UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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BRIEFING ON PLANT AGING AND MATERIALS DEGRADATION ISSUES - PART II

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Nuclear Regulatory Commission

One White Flint North

Rockville, Maryland

MONDAY

NOVEMBER 8, 2004

The Commission met in open session, pursuant to notice, Chairman Nils J. Diaz, presiding.

COMMISSIONERS PRESENT:

NILS J. DIAZ, Chairman of the Commission

EDWARD MCGAFFIGAN, Member of the Commission

JEFFREY MERRIFIELD, Member of the Commission

(This transcript is produced from electronic caption media and audio video media provided by the Nuclear Regulatory Commission.)

STAFF AND PRESENTERS SEATED AT OR NEAR THE COMMISSION TABLE:

JIM DYER
DR. PAPERIELLO
LUIS REYES
NILESH CHOKSHI

P R O C E E D I N G S

CHAIRMAN DIAZ: Good afternoon. Welcome to phase two of the materials issues. I do believe this is important stuff. It's very important stuff because it not only relates to many of the issues of how we see events, but I think it has a direct relationship to how we prevent events. And in that regard, we heard from the industry this morning.

We look forward to hearing from the staff about what staff is doing and how we can get more for our buck. And so without any further ado, Commissioner McGaffigan any comments? Commissioner Merrifield? If not, Mr. Reyes.

MR. REYES: Good afternoon. Staff is here today to present the activities and update regarding material degradation.

Today's briefing is the materials of the pressure boundary of the reactor coolant system and the safety systems. And these materials are alloy steels, stainless steels and inconel alloys.

Examples of the pressure boundary components we are discussing include reactor vessels and other vessels as pressurizes, steam generators, vessel penetration, pipings, steam generation tubing and various welds.

When we refer today to material degradation, we're not including issues such as cable insulation, containment structures or fuel.

As we have been discussing, we have had an active regulatory and research program regarding the management of material degradation issues.

The presentations are going to be presented to the Commission by Jim Dyer, the Director of the Office of Nuclear Reactor Regulation and Carl Paperiello, the

Director of the Office of Research. Without further delay, Jim.

MR. DYER: Thank you. Can I get slide two, please?

Slide two is our listing of acronyms we are proposing to use today. I heard the admonishment this morning.

COMMISSIONER MERRIFIELD: Yes. For those of you who weren't here this morning, I admonished the industry for not consistently using and defining the acronyms within the presentation rather than have a separate list.

So it would be unfair of me to have admonished our licensees without appropriately admonishing you as well. So, duly noted.

MR. DYER: Thank you.

Slide three, please.

This afternoon I, for my part of the presentation, am providing an overview of the regulatory activities for the NRC materials degradation management of the reactor coolant pressure boundaries and vessel internal components.

This overview includes a description of the regulatory framework, a historical summary of issues we dealt with and are dealing with, the current challenges that we're facing and finally, the future goals for where we'd like to go in the management of materials degradation in the future.

Managing materials degradation has proven to be one of the more challenging issues facing the NRC and the industry since the start of commercial reactor operations.

It's very complex and a dynamic area of reactor safety with degradation caused by chemical and cyclical stress factors in a harsh and chemical environment at high-pressures, temperatures and flows and radiation levels.

Each of those has a bearing on the rate of degradation.

Everything wears out at some point, and for these reactor coolant system components, the inspection repair and replacement is very difficult to accomplish.

So effective degradation management involves the design of components with materials least susceptible to degradation in the environment in which they operate and monitoring the degradation to ensure the components are replaced or repaired before safety margins are unacceptably reduced.

Both the demands and available technology for monitoring and new materials are continually evolving.

And keeping improvements ahead of the degradation mechanisms is our management challenge.

Slide four, please.

The framework begins with the high-level requirements identified in the Code of Federal Regulations for both design of the components and the periodic outage inspections to ensure the safety margins are maintained throughout the component life.

These regulations refer to the American Society of Mechanical Engineering, or ASME standards, and are continually being updated as ASME code changes and later versions are endorsed by the NRC.

Licensee in-service inspection programs are updated every ten years to incorporate the latest versions of the codes and risk informed alternatives are reviewed and approved by the NRC staff as exemptions to the regulations.

The license technical specifications also include requirements for leakage monitoring and have shutdown requirements for reactor coolant system boundary unidentified and identified leakage to provide a layer of defense-in-depth for the reactor coolant system boundary integrity.

The NRC also issues generic letters, bulletins and orders for dealing with emergent issues that may not be properly managed by the existing regulatory framework and licensed technical specifications or common industry practices.

These actions usually require licensees to provide additional information and inspections of components to determine whether the previous assumptions on degradation mechanisms remain accurate.

Next slide, please.

The regulatory framework is highly influenced by the results of the NRC research activities on new materials, degradation mechanisms and inspection techniques which influence the staff decisions on revisions to the regulations and technical specifications as well as issuance of the generic correspondence and orders.

The specifics of the research I will leave later to Carl's presentation.

We also rely on industry initiatives and actions to the extent we can, often referring or deferring to industry commitments and guidance documents.

These initiatives also provide input to the ASME standards for later incorporation into our regulations.

Examples where we have referred to industry initiatives include flow accelerated corrosion monitoring, boiling water reactor vessel internals project and steam generator nondestructive examination and analyst qualification requirements.

As you heard this morning from the industry, we are continuing our active involvement with the industry on these areas.

