
12 transients which were full pressurized thermal shock scenarios.
13 Every single one of those scenarios -- I mean, these were not
14 scenarios. These were incidents, actual incidents, were
15 initiated by a failure of a non-safety related component or
16 balance of plant component.

17 It's -- I mean, this is the kind of philosophy we're
18 looking at. If you have a system out there which, if it
19 fails, will seriously challenge your system, then we would like
20 you to look at that and talk about the -- give that the same
21 consideration as you would really a safety related system as
22 far as aging goes. Is it aging?

23 MR. McCUMBER: Just to clarify the point, it's in
24 Section 9C there. The definition as it's worded is non-safety
25 related safe -- whatever it is -- systems, structures and

1 components whose failure under environmental conditions could
2 prevent satisfactory accomplishment of safety functions
3 specified in paragraphs -- blah, blah. I think you are going
4 beyond that.

5 MR. VAGINS: I think we -- well, I don't know what
6 will prevent me. I think that word, "prevent" means
7 intercession into a safety system and there's no such thing.
8 The verbiage may have to be changed. How did the failure of a
9 non-safety related system prevent anything?

10 MR. WERMIEL: That's a different set. What you're
11 reading is essentially the kind of wording that's right now in
12 5042 for equipment qualification where it speaks to a failure
13 of a non-qualified component that may impact a qualified
14 component. That would essentially be true for the kind of
15 analysis you do even in the seismic arena where a failure of a
16 non-seismic component is not supposed to impact a seismically
17 qualified component and prevent it from doing its function.

18 That's a little different from the kind of thing that
19 he's talking about. I agree with you, it is different.

20 MR. VAGINS: The words may have -- may need some word
21 engineering.

22 MR. WERMIEL: What I think Milt is trying to say, if
23 I could put it maybe in more of a lay term, if I take a
24 feedwater system, for example, I know if I lose feedwater, I'm
25 going to challenge Auxfeed. The feedwater pump is not a whole

1 lot different from a safety related pump and it's subject to
2 certain age-related degradations.

3 Would there be a need -- and there's still a question
4 -- would there be a need to have a program in place if you
5 determine you need a program for safety-related pumps, to also
6 have a similar program or something like it for a main feed
7 pump, in order to ensure that there's no more chance of a
8 feedwater challenge, a loss of feedwater, in the extended life
9 than there was in the previous 40-year life.

10 That's the sort of thing, I think, that Milt is
11 talking about as a focus -- something to think about -- and I
12 would agree, it certainly isn't clear that the existing wording
13 of the proposed rule -- and it's just a proposed rule -- would
14 go to that sort of thing. That's all I think he's trying to
15 say.

16 MR. BURKE: My name is Richard Burke from FPRI. I
17 had a question, but first I wanted to maybe clarify for my own
18 self, what Mr. McCumber and you, Milton, just said. Presently,
19 as I read it in the rule, this is very much like the
20 methodology to identify plant equipment for a license renewal
21 that NUMARC submitted, in that what I see here is that those
22 systems that could prevent the operation of a safety system; in
23 other words, that would necessarily challenge or prevent the
24 operation, would be included in what was defined in the
25 proposed rule.

1 The screening methodology presently, that was sent in
2 under NUMARC, identifies those systems that -- they might be
3 initiators that would challenge, but they also would be
4 mitigators if they were initiators, or they're strictly
5 mitigator systems. Feedwater systems can be used as a source
6 of water or something that would be used in emergency
7 procedures would be considered a mitigation system.

8 But what's excluded are those that simply challenge.
9 Then, regarding that, since I brought up the screening
10 procedure which is called the Methodology To Identify Plant
11 Equipment For License Renewal, I wanted to ask if the NRC had a
12 similar type of screening procedure that they were going to
13 release or what they had in mind along that line to focus on
14 what you spoke about?

15 MR. VAGINS: We're going to make that decision when
16 we finish reviewing the industry screening criteria. If we
17 feel that the industry screening criteria is satisfactory,
18 that's where it's going to end.

19 MR. ROTHBERG: I'm Owen Rothberg. I'm with the
20 Office of Research staff. I have a comment and a question.
21 The comment is that the degradation mechanisms that I'm aware
22 of with respect to motor-operated valves and possibly other
23 valves, are not well understood.

24 I disagree with the characterization that they are
25 well understood. The other thing is a question and this is

1 more or less for everyone.

2 Is there any scenario where testing or analysis at
3 the end of a 40-year life of a plant and before licensing
4 renewal or extension is necessary?

5 MR. VAGINS: Say that again?

6 MR. ROTHBERG: Is there any circumstance or scenario
7 where testing or analysis at the end of a 40-year plant life
8 and before license renewal or extension is necessary? Is there
9 any circumstance?

10 MR. VAGINS: Specific components, any testing of
11 specific components.

12 MR. ROTHBERG: That's right. In other words, does it
13 continue, or continue with a break?

14 MR. VAGINS: Well, I think there's a general answer,
15 of course, and that is; where in these fatigue limited --
16 again, I'd bring back my experience in designing piping
17 systems. We'd go to the end of life; look at assumed load;
18 pick something that would give us as close to a usage factor of
19 1; go back and pick out the scheduled piping. We always had an
20 increment, because scheduled piping goes in steps and it
21 doesn't go smoothly.