Recognizing that going forward with the frequent and active communications with the industry is vital to effectively address these issues.

The staff and the industry communicate frequently at several levels, and we would see this increase going forward as the proposed industry initiatives mature.

Next slide, please.

The level of confidence we get on these industry activities is heavily influenced by the feedback from our oversight program activities of the specific licensee implementation.

In particular, the reactor oversight program baseline inspections include mandatory in-service inspection, or ISI, NRC inspection requirements at each outing.

When emergent issues are identified, we can also issue temporary instructions for inspector follow-up on specific issues for generic correspondence order implementation.

Often these TIs require inspector training by the NRR technical staff, which serves to improve the communications between NRC headquarters and regional technical experts.

NRR technical staff also have follow-up interaction with licensee and regional inspectors on the in-service inspection findings during outages.

Both the baseline inspections and the technical instructions call for interaction between the various NRR. technical branches and regional inspectors to ensure we have consistency in our inspection practices and disposition of findings.

This interaction has significantly increased since the Davis-Besse reactor vessel head degradation discovery.

Lastly, as with any performance deficiency identified under the reactor oversight process, the follow-up extent of condition review of an in-service inspection deficiency by the NRC is determined by the risk significance and the repetitiveness of the findings.

Complete review of the licensee's in-service inspection program could occur for a more significant or repetitive issue utilizing a customized inspection plan to fit the circumstances.

Next slide, please.

Since the 1970's, we have been managing materials degradation challenges.

This slide provides a listing of several of the challenges that have emerged and are continuing to be addressed by the industry and NRC materials degradation programs.

A review of the specific histories of these challenges reveals that the technical input both the industry and the NRC research has been critical component to the amount of success we've experienced in managing each of these areas.

Next slide, please.

These next few slides discuss some of the challenges that both the NRC and the industry are currently facing.

All the forms of material degradation require active management and oversight.

These are just some of the challenges that have emerged.

And I'll use the term recently.

And recognizing that recent is a relative term measured in years often to get resolution on many of these materials degradation issues, the challenge is to keep the proper risk perspective during the resolution period.

At the top of the list of current challenges facing the NRC and the industry in materials degradation is the primary water stress corrosion cracking of nozzles in reactor pressure vessel and pressurizes.

As was documented in the Davis-Besse Lessons Learned Task Force Report, emerging concerns with reactor vessel head nozzle cracks were initially addressed through a generic letter in 1997, and then followed up by a bulletin in 2001 after circumferential cracks were discovered in the Ocone nozzles and subsequently with an order after the reactor vessel head degradation was discovered at the Davis-Besse facility.

The day the inspections called for by the NRC orders are identifying cracks in heads that require repair.

The long-term solution to this issue would be head replacement by the industry with materials less susceptible to the cracking, and we are working through the

American Society of Mechanical Engineers to identify alternative inspection schemes to the ones initially proposed in the order.

After cracks were discovered on the bottom vessel nozzles by the South Texas project, the staff issued a bulletin to require inspections of other pressurized water reactors at the next outage.

The discovery and handling of this issue by the industry in the South Texas project was commendable.

But the potential significance dictated the regulatory response of a bulletin.

To date the inspections directed by the bulletin have not identified any further instances of bottom vessel nozzle cracking.

These nozzle cracks.

In 2004, we also issued a bulletin on pressurizer heater nozzle cracking inspections.

These inspections are identifying cracks on the pressurizer nozzles leading to repairs and replacements.

Since 2001, we have seen two instances of cracks on dissimilar metal butt welds on reactor coolant system piping in the United States and in one instance, one occurrence internationally overseas.

As discussed in the meeting this morning by the industry, the staff engaged industry material groups and is considering the appropriate regulatory approach on this issue.

Next slide, please.

With boiling water reactors, we're also seeing material degradation problems due to increased flow in systems from the power uprates. In particular, at some boiling water reactors excessive steam dryer cracking and breaking of feed water probes are leading to foreign material in the reactor vessel and steam and feedwater lines.

The BWR owners group is taking the lead for resolution of this issue with the individual licensees.

Exxon has voluntarily limited the city station to its preextended power uprate levels until the steam dryers can be sufficiently reinforced and has proposed to instrument the new driers scheduled to be installed at next outage.

This issue is also one of our key technical issues that is being looked at as part of our Vermont Yankee standard power uprate amendment review.

The NRC is monitoring these industry actions quite closely.

Today the NRC is closely following the results of the Dresden 3 outage inspection for the steam dryer cracking and have been working closely with the industry for instrumenting -- to understand the instrumenting the new Quad Cities dryers plan for their spring outage.

The key challenge is to understand the stresses and forces caused by the increased extended power uprate flows, which will allow the industry to redesign their dryers and probes in understanding the forces on the dryers.

Next slide, please.

Another challenge where the industry and the NRC have made significant progress over the past several years is with steam generator tube degradation.

In the late 1980's and 1990's there were technological advances in the nondestructive examination that led to earlier identification of degraded tubes.

Industry chemistry control improvements and improved repair have benefitted this area greatly.

Many licensees have replaced steam generators with improved designs and more resistant materials.

The NRC and the industry have also collaborated to recently develop a new regulatory framework consisting of performance-based technical specifications and industry guidelines for ensuring steam generator tube integrity.

We've provided the Commission a briefing on these improvements in May of last.