22 We never tried to put excessive fitness in, because
23 that was money. So, there are, as far as I'm concerned -- and
24 I've done this -- is that there are certain pieces of equipment
25 that are fatigue limited, and obviously, those are going to

1 have to be handled in some way.

2 There are other things that have come up through life
3 such as thermal fatigue which was not originally designed and
4 in and have been identified and in some places, judgments are
5 made to -- well, it's okay through this present licensing
6 period, but not much more. This is rather low cycle, high
7 amplitude fatigue.

8 There are other judgments about erosion/corrosion
9 where the allowance or the thickness is sufficient within the
10 licensing period. If you make that judgment that that's all
11 sufficient until you want to go for license renewal, you're not
12 going to replace your piping system if your erosion rate is
13 within acceptable limits.

14 But it may not be for the 41st year or the 50th year
15 or whatever. So I can think of a series of scenarios where
16 I've either designed in a limited life by economic necessity at
17 the beginning of life; where I have encountered a non-
18 anticipated load such as some of our thermal loadings, or
19 where, indeed, I've encountered some things which I didn't
20 anticipate such as some of our erosion/corrosion problems.

21 Now, don't get me wrong. I'm not implying these are
22 very widespread, but there are conditions. I can name a few.
23 I'm sure everybody here can, too. So, definitely, there are
24 some and I'd entertain questions and other responses from the
25 floor.

1 Yes?

2 MR. SNOW: The NUMARC response to that would be --

3 MR. VAGINS: Would you give us an ID?

4 MR. SNOW: My name is Bruce Snow, representing the
5 NUMARC working group. The NUMARC response to that would be
6 that there may be some circumstances identified as we apply the
7 screening process to our various plants and as we review the
8 various systems in our industry reports. There may be specific
9 items identified in that process.

10 Specifically, because the plants are all different,
11 there more than likely will be various items identified that
12 would require further evaluation or work.

13 MR. VAGINS: This is an aside from our session, but
14 it certainly is -- from my background -- of vital importance to
15 everybody in this room and that's, of course, the pressure
16 vessel. The limiting item on the pressure vessel probably
17 would be embrittlement.

18 Again, it's probably governed by today's rules which
19 are going to carry over. The PTS screening limit, 50-61 is
20 going to apply. Some vessels are not going to make it on the
21 basis of that analysis, much beyond their present licensing
22 period.

23 So you see, it depends. Again, it's plant-specific.
24 There are some generic things.

25 MR. McCUMBER: Hi, this is Joe McCumber from Yankee

1 Atomic again. You shouldn't have let me sit next to a
2 microphone.

3 [Laughter.]

4 MR. McCUMBER: I have just a couple of points that I
5 think were relevant to some of the questions that were just
6 asked. One had to do with; are there any needs to actually do
7 some type of one-time inspection before you go into license
8 renewal.

9 I'd just like to read to you the results of a task
10 force study on ASME 11 into exactly that question on the need
11 for re-baseline. That is, a special task force studied the
12 potential for supplemental inspection, including re-baseline
13 inspection for plex and concluded the following:

14 ASME Section 11 should not develop special
15 supplemental requirements related to license renewal and two;
16 ASME Section 11 should continue to play a proactive role in
17 addressing age-related degradation. This should include code
18 changes where technically justified and on time scales relevant
19 to the particular aging process.

20 I think that's probably relevant to most concerns.
21 We don't see the need right now, and we should attack it when
22 we do. One other comment that was made having to do with
23 fatigue: I totally agree that fatigue is an issue that we're
24 all going to have to address, but there was something said
25 about it that we didn't want to add material.

1 But I think a lot of it went the other way also; that
2 in fatigue analysis, once you got yourself below that usage
3 factor 1, you said sometimes, the heck with that. I don't want
4 to do any more analysis. In fact, there's a lot of inherent
5 margin in the existing fatigue analyses at time also.

6 MR. VAGINS: No question at all about that, I was
7 just pointing out how we did it. I'm sure that everybody did
8 it the same way. You work from the back, the front, and when
9 people say that there's no basis for the four-year licensing
10 period that is true but we made it a basis when we went into
11 the actual design instruction, when we went in and physically
12 designed the piping.

13 MS. DONEY: My name is Rhonda Doney of Combustion
14 Engineering. I have a couple of questions and a couple of
15 comments and I thought I'd accumulate them all and only have to
16 come up here once and talk into the microphone.

17 The first is with respect to these seven questions
18 that were provided to us, specifically with respect to question
19 four regarding the treatment of fatigue for design Class I
20 components.

21 A lot of you in this room look familiar to me and
22 you're probably -- most of you are aware that a couple of years
23 ago ASME Section XI formed a task group on fatigue and
24 operating plants, which I'm a member of, and at our most recent
25 meeting -- well, the charter of this group was to develop a

1 white paper that would provide guidance to the ASME code and
2 recommendations for what to do on the issue of fatigue and at
3 our last meeting, which actually took place just last week in
4 Orlando, we finally solidified what we feel our recommendations
5 are going to be to ASME Section XI and I'd just like to share
6 those with you for those who aren't familiar with what our
7 group is doing.