The first improved technical specifications were recently issued to the Farley Nuclear Station and other licensees are now developing requests based on the Farley precedent.

Next slide, please.

For our future goals, foremost is the return to a more stable regulatory environment, one with fewer bulletins, orders and generic letters concerning materials degradation. To do that, we need fewer emerging issues. That can be accomplished only if we have an effective industry program, a pro-active oversight of our inspection review programs, a solid understanding of U.S. and international operating experience and input from independent NRC research.

We welcome the industry formation of the materials degradation management groups and will continue to work with them to pro-actively address potential issues of concern.

For the NRC staff, pro-active means dealing with potential issues of concern before they become a problem. And we are worried about the extent of conditions throughout the industry.

The industry proposal described this morning offers the potential to achieve a more stable regulatory environment if implemented thoroughly.

However, as I described earlier in my discussions of the current challenges, the NRC actions now are often identifying the problems within the industry.

We look forward to the industry initiatives replacing our actions as a vehicle for identifying potential concerns and proposing resolutions to these concerns.

However, the regulatory framework must continue to rely on our own independent research to confirm the adequacy of the industry approach in this area.

Let me now turn the presentation to Dr. Paperiello to discuss the materials degradation research.

DR. PAPERIELLO: Thank you.

I'm going to discuss just one aspect of our materials degradation program, and that is the pro-active materials degradation program that we have taken on to address the forward-looking issues, what could occur.

I'd just like to reflect on a couple things.

One of the issues I heard discussed this morning was duplication of effort, and I would like to address that. I hadn't prepared to do it. I put something together.

With limited resources, neither the NRC, the regulated industry, or even foreign nuclear community can afford duplicative programs.

There is in fact an extensive collaborative effort not only domestically but with foreign parties.

I met with NEI last week, with NRR on Tuesday to discuss this program. I met with EPRI on Friday to talk about the whole range of programs that we share with EPRI. I think most people are aware here that within the last few weeks we put out a joint publication with EPRI on fire PRA models.

Such an example is the kind of collaboration we do. We keep track of much of the foreign work through our foreign bilaterals

And also our participation in multilateral efforts such as CSNI and efforts at IAEA.

So collaborative research is one of the strongest ways of preventing duplication and ensure everybody complements each other.

Also when we're looking at doing research, we consider what's been published in journals.

We keep track of what is happening in the field at professional society meetings.

And of course, we have our own safety -- we have had but we're going to move it to the RIC -- but our own safety research conferences where we discuss with people what we're doing and we hear from them what they're doing. We participate in ASME, which of course a lot of the new results are brought into.

Do we ever duplicate? In some cases we do duplicate, particularly on the analytical side.

But I would hope we don't duplicate in experiments. Although I understand from my staff there's a few cases over the years where we have because we felt that we had to get better information or we've had some advice for an independent decision, we were going to have to duplicate an experiment.

But analytically, we do that all the time. When we do a license evaluation, we're doing analyses, and we're doing an independent analysis.

So there is duplication at times in the area of analysis.

And we do it not just in research, but, for example, in NMSS when they run scale code for packages and fuel facilities or they do performance assessment for high-level waste, there is an independent analysis. So in those cases there is some duplication.

I think in this particular project, I think the word complementary is the best way to describe it.

My inclination is that the industry effort is a top-down and ours is a bottom-up.

But I don't want to be held to that being precise, it's not completely top-down on their part and is not completely bottom-up on our part. But we're doing some things and doing it slightly somewhat different. And we're going to have an opportunity soon for an early comparison of our results with their results on some subsystems so we see how well we fit together.

If I could go to slide 12.

I would say when you heard the list of current challenges that were presented by Jim Dyer, there is a Research component in every one of them. We are participating as partners with NRR in resolving the technical issues. I'm going to talk about our approach to materials degradation.

Our short-term program which will be completed relatively soon; our longer program, which will be completed by the end of calendar 2005; the schedule, and how we're going to expect to use the results.

Slide 13.

I think you've already heard from Jim Dyer there has been a long history of Research input into regulatory activities.

The program actually started in the 1960's and 1970's in developing an understanding of materials, environmental degradation, embrittlement, fracture mechanics, nondestructive examination and steam generator integrity. There was an input into the inspection enforcement bulletin, AD-302, on guidance for qualification for inspection of BWR pipe cracking.

We provided technical input into NUREG-0313 to provide industry regulatory guidance of treatment of stresses, environmental and in-service inspection requirements in crack growth, disposition curves to manage BWR pipe cracking.

And also Research work has been used by the industry to update the BWR water chemistry guidelines.

Data analysis on radiation assisted stress corrosion cracking initiation and growth for regulatory assessments of internals cracking has been provided.

We've done a lot of work on nondestructive examination and it has resulted in ASME code requirements for qualification by performance demonstration, risk-informed inspection guidelines and numerous procedural and method improvements to the ASME code inspection requirements. So there is a whole history of Research involvement in this area.

Next slide.

The approach we're taking to the current issue is looking at trying to anticipate what might happen. The current ways that we have dealt with material we believe have been less than fully effective and efficient and placed a great financial manpower burden on people, and has things occur unexpectedly, we believe, erode public confidence.

What does it mean to be pro-active? We believe it involves a prediction of future degradation and taking action to avoid it. And as a minimum, we'll need to predict, monitor, and repair a component before the integrity is impaired.

Slide 15.