8 I don't have anything to read that's been pre-
9 written so please bear with me, but as a group we came to the
10 conclusion that we feel that ASME Section XI should be expanded
11 to address fatigue concerns and the guidance that we are
12 proposing to provide would address three specific areas.

13 The first would be those concerns related
14 specifically to license renewal.

15 The second area would be to provide guidance to the
16 industry for how to go about maintaining your current design
17 basis integrity, for example, technical specifications and
18 related documents.

19 The third area would be some generic guidance on how
20 to address new issues related to fatigue as they arise such as
21 those identified in NRC Bulletin 8808 and 8811, I believe,
22 regarding stratified flow in the surge lines and so we are
23 planning to make that formal recommendation and it appears as
24 if we would go ahead then and begin to prepare code verbiage
25 that would address these three areas.

1 My second comment is with respect to question five
2 and from my own personal -- this regards addressing residual
3 fatigue life or Class II and III piping and components. From
4 my own experience most of these components that don't have a
5 fatigue design basis are that way because they were never
6 considered to need one. The thermal transients that the Class
7 II and III components see in the balance of plant, in general,
8 they're just not subjective to the same type loadings that the
9 primary components are subjected to, and so unless we feel that
10 current requirements are not adequate with respect to the
11 design of these components, then it's my opinion there should
12 be no need for any new requirements associated with license
13 renewal.

14 My last comment is with respect to question six which
15 discusses new information that has been developed and
16 researched regarding the fatigue curves in Section III of the
17 ASME code and that is that -- let me just refer to my notes
18 here. I agree with the concern that's listed in this question
19 and this concern is being investigated by both ASME Section III
20 and is being followed very closely by Section XI specifically
21 by this task group on fatigue and I feel that while this is a
22 valid technical issue it's not that's related specifically to
23 life extension and that it should be allowed to be addressed on
24 a continuing basis and not something that's directly tied into
25 life extension.

1 Questions. I heard about this NUMARC/NUPLEX group,
2 this ad hoc group that was formed on fatigue and I was just
3 curious if there was any information available on what the real
4 purpose or the charter or the goal of the group was.

5 Curt, may you can answer that.

6 MR. COUSINS: This is Curt Cousins. I'm with NUMARC
7 and in response to Rhonda's question, we were addressing it in
8 the scope of how should our IRs address the question of fatigue
9 and we have a twofold step that actually goes a bit further
10 than the scope of the current Section XI fatigue committee,
11 which was to ask questions what should be do about plants that
12 do not currently have a fatigue analysis? And those that use
13 such as B-31-1 for analysis or such, so, we have incorporated
14 that into our examination. We have some preliminary positions
15 that have been developed and we propose on -- passing those to
16 the industry and if there's a consensus that we should move
17 with those then we will be bringing them to the NRC.

18 Thirdly, we have represented on this ad hoc committee
19 the Section XI chairman of the fatigue group and he was quite
20 enthused and encouraged by this particular activity.

21 MS. DONEY: Just one comment on that, Curt. It's my
22 understanding that the guidance that we're going to try to come
23 up with in Section XI would also address components that were
24 pre-Section III and had that particular concern to cope with.

25 On the other hand, it may be difficult to complete

1 that in a manner that would be expeditious enough to support
2 license renewal for the first plant, so, I think I agree with
3 what you said.

4 The last question, maybe Mr. Vagins you can answer
5 this one, we've got -- combustion engineering has an owner's
6 group program, a fatigue monitoring program that we've had for
7 a couple of years now before there was the benefit of this new
8 guidance that's coming out now and what types of components you
9 should be considering and things like that and the position
10 we've taken in the past is you have a plant and basically
11 everything in the plant is subject to some sort of thermal
12 transience and so our question was always where do you draw the
13 line also and so what we've done to date is we include all
14 systems that are in the plant technical specifications and the
15 second thing we do is we review the plant's FSAR and any
16 systems that were either -- or components in systems that were
17 initiators of an accident or were credited in the accident
18 analyses as a mitigating system were included in this broad
19 list of systems and then we went into each system on a
20 component level and started looking at individual components
21 but our reason for that approach was we felt that between the
22 FSAR and the plant technical specifications those systems
23 formed your licensing basis for your plant and I just wondered
24 if -- I was curious as to your opinion.

25 You know, theoretically Chapter 15 analyses are

1 supposed to bound anything that can happen to your plant and if
2 you took that one step further that would be true, that would
3 include, for example, the fatigue issue, that those components
4 are required to be able to operate during an event, and I just
5 wondered if you felt that that was an appropriate envelope to
6 chose?

7 MR. VAGINS: Yes, well first, though, let's go back
8 to Chapter 15. Chapter 15 only deals with design basis. We
9 know that design bases -- accidents do not envelope the
10 potential problem. Again, I go back to PTS. PTS is not a
11 design basis accident. So, therefore we do have some problems
12 on re-defining or looking at what we consider challenges to the
13 system. So, this is why I, personally, put such greater
14 emphasis on balance of plant, failures and challenges to the
15 system, and I'm not speaking in this case for the NRC, this is
16 -- one of the questions we threw out, my personal opinion is
17 that they are extremely important when you find the potential
18 challenges that are outside the envelope.