And we're focusing our efforts in terms of risk to avoid failure of safety-significant components and to avoid significant releases of radioactivity.

And what we are going to be doing is to identify materials and locations where degradation can be expected in the future.

And then we would use that information to ensure there is an integrated cooperative program by everybody; whatever was done complemented each other, no overlap, to assure that the risk significant degradations were being addressed.

Next slide.

We have two ongoing activities in this area. A short-term effort and a longer-term effort. And the longer-term effort is a phenomenon identification and ranking table process for light-water reactors.

Next slide.

In terms of a short-term program, we have held a week long workshop with the staff from PNL, Oregon with Research and NRR.

We've identified components that have experienced degradation from the generic aging lessons learned report, the GALL Report, the licensee event reports and the database from the Institute of Nuclear Power Operations.

The task group began to assess the effectiveness of in-service inspection and leak monitoring techniques and the requirements for these components.

The task group also began development of recommendations for improvements as necessary. The task group is providing a list of components that are susceptible to degradation and whose inspection requirements may not detect degradation in a timely manner to the Research PRA staff who will then conduct additional core damage frequency for these components.

In addition, existing probability of failure data for metallic components is being collected for use in future PRA's. So there's two uses of this data.

We're not only doing it to deal with degradation, but we're also producing data that will be used for future PRA analyses.

The report, the draft report for this work will be available to us and to NRR for review by the end of this year.

And the conditional core damage probability analysis being conducted on the components of experience are expected to experience degradation, we will have those results by the middle of calendar 2005.

Next slide.

The longer-term program uses the phenomenon identification and ranking table process. It is a type of expert elicitation.

Analytical prediction of future degradation is not feasible at this time since it would require extensive time, funding, data and mechanistic understanding of the degradation process.

Therefore, identification of components susceptible to future degradation is best made using expert opinion.

The PIRT process provides a structured approach for eliciting expert elicitation to obtain information on potential future degradation. It provides a basis for quantative evaluation of the potential for degradation.

The state of knowledge -- not just the potential -- how well do we really think we know it. And it's a vehicle for documentation of the results.

We have an expert panel of eight world-class materials and degradation experts in industry, research laboratories, regulatory agencies, and universities from the United States, Canada, Japan, France, and Sweden.

The panel members have brought expertise in materials and degradation phenomenon from the nuclear and nonnuclear industries. And this panel is being supported by experts in stress analysis, reactor systems, and operational experience. In

using this approach, hundreds of LWR components are being carefully evaluated for potential future degradation.

However, the exercise is bounded by considering systems that are important to safety and portions of systems whose failure would lead to a significant release of radioactivity. Our approach begins with a breakdown of systems in the individual components.

Information on operating experience, operating environment, material pipes, stressors is assembled for each specific component and provided to the materials experts.

Based on a specific component material and its environment, the experts determine the potential for future degradation.

In addition to past experience, the experts also consider time-dependent phenomenon and parameters that could contribute to the development of future degradation for specific components, even if it hasn't been experienced.

Other approaches industry considers broadly the material type in a known degradation phenomenon for a given material and not necessarily the specific components and the associated specific conditions that would be necessary to produce degradation.

Now, this is kind of what I'm looking at when I say a bottoms-up, and a top-down approach.

Next slide.

A component is a continuous portion of the system that is of the same material and product form and experiences a similar environment.

The component's environment includes the temperature, stress, water, chemistry, radiation history, et cetera experienced by the component.

Experts assign numerical values with three parameters in the evaluation of potential degradation expected for each component and provide bases for their decisions.

The three parameters relate to the degree of susceptibility, the personal confidence in that judgment, and knowledge level for the degradation mechanism.

In addition, the experts provide a narrative describing the bases for their decisions.

Next slide.

This is just a small snippet of how this is done, and I don't have slides here for the computer screens that are generated. But corresponding to this schematic and each of the numbers on the schematic is a computer screen.

And that computer screen has the information on that particular component with respect to what it's made out of, what kind of degradation it has experienced, what we know about it. And the experts are passing judgment in each of the three areas. What we know, the confidence in our knowledge on each of those components that correspond to one of those numbers. And then that information is assembled.

Next slide.

The first two PIRT meetings on PWR reactor coolant system and the emergency core cooling system have been completed. And potential future degradation is being identified. There will be six more meetings to complete the PWR and BWR evaluations.

And the PWR report will be available in June in draft, in June of 2005. And the BWR report will be available in December of 2005. They will be peer-reviewed. They will be shared with everybody.

And in fact, what we were actually going to be doing, since we will have pieces of the reports early on, we're going to be comparing the results for the PWR reactor coolant system with the industry matrix as soon as we get that information in our analysis. We have the industry matrix to see how results compare and make judgments on whether or not we ought to change what we're doing based on that comparison.

Next slide.

What are we going to use results for? We're going to have information. We're going to have a list of components susceptible to future degradation, the bases for why we believe they're susceptible to degradation and the knowledge level. How well do we really think we know this? That will be then combined with what the industry has identified. And I suspect we are going to have significant overlap. My hope is that we by and large come out in the same place.

We may have some points of disagreement, which are then going to have to be resolved the way scientists and engineers resolve these things.

And then all that information should be put together.

And we then launch or we -- we have ongoing degradation research from steam generators from the Davis-Besse program. But we would then have to realign ours. I assume the industry would realign theirs when we get this information and determine, you know, what needs to be done, if it hasn't already.

We may find out we're doing most of the things that need to be done in this particular area. But we want to be able to establish priorities based on risk.

And with the hope that we're going to come up with a program, a material reliability program that will preclude events such have occurred in the past from surprising us.

Thank you.

MR. REYES: That concludes the staff's presentation.

CHAIRMAN DIAZ: Thank you Mr. Reyes, Jim, and Carl. We appreciate the presentation. Let me just start the afternoon meeting with a couple comments.

I think what we have heard this afternoon; it's a real complement of what we heard in the morning in many senses.

I think specifically it's because we're now focusing on not only a pro-active program, a pro-active program that focuses on those issues that are important to safety, or has a risk significance to it. The industry also did that, but I think ours in a certain way is a little different because we come from a different perspective.

I think that's okay. I think that complements the results that we hopefully will get from the industry. I think that one of the issues that really are going to come out from this are what type of regulatory actions come out of a pro-active program.

Let me read again what you call a pro-active program. A pro-active program is really a program that predicts future degradation in a manner that you can use it by us and by the industry. I think that's the whole key.

Since I've been here, we've always been, call ourselves good at event, an issue -- jumping at it and making sure that everything is done after the fact. This is one

of those issues in which we are trying to jump at it before the fact. And that would also require regulatory actions. We don't need to have events to trigger regulatory actions. And I think that's the important aspect of these things. I can stand not having serious materials degradation events.

I can definitely live a few years without being excited by any of those. Having said that, let me go back and take a look at some of the statements.

There's -- the material you provide, there are a couple of statements that kind of somehow ring an alarm. One of the statements says we know that we will never be able to declare victory over material degradation issues. Well, can we declare partial success? Can we -- how do we reconcile this with a prevention type program that is pro-active and aggressive? Can we get -- you know what I mean, Carl?

DR. PAPERIELLO: You don't know what you don't know. In fact, this morning when I was listening to the presentations, I was thinking as a physicist, how can I calculate all this from atomic theory. Because in fact, I know the mechanisms that are causing all this from first principles.

The problem is material is heterogeneous. As much as I'd like to say this will never happen again, you know --

CHAIRMAN DIAZ: What I'm trying to refer to is that what we should do is try to make sure that all issues that could require potential regulatory action from the basis of what is known are there. I would consider that success. Not victory, but success.

DR. PAPERIELLO: Properly speaking as a scientist.

CHAIRMAN DIAZ: I'm trying to refer to the fact that, you know, the

reason to have this program is to achieve success in a manner that we can prevent or minimize a safety issue from what is known and from what we can anticipate. And that, to me, really would be success. We're not there, but that to me would be success. I think as the staff goes into these issues, the same problem that the industry had of prioritizing and coming up with things that we need to focus on first, because they're more important to risk and safety, become really -- and I'm sure you're doing that; right?

DR. PAPERIELLO: Yes.

CHAIRMAN DIAZ: I'm seeing Jim over here, and I want to see both your faces. The surprise element, I guess, we all have been surprised, and the industry is putting a significant amount of weight on the issue of self-assessment as a tool to prevent surprises. Id like to ask you, Jim, how are we going to interact in this process of self-assessments and how we're going to be coupling it so that we also don't have surprises.

MR. DYER: If I understand the question right, Mr. Chairman, I believe the key is communications in what we were talking about what we heard this morning. The industry has done a self-assessment and come up with its deltas. We have done a similar self-assessment as part of our budget process actually as to where we think we need to focus in working with Research as to identifying what are the things we need to look at going forward in our inspection program, in our review program, in our research program.

I think marrying up the two and comparing our notes with the industry's notes is where we're going to, as Carl described, come up with the differences and look for where do we need to -- where can we back off because the industry has got a

more aggressive program

And where do we need to focus because maybe we're not so sure about the industry's program.

That's what I would say. I don't know if that answers your question or not.

CHAIRMAN DIAZ: I think so. This morning I asked about new technologies. I notice that there was a little bit of pull back in there because of concern of how the new technologies is going to aid or not aid what the plan is trying to achieve in operational safety operations. How is our program looking at new technologies? Is that an area that you want to --

DR. PAPERIELLO: I heard two things this morning. I'm going to address one and then I'm going to ask Nilesh to address the other. That is the code did not keep up with new technology. I'm aware of that. Primarily in the mid-1970's when my field was research radiochemistry, the analytical methods that were used at some nuclear power plants, like most nuclear power plants, were right out of the code. Actually the ASTM analytical methodology. From my viewpoint, they were at least a decade out of date. I recognize how that can happen. But, Nilesh, can you address the issue of what we're doing in new technology?

MR. CHOKSHI: I think the major area of the new technology is nondestructive examination because that's where a lot of the challenge. And in the pro-active sense you need methods and tools to be able to beat that. So we bring a lot of work.

For example, for the PWSCC, this similar metal, we are in the process of a joint program with EPRI, Finland, Japan, Sweden and looking at the inspection technology on how to detect the PWSCC cracks, alloy pipe cracks, what kind of metals will work with the different materials. That's one example. We have been working with industry on the North Anna 2 head. Environmental assisted corrosion. We are looking, for example, at alloy 690, a replacement material . Most of those, I would say the technology focuses in that area. That's where really development is and understanding of mechanism and experimental type of work.