19 I'm not ready to say yet what should be totally
20 involved -- what we should look for. We are asking the
21 industry to give input. The screening methodology is going
22 hopefully identify these components because everything excluded
23 will be justified. That's fine. In other words, the work will
24 go to the justification rather than to any kind of proof that
25 the system needs -- or, any kind of detail as far as managing

1 the aging process. But the justifications have to be complete
2 and they have to say, okay, this is not important -- it's not
3 aging related, it's covered by the present licensing basis and
4 it's fine. It's not an additional or new safety issue that's
5 solely related to licensing.

6 The thing -- I'd like to make one comment, again, as
7 a personal. When you said ASME Section XI is getting a license
8 renewal, why? Why is Section XI getting a license renewal?
9 Why should you have any time limits on your work? Section XI
10 states it's not design criteria, it's inspection, and
11 inspection and testing procedures, right? Why should there be
12 anything that says license renewal, not license renewal, why
13 should there be any time limits in anything the code does for
14 that matter?

15 Section XI says design by analysis. Whatever your
16 time period is, such Section III should cover it. Section XI
17 should not be governed by what is license renewal. Section XI
18 should say what is good practice, how do you calculate
19 remaining life as you do in a crack provocation study.

20 So, I'm really confused as to why Section XI is doing
21 this.

22 I mean, it's a magic word. License renewal is a
23 magic word now.

24 MR. MCCUMBER: This is Joe McCumber from Yankee
25 Atomic. In general, I think, license renewal started a lot of

1 activities within the industry that started looking into
2 degradation even more than before, so it's increased the focus
3 and there are committees in just about every code group right
4 now or standard group that is studying degradation with respect
5 to license renewal, but I totally agree with you that there is
6 not a difference in how the code should handle it. It should
7 put in the proper wording where it's needed and I think what
8 Rhonda is also saying is that whatever is put in for fatigue
9 will both take care of concerns that people have right now with
10 respect to fatigue questions that they have but will be equally
11 applicable to anybody going into license renewal as far as
12 demonstrating that they have adequate margin and that whatever
13 methods come up, again, will be applicable for both the older
14 plants and the newer ones that will give different methods of
15 demonstrating adequacy.

16 MS. DONEY: If I could just clarify that. We're not
17 planning to provide any technical guidance on what you do for
18 license renewal, but it seems that there was a need for a
19 utility to be able to demonstrate to the regulators that
20 fatigue was not a concern or that they had adequately addressed
21 the fatigue issues or how to program and a place to address
22 fatigue for the purpose of license renewal, not that we felt
23 there were any actual technical issues there.

24 So, what our concept is so far is that we would
25 provide guidance for a fatigue assessment report that would be

1 similar to -- in Section III there's guidance provided for what
2 goes into an equipment specification and what goes into an ASME
3 code design stress report. Not how to do it, but just the
4 types of things that need to be considered in such a report and
5 what we are envisioning at this time is that we would provide
6 guidance for these are the types of things that you should
7 probably consider in a fatigue assessment report for the
8 purpose of license renewal, but not trying to provide guidance
9 to anybody and how you go about doing fatigue analyses or
10 anything like that.

11 MR. VAGINS: Why don't you just say this is how you
12 do a fatigue assessment? In other words what I'm saying is I
13 don't see where the words license renewal really belongs -- the
14 word license for that matter -- belongs in any Section III or
15 Section III or Section XI.

16 What we're doing in the professional society is
17 setting good design and practice -- good design and operating
18 practice and that should be independent and irrelevant at the
19 time. The time, if we really mean design by analysis, if we
20 really mean operation by analysis, then whatever the time is
21 the time is and it really doesn't make any difference.

22 MS. DONEY: Well, that's a very good point.

23 MR. VAGINS: Well, it's just philosophy again, it's
24 my own.

25 MS. DONEY: Just one additional comment for the NRC

1 is if you're interested in any more information on what our
2 task group is doing the NRC representative on our group is
3 Keith Whitman.

4 MR. LEONARD: My name is Dan Leonard from Multiple
5 Dynamics Corporation. A comment in regards to the scope that's
6 needed to address the balance of plant systems. I would offer
7 that the balance of plant systems is certainly recognized by
8 the industry as being directly effecting the performance goals
9 of the plant, and that these issues are being currently
10 addressed through the industry in terms of performance
11 indicators such as capacity factor, availability factors, scram
12 reduction programs, and many other programs. I would suggest
13 that these ongoing programs are very valuable, and perhaps a
14 sole definition of what we need to do to address balance of
15 plant systems.

16 Data in the industry is showing that in all these
17 areas, that the industry is improving in terms of scram
18 reduction. NRC's concern is challenging to safety systems, and
19 that's certainly a leading indicator. Continuation of these
20 types of program, perhaps specifically the scram reduction
21 program, is probably primarily the only thing that we need to
22 do for balance of plant systems.

23 MR. VAGINS: My general answer to that is probably.
24 Most probably, you are correct, and it definitely will be used.
25 We're not going to throw away anything valuable that the

1 industry has come up with. But I would like to point out that
2 there are types of failures that have never occurred before.

3 If we look at the statistical basis of failure and
4 use that as the criteria for aging and what to study, we would
5 not worry about pressure vessels, would we? I mean, a pressure
6 vessel has never failed.

7 The reason why it's never failed is because we
8 anticipated it and we studied the hell out of it -- excuse me
9 -- studied the heck out of it, and we are not going to let it
10 fail. Well, I maintain that there is a possibility of
11 equipment aging out there in the industry right now that could
12 possibly fail.

13 One of the missions of the aging program that I run
14 is to look for these things and the possibility of them
15 occurring. I haven't found too many. I have found one which
16 we are going to hear about later -- not today, but in the
17 coming future -- but that's fine. So what I'm saying is, yes,
18 I think the NRC definitely will accept the industry incentives
19 toward scram reduction total, all of these things. Reliability
20 performance indicators and reliability improvement is a very
21 critical part of improvements and safety. I think reliability
22 and safety go hand in hand. They are not separable.

23 So, yes, we're going to use that.

24 MR. LEONARD: Dan Leonard. I would agree with what
25 you just said. The point that I'm trying to make is perhaps,

1 using reliability indicators as a first step, that if those
2 reliability indicators are good, they certainly are a strong
3 indication, perhaps, that we don't need to treat these balance
4 of plant systems individually and examine the aging mechanism
5 in detail for those systems; that we can utilize that kind of
6 judgment in place of automatically going off and trying to
7 study them individually.

8 MR. VAGINS: Until the occurrence of, say, the
9 feedwater failure systems and erosion/corrosion, your method of
10 approach would have been, "That's not an important system
11 because we're not scrambling due to it." But it failed once,
12 challenged the system and did some other damage and injury,
13 etcetera.

14 So what I'm saying is, yes, I generally agree with
15 what you're saying, but we still have to take a good, hard look
16 at it and see that we're not moving toward the direction of
17 surprise. I have a real simple way of running everything -- no
18 surprises if I can help it, both management and plants,
19 etcetera.

20 Yes?

21 MR. SNOW: Bruce Snow, representing NUMARC. I'd just
22 like to offer a comment, a different viewpoint. It's probably
23 our opinion that indicators are not matured enough to the point
24 where we'd want to manage our plants by them. We would agree
25 that the indicators provide a reason to evaluate further, but I

1 think NUMARC would not be prepared to say indicators are the
2 way to go with respect to balance of plant, and that's, I
3 think, been stated in the past.

4 MR. VAGINS: Yes, I think NUMARC stated it very
5 strongly in the past, and we appreciate that.

6 Eventually, if you develop a system which improves
7 the reliability of your plant significantly, it's certainly
8 going to make a big step toward making license renewal easier.

9 One of the big things that is important with
10 indicators, of course, is how well your records are kept.

11 There is one other question, one other thing I wanted
12 to bring up. I want to go back a little bit. We talk about
13 Class II and III systems, and how the loads on them, generally,
14 are very low, fatigue loads are very low. This is not quite
15 true. As we know, experience has shown that conditions of
16 water has -- that we have -- in many Class II and III systems,
17 we have had some significant loads. Maybe not too many, but
18 how has that effected its residual life?

19 These were not designed in, and they were not
20 considered when we did our equivalent fatigue analysis on Class
21 II and III systems. So, again, a consideration, just to look
22 at it.

23 What I'm saying here are -- these are words to stir
24 discussion. They do not represent the current NRC policy.
25 We're trying to form that.

1 David?

2 MR. EISSENBERG: Dave Eissenberg, Oak Ridge National
3 Lab. I want to get back to Owen's question because a lot of
4 this debate was supposed to be in response to it, or
5 discussion, and summarize what I think I've heard, which is
6 that I don't think I've heard any statements to the effect that
7 there's some unique tests that should be performed simply
8 because there's a license renewal; that what should be
9 performed are tests which are important when the reactor
10 reaches age 40, or age 30, or age 50, but not simply because of
11 license renewal.

12 I'd like to raise one potential reason for running a
13 test simply because of license renewal, and that has to do with
14 design margin to take into account uncertainty. That's done at
15 the very beginning of life. When a piece of equipment is
16 designed, we extrapolate off to some future life, but then we
17 add a margin. If we want to continue to run that piece of
18 equipment beyond its design life, do we have to rethink the
19 margin?

20 Up to the 39th year, we don't worry about the margin
21 because it was built in there at the very beginning to handle
22 the 40 years, but at the 40th year, when we look forward, do we
23 have to reassess the margin for uncertainty simply because
24 you're reevaluating it?

25 MR. VAGINS: Well, I certainly think that the biggest

1 place we deal with margins are in the fatigue area. The
2 margins on pressure, stress, temperature really shouldn't
3 change that much unless you've had drastic geometry changes due
4 to erosion, erosion/corrosion, etcetera, which we are going to
5 address in some way.