CHAIRMAN DIAZ: You mentioned about destructive examination. Are we having a good, aggressive program to make sure that the industry or us captures whatever learning needs to be done from some of these materials that are being retired where there are heads or, you know, pressurizes, whatever; we can learn from and get a much better idea of what degradation is?

MR. CHOKSHI: Yes. North Anna 2 was specifically an example where we have repair nozzles. Also the origin nozzles. We are doing both destructive and nondestructive. That is one example.

CHAIRMAN DIAZ: It is important to capture once these materials are being retired.

DR. PAPERIELLO: This is an area where there's been a lot of cooperative effort with the industry.

MR. REYES: I want to add that another way to think about this is using existing technology in a different way. And I give you an example.

When Summer identified a crack in a hot leg, one of the issues that came up was using eddy current testing to check the surface, internal surface of the pipes. It's been done overseas. It's never been done here. There's a lot of limitations in using that technique, and there was a lot of apprehension from the licensee.

Nonetheless, I think it was useful. And as a regulator, we need to understand that using the existing technology in a different way provides some information, but it has its limitations. So we cannot make regulatory actions that go beyond what the technology affords you to do. So that there are innovative ways to use existing technology that's being used overseas. We have used some of it here.

But when it's all said and done, I think we need to be technologically knowledgeable about the limitations of the new tech technology, because I think part of the reservation, with good reason, from the industry is that as a regulator, we don't take a posture beyond what the technology can offer.

MR. DYER: Mr. Chairman, if I can add, I think certainly I remember quite vividly the efforts we went through with the Davis-Besse reactor vessel head to make sure we had all the right samples there. But this is an area we need to improve our communications with the industry on. But not so much when it's a disposed of component that's been removed from service.

But when we get involved and find something that's going to be repaired in place, there's that challenge of delaying the outage to get industry generic information when a licensee may want to just go in and repair and destroy the evidence, if you would, that might be more valuable for degradation, growth rates, and information like that.

CHAIRMAN DIAZ: I think that's what interactive and aggressive means.

You need to look at one of those issues. I guess that, you know, by the end of next year we will meet again on this issue. In that respect, I notice that you have quite an aggressive program to get to a series of milestones. And I hate to be the one to ask this question, but do you have all the resources you need to carry all of this out?

MR. REYES: Yes.

CHAIRMAN DIAZ: All right. With that very, very elaborate answer, Ed you want to?

COMMISSIONER MCGAFFIGAN: I'll defer to Commissioner Merrifield.

COMMISSIONER MERRIFIELD: Thank you, Mr. Chairman. On slide six; we talked this morning about the industry's desire to categorize some of their findings and then a series of actions being deemed to be determined to be mandatory, needed, or good practices. My question, you've got a bullet here talking about reactor oversight processes, indicators and findings.

I'm wondering to the extent to which some of these items are identified by the industry as mandatory or needed, might somehow find their way into interweaving them into the reactor oversight process. Do you have any views on that?

MR. DYER: Yes sir, Commissioner. After this morning's meeting, we had a meeting of our brain trust in my office. Looking at this very question, we believe the existing framework we have is adequate for providing industry oversight. It would have to be tailored.

And as part of our communications going forward in these mandatory items, one of the things we would be looking at is for which items should we possibly flag as part of our problem identification resolution follow-up.

Would they be appropriate for that? Which items depending on the significance of the issue would we issue a TI for?

And in fact, it might require some budget adjustments on our part, where we would, if you're going -- if industry initiatives are going to replace some of our efforts in issuing generic correspondence, we may have to adjust, but are these the issues we want to follow up with some inspection activities on or audit or report back to the -- have the industry report back via INPO or something like that.

There's a lot of variables, but we are looking at that.

MR. REYES: One of the things that I like about what Research is doing is we currently have inspection requirements during outages to go and look at components. The effort that Research is leading would give us a risk categorization of components and systems from the materials degradation point of view. So now you take an inspection procedure that we already have. We need to sample the right places. And I think that that is going to leverage what we do from a risk point of view.

MR. BATEMAN: As a point of interest, to my knowledge, we only had one example so far. I mean this is a fairly new process that they're implementing, and we have one needed recommendation. And that is to inspect the similar metal butt welds in the reactor coolant system, and that has just started. So we're in infancy stages of this right now.

COMMISSIONER MERRIFIELD: On slide 15, we talked a little bit this morning about the coordination of research.

And I think we've -- at various points folks have spoken about the need not to duplicate efforts or to avoid unnecessarily conducting efforts where we don't have a

regulatory basis for doing it. And Carl made some comments about that I thought were on par.

In the second bullet, it talks about effective implementation of pro-active materials degradation management. Luis, you answered very briefly that we had the money to support what we need to do for Research. But I'd like to dig a little bit in terms of how we are going to focus our dollars on some of these pro-active efforts and manage our resource base in order to support some of these upcoming materials degradation issues.

DR. PAPERIELLO: When we've done the analytical work, you will rank the issues, what is more serious, what do you know, what is unknown. And then we're going to have to decide with the resources that we have, what the industry has, what's being addressed. Are there loose ends?

Are there areas we're working in when you do the analysis that there's not a whole lot of payoff and do you drop them and reprogram resources?

But right now this is -- what I'm talking about here is process and not -- as I said; I opened my remarks on this thing.

The amount of research that might be needed, what's actually going on is far in excess of any kind of resources that are available to us or even to this agency.

So effectively you have to shop this thing around.