6 The other margins are seismic, and unless you can
7 show that they are aging related, I'm not quite sure -- you
8 know, we have definitely shown one margin is aging related --
9 in fact, two, maybe -- in the case of fatigue and
10 erosion/corrosion. If we can show something else is aging
11 related --

12 MR. EISSENBERG: Temperature, radiation --

13 MR. VAGINS: Radiation.

14 MR. EISSENBERG: -- wear, operating stresses,
15 pressure.

16 MR. VAGINS: Operating stresses and pressure, unless
17 we have a geometry change, doesn't change. The radiation, yes.
18 I mean, there's no question about that. Pressure vessel.
19 Anything that supports -- anything that's effected by radiation
20 will be considered in the total time domain. But as I said
21 before, I think that we already have rules in place to handle
22 that. The industry's problem is how to meet the present
23 requirements, and how to mitigate them.

24 You know, you really get down to it. If we doing the
25 aging research had unlimited funds and time, license renewal is

1 trivial, because we'd have the answers, because they'd be
2 today's answers. Then the problem is we're not going to have
3 all the answers, and we're going to have to use the best
4 judgement of the best people in the country, and that's the
5 industry, us, whoever. We're just not going to have all the
6 immediate answers to solve today's problems.

7 But, again, let me -- if there are no further
8 questions, I'd like to emphasize again: What is the philosophy
9 of license renewal? Assurance of continued safe operation. If
10 you're safe today, we just want to make sure you're safe
11 tomorrow, and anything we can identify to help us along that
12 line, we'll use.

13 We are not going to ask you to enhance your plant.
14 If you were not deemed adequately safe today, we'd shut you
15 down. So obviously, we deem you adequately safe by the
16 definition of the commission, and that's where we want to
17 continue.

18 Are there any other questions? I thought it was a
19 very stimulating session, by the way.

20 [No response.]

21 MR. VAGINS: If not, that's it.

22 [Whereupon, at 2:27 p.m., Session No. 3 adjourned.]

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FLUID AND MECHANICAL
SYSTEMS OF INTEREST

SESSION 3

- I. Those fluid and mechanical systems relied upon for the integrity of the reactor coolant pressure boundary, safe shutdown, and accident prevention and mitigation.

FLUID AND MECHANICAL
SYSTEMS OF INTEREST

SESSION 3

PWR

- **Reactor Coolant Pressure Boundary**
- **Service Water System**
- **Component Cooling Water System**
- **Emergency Core Cooling System**
- **Residual Heat Removal System**
- **Chemical Volume and Control System**
- **Fuel Pool Structure and Cooling System**
- **RVs, Block Valves, and Interconnected Piping**
- **Seismic Category I Piping, Raceways, Hangers and Supports**
- **Auxiliary Feedwater Systems**
- **Control Rod Drive**

FLUID AND MECHANICAL
SYSTEMS OF INTEREST
SESSION 3

BWR

- **Reactor Coolant Pressure Boundary**
- **Standby Liquid Control System**
- **Reactor Core Isolation Cooling System**
- **High-Pressure Coolant Injection System**
- **Residual Heat Removal System**
- **Emergency Equipment Cooling**
- **Fuel Pool Structure and Cooling System**
- **Control Rod Drives**

LICENSE RENEWAL WORKSHOP

SESSION 3

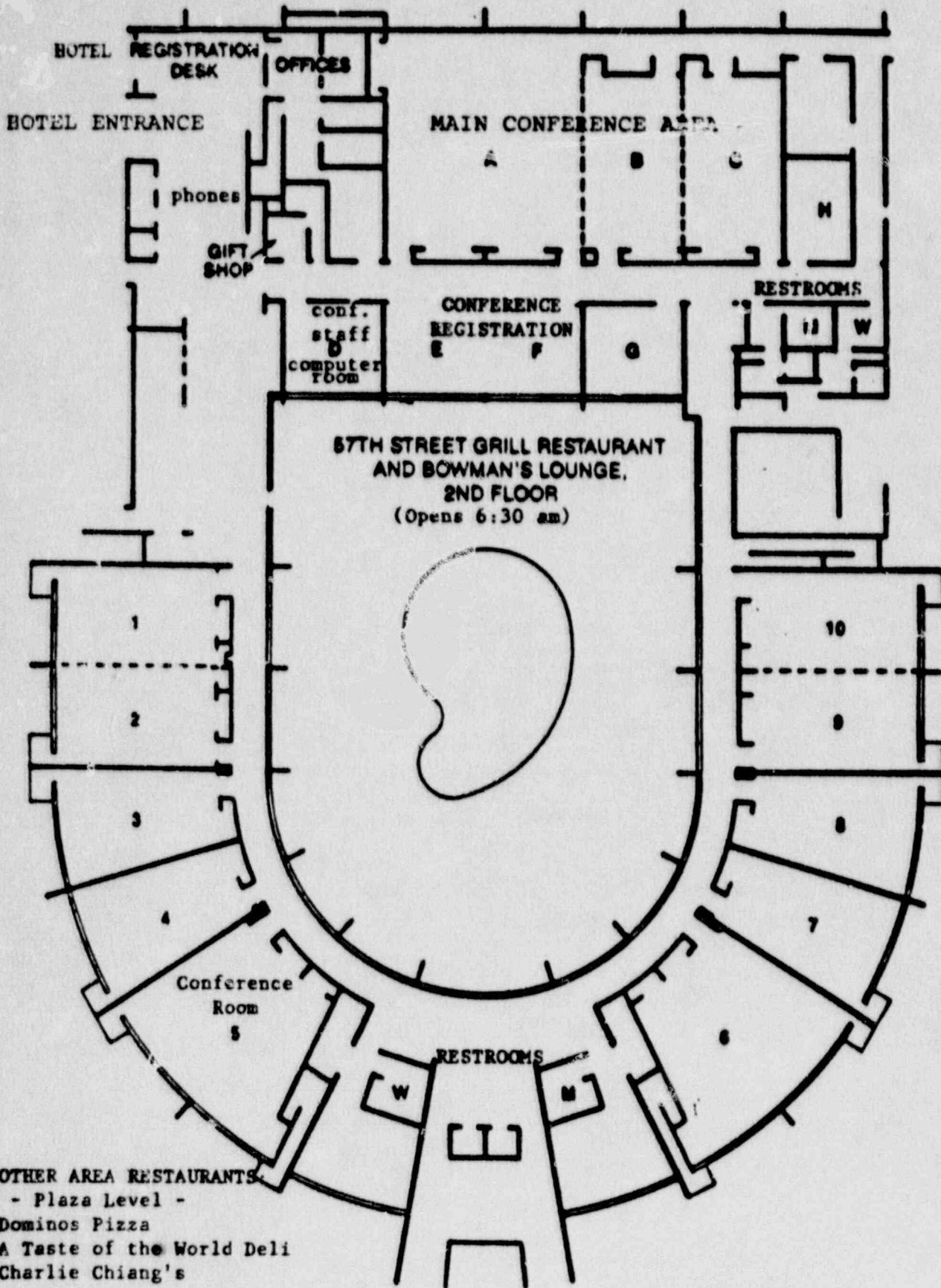
FLUID AND MECHANICAL SYSTEMS

1. ADDITIONAL CRITERIA FOR PERIODIC SURVEILLANCE AND PREVENTATIVE MAINTENANCE TO ENSURE OPERABILITY OF MECHANICAL EQUIPMENT BEYOND INITIAL DESIGN LIFE
2. AUGMENTED INSPECTIONS/ANALYSIS TO ADDRESS AGING MECHANISMS IN PUMPS AND VALVES
3. FUNCTIONAL TESTING OF SYSTEMS AS A PREREQUISITE FOR LICENSE RENEWAL
4. LONG TERM EFFECT OF FATIGUE ON CLASS 1 COMPONENTS
5. RESIDUAL FATIGUE LIFE FOR CLASS 2 AND 3 PIPING AND COMPONENTS
6. EFFECTS OF WATER ENVIRONMENT AND ELEVATED TEMPERATURES ON FATIGUE OF PIPING AND COMPONENTS
7. PROOF TESTING AND HOT FUNCTIONAL TESTING TO DEMONSTRATE INTEGRITY AND OPERABILITY

APPROACH TO ESTABLISHING SCOPE OF TECHNICAL ISSUES

1. DEFINES A PROPOSED SCREENING PROCESS FOR EQUIPMENT AND STRUCTURES TO BE REVIEWED
2. DEFINES STRUCTURES, SYSTEMS, AND COMPONENTS FOR EVALUATION
3. DEFINES SPECIFIC SET OF DEGRADATION MECHANISMS FOR EVALUATION
4. DEFINES REQUIREMENTS FOR CORRECTIVE ACTION WHEN DEGRADATION IS NOT BEING MONITORED

HOTEL FACILITIES



OTHER AREA RESTAURANTS
- Plaza Level -
Dominos Pizza
A Taste of the World Deli
Charlie Chiang's

SPEAKERS AND SESSION LEADERS

WORKSHOP ON LICENSE RENEWAL

OFFICE OF NUCLEAR REGULATORY RESEARCH:

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Themis P. Spøis, Deputy Director for Generic Issues

Lawrence C. Shao, Director, Division of Engineering

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Division of System Technology

OFFICE OF THE GENERAL COUNSEL:

Lawrence J. Chandler, Assistant General Counsel for
Hearings and Enforcement

NRC LICENSE RENEWAL WORKSHOP

November 14, 1989

<u>Time</u>	<u>Subject</u>	<u>Session Leader(s)</u>	<u>Place</u>
8:00 am	Registration		Foyer of Room A
8:30 am	Concurrent Sessions Session 6 - Containments Session 7 - Electrical Systems Session 8 - Environmental Effects	J. Richardson, L. Shao A. Thadani, M. Vagins F. Gillespie, D. Cleary	Room C Room B Room A
10:00 am	Break		
10:15 am	Sessions Continue		
11:45 am	Lunch		
1:15 pm	Summary of Concurrent Sessions	T. Speis, All Session Leaders	Rooms A, B, & C
2:45 pm	Break		
3:00 pm	Comments and Discussion	T. Speis, All Session Leaders	Rooms A, B, & C
4:00 pm	Summary and Conclusion	T. Speis	Rooms A, B, & C
4:30 pm	Adjourn		