We need to know who's going to -- the goal would be to have a listing that everybody buys into and then we sort out who's going to do what. We're doing it right now. Only we're doing it on a subjective basis rather than trying to do it on a more analytical,

more PRA basis. I mean, the industry matrix is doing the same thing, looking at what do we know, how certain is what we know.

Do we have a program in place? So all that information goes into the process. So what happens at the end when you have an analysis of what is degrading?

What could degrade? What would be the consequences of that degradation in terms of risk? And then what programs are in place to address each of those issues? Are there holes? Are the priorities right?

So this is not a, sort of a, well, we're going to have a whole new -- we have to face reality.

Again, I preface my remarks about the resources that everyone has is limited.

COMMISSIONER MERRIFIELD: On that score, I would like to make a follow-up to your comment. One of the strategic goals that we have is openness. And recognizing and agreeing with the notion that we shouldn't be duplicating research, one of the things that is notable about the research that we conduct is that we open it up to everyone. Anyone can take a look at it and make their comments.

To the extent that we have to rely on the research of others, whether it's EPRI or NEI conducted research or other entities, there is a tension there of making sure that we have the degree of openness, that it would ensure the increase in public confidence for our regulatory actions.

So I'm wondering if you could sort of talk about the philosophy perhaps of how we will bridge the need to avoid duplication and at the same time fulfill our strategic

goal of openness.

DR. PAPERIELLO: Right now -- I'll have to get back to you.

COMMISSIONER MERRIFIELD: It is an issue.

DR. PAPERIELLO: Some of our foreign collaborations as well as the, when we met with NEI last week, of the 20 projects they're working on, some of it is proprietary information. Of course we handle proprietary information.

MR. REYES: We will have to go by the requirements of proprietary information.

But to the extent there is information that is not limited by that and we will use it in our decision-making, as always, that will be accessible to the public.
I mean, we have constraints on proprietary information, and we always have had those. But to the extent that information is not proprietary, if we use it for any recommendations to the Commission or decision-making of any sort, we will have to make that available.

COMMISSIONER MERRIFIELD: It may be worthwhile considering in engaging in dialogue about it, especially up front before the research is completed, is there a way to appropriately contain information which is proprietary versus other generic information that could be made available? But that is something worth considering.

On slide 11, one of the bullets -- one of our, right up front, return to a more stable regulation. And I think you get no quibble -- I shouldn't speak for this side of the table. You won't get any quibble from me about the need for stability. I'm wondering if you have a particular road map that will return to more stable regulation?

MR. DYER: Yes, sir. The more stable regulation is returning, in my

view the license, technical specifications and regulations.

And fewer bulletins, generic letters and orders. Those are the indications of an emergent issue that has caught us by surprise.

To get back into more, to have a more pro-active approach, if you would, to be dealing with things when they are potential issues, when we don't have a concern about the extent of condition and the safety is what we are talking about.

The NRR staff, certainly the NRC staff overall is very encouraged by the industry efforts because there's less -- when we're in a bulletin space or an order space, it's a significant amount of emergent work on our part.

CHAIRMAN DIAZ: Mr. Dyer, I've said a few times there are not going to be any more Davis-Besse. You're going to make me look good; right?

MR. DYER: Yes, sir.

COMMISSIONER MERRIFIELD: Slide 21, you go through the PIRT, phenomenon identification and ranking table, meetings. You've got six more meetings to complete with PWR and BWR evaluations. The PWR report is June of 2005 and the BWR report is December of 2005.

Could you talk a little bit more about what the other six meetings are intending to cover? And is there any significance to the fact that we're working on the PWR issues first, or is that just a flip of the coin issue?

MR. CHOKSHI: I can tell you what we're going to do in the next six. We start with the reactor coolant system and ECCS and then we're going to go down to the other BWR systems, like auxiliary feedwater systems. Roughly about two or three systems per meeting. We'll cover all the PWR systems in the four meetings.

And similarly on the BWR systems. The PWR, I think, a couple of reasons earlier. The current issues on the PWSCC and Alloy-600 are the PWR issues. That was a little bit more emphasis on the PWR's.

We start preparing tables for the meetings, starting with PWR. We take meetings every six weeks. Scheduling those meetings with eight people involved, that was a big challenge. Now all the meetings are scheduled.

COMMISSIONER MERRIFIELD: Thank you.

COMMISSIONER MCGAFFIGAN: Thank you, Mr. Chairman. I will note that the staff's initial concern about the 55 minutes was misplaced. I think you had 27 minutes to spare at the end.

MR. REYES: I want a rain check.

COMMISSIONER MCGAFFIGAN: We're not Sprint. We're Verizon. I also want to apologize for not being here this morning. I had a medical appointment that kept me out of the office.

First for Jim Dyer, you mentioned when you were dealing with slide six that the training on these temporary instructions gets done by NRR staff with the regional staff. That training is done here in Washington or is it done in Chattanooga?

MR. DYER: It's actually done, a lot of times we'll be sending staffs to the regions for the inspection counterpart region.

MR. BATEMAN: None of it is taking place in Chattanooga.

COMMISSIONER MCGAFFIGAN: None of it takes place in Chattanooga. Some of it takes place here, some of it takes place in the regions during the regional counterparts?

MR. BATEMAN: Some of it takes place, phone calls. We'll have joint phone calls and do it that way.

COMMISSIONER MCGAFFIGAN: Very efficient.