NRC LICENSE RENEWAL WORKSHOP

November 13, 1989

<u>Time</u>	<u>Subject</u>	<u>Session Leader(s)</u>	<u>Place</u>
7:30 am	Registration		Foyer of Room A
8:30 am	Introduction	E. Beckjord	Rooms A, B, & C
8:45 am	Regulatory Philosophy and Approach	J. Sniezek	Rooms A, B, & C
9:30 am	Session 1 - Overview of Conceptual Approach to a License Renewal Rule	F. Gillespie, R. Bosnak, L. Chandler	Rooms A, B, & C
10:00 am	Break		
10:15 am	Session 1 Continued		Rooms A, B, & C
12:00 am	Lunch		
1:15 pm	Concurrent Sessions		
	Session 2 - Reactor Pressure Boundary	J. Richardson, L. Shao	Room C
	Session 3 - Fluid and Mechanical System	J. Wermiel, M. Vagins	Room B
	Session 4 - Screening Methodology for System, Structures and Components Important to Safety	A. Thadani, M. Cunningham	Room A
	Session 5 - Overview of Conceptual Approach and Regulatory Framework - continued discussion from Session 1	C. Thomas, R. Bosnak, L. Chandler	Room 5
2:45 pm	Break		
3:00 pm	Sessions 2, 3, 4, and 5 Continue		
5:00 pm	Adjourn		

Session 3
Fluid and Mechanical Systems

Public Workshop
on Technical and Policy Considerations
for Nuclear Power Plant License Renewal
U. S. Nuclear Regulatory Commission
November 13-14, 1989, Reston, Virginia

SESSION 3

FLUID AND MECHANICAL SYSTEMS

1. What additional criteria should the proposed license renewal rule and associated regulatory guidance contain regarding periodic surveillance and preventative maintenance to ensure the operability of mechanical equipment important to safety and fluid system performance beyond their initial design life?
2. What type of augmented inspections and/or analyses are needed to address aging mechanisms in pumps and valves, such as:
 - detection of degradation in pump and valve internals (e.g., erosion and corrosion due to flow turbulence and chemical attacks)
 - detection of possible cumulative fatigue of pump shafts which may lead to cracking.
 - detection of possible cumulative fatigue effects to valve discs and hinges due to cyclic stresses and impact loading from valve operation and flow excitations.
3. What should the proposed license renewal rule require regarding functional testing of systems important to safety as a prerequisite for license renewal, recognizing that such functional testing may not have been performed previously as part of the original licensing basis?
4. In light of the great variability in the treatment of fatigue in the design of Class I (or quality group A) piping and components, there is a need that license extension requirements be based on operating history of individual plants. How should the NRC confirm that Class I components have not exceeded their original fatigue design requirements? Also, should the industry address this issue in a topical report?
5. How can the residual fatigue life for Class 2 and 3 piping and components be determined for license renewal?
6. Existing fatigue requirements do not take into account the accelerated damage caused by water environment and higher temperatures of LWR plants. What provisions should be required to permit operating life to be safely extended without more definitive knowledge of this effect and how should these provisions affect the application of Miner's rule and the S-N curves applied in the ASME design code incorporated by reference into the NRC regulations? Should NDE techniques be used that give measures of remaining fatigue life and levels of toughness?
7. Are there any kinds of proof tests or hot functional tests that should be done to demonstrate integrity and operability to qualify for extended life?

REPORTER'S CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission

in the matter of:

NAME OF PROCEEDING: Session 3 Public Workshop

DOCKET NUMBER:

PLACE OF PROCEEDING: Reston, VA

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.

Jon Hundley

JON HUNDLEY
Official Reporter
Ann Riley & Associates, Ltd.

FLUID AND MECHANICAL
SYSTEMS OF INTEREST
SESSION 3

II. Those fluid and mechanical systems whose failures can cause or adversely affect a transient or accident that significantly challenges structures, systems, and components relied upon for the integrity of the reactor coolant pressure boundary, safe shutdown, or accident mitigation.

- Condensate/Feedwater System Including Reheat
- Turbine
- Main Steam System
- Condenser Cooling System

LICENSE RENEWAL WORKSHOP

SESSION 7

ELECTRICAL SYSTEMS

1. ADDITIONAL CRITERIA FOR ELECTRICAL EQUIPMENT INCLUDED IN THE E.Q. PROGRAM BUT NOT PERIODICALLY REPLACED
2. ADDITIONAL PROGRAMS TO ADDRESS AGING DEGRADATION OF ELECTRICAL EQUIPMENT LOCATED IN MILD ENVIRONMENTS
3. PROGRAMS TO ESTABLISH THE INSITU CONDITION OF CABLES AND COMPONENTS AND THE POTENTIAL FOR FUTURE DEGRADATION
4. REQUIREMENTS WITHIN THE RULE FOR ELECTRICAL EQUIPMENT IMPORTANT TO SAFETY
5. FUNCTIONAL TESTING OF ELECTRICAL EQUIPMENT AS A PREREQUISITE FOR LICENSE RENEWAL