MR. BATEMAN: We try our best.

COMMISSIONER MCGAFFIGAN: Carl mentioned, and this is probably for both of you, that this task group working on short-term programs -- slide 17 -- is evaluating inspection and leak monitoring techniques and requirements, and implied that there might be some new requirements that were coming out of this short-term program.

Are there new -- you know, as you evaluate -- in leak monitoring, you know, there's -- we correctly have in our tech specs, you know, tech specs for known and unknown leakage. You can't maybe know down to the atom that there's a leak somewhere. But are there improvements in leak monitoring techniques that we're considering? Are there -- you know, inspection changes?

I guess Carl to some degree has already answered that, and Luis, as you get these results, you'll focus more on one piece of equipment than another in your inspection program. But in leak monitoring techniques, has there been any improvements that we want to --

DR. PAPERIELLO: We are coordinated with NRR. The Research role is this is what we're doing. This is what works. This is what may not work as well. So I wanted -- there is going to be a decision, a regulatory decision is NRR's responsibility. Our responsibility is information. So I want to make it clear, we are coordinated.

COMMISSIONER MCGAFFIGAN: The reason I asked the question is a couple, I don't know how long ago, Brian Sheron sitting behind there, but there was a Sheron/Strosnider memo a couple of years ago that really didn't find much at the time in leak monitoring techniques that we should be applying. They looked at a bunch of them, and every one of them had some faults. And I'm just wondering if there's been any change.

DR. PAPERIELLO: Again, I wanted to clarify -- I don't want it to be said that Research is imposing requirements. Nilesh do you want to talk about what we have seen to date.

MR. CHOKSHI: As a part of the Davis-Besse recommendation, one of the things was to evaluate the leakage. So that effort is going on.

And there is a separate task group, which is we had a program at Argone which looked at the current available methods. The report is finished, the task group is looking at the methods and all the implications so all this has to be integrated. That probably will not be done until next spring. When we come and report to you on Davis-Besse next month, I'll be talking about that.

COMMISSIONER MCGAFFIGAN: Okay.

MR. REYES: It's just that there are detection systems in place, and you have to evaluate.

COMMISSIONER MCGAFFIGAN: There were complaints being made by some that there were super duper French techniques out there that would have found various things.

I recall -- I don't really recall, but I vaguely recall the memo that I'm thinking of saying things like even the original Ocone leakage, the axial degradation at Ocone almost would have been impossible to detect with any sort of leak detection equipment.

MR. REYES: That one I know for a fact.

COMMISSIONER MCGAFFIGAN: Much of the phenomenon that we're looking for here probably -- I'm asking the question because I'm interested, but I haven't heard of any leak detection equipment that's going to solve our problem. It's going to be other, as you say nondestructive evaluation, inspection techniques, those are the things that are going to help identify these things.

MR. CHOKSHI: More likely than the leak detection.

COMMISSIONER MC GAFFIGAN: Mr. Chairman, that's all I have.

CHAIRMAN DIAZ: Thank you. I think there are a couple of things that when we meet again -- and we'll meet again -- I'm going to go back to. I think we talk about it. Let me just make sure that they're right there on top of the regulatory issues. One is we really need to focus on when the industry provides mandatory requirements and needed requirements, how are they going to be treated in the regulatory space. I think once we -- I'm sure we're going to meet next year on it.

We need to go back and ensure that we're dealing with those issues ahead of time, that we recognize their importance, we recognize the interfaces.

And like Commissioner Merrifield said, we're pretty open about it, which is how we're going to be dealing within the reactor oversight program, how we're going to deal with those issues. I think it is an important issue.

The second issue is, and we really get deep into this, I think, the next time, once you have prioritized issues both as to how important they could be regarding degradation and how important they will be for the -- their importance to safety and risk, I think the Commission would like to see those in a manner that before the meeting we can sink our teeth on it and have a little more roast flavor in our mouth if that's possible.

COMMISSIONER MERRIFIELD: Mr. Chairman, I appreciate your and Commissioner McGaffigan's indulgence for a moment. It is just about, and maybe a couple of days beyond. But it is just about six years from the time when I first sat in this seat as a member of this Commission.

At the time we were working quite hard with our staffs to make sure that we were transparent and open as a regulatory agency. We worked very hard on that effort, as our staff did.

Unfortunately, the events of September 11 have caused a lot of things in our society to change. Immediately after the events of September 11, we undertook an effort, quite robust, as I reflect on it at the time, to try to make sure that our public document rooms and our web-based materials, including ADAMS, were cleaned up in order to allow material that would not appropriately fall into the hands of terrorists to be there.

Well, despite the best of intentions and hard effort, it was identified a couple of weeks ago that there were in fact some documents relatively obscure, but there were some documents that remained on our web site that did not -- perhaps should have been picked up that weren't.

And we had folks in the news media who called us to task on this appropriately.

The Commission and the staff, for our part, went about an effort to again, in order to respond to the concern and respond to the media inquiries, we decided to take down the ADAMS system and do a scrub to be sure that documents that could fall into the hands of terrorists would no longer remain there.

Earlier today the Chairman spoke about regulatory success. Are we able to find regulatory success?

And I, in thinking of those comments, was reminded of the issue that I would term regulatory frustration. And I just want to make the comment to express my own personal views, Mr. Chairman, that the very same people who have oft criticized our openness -- not all of them -- but some of our stakeholders who have oft criticized our openness are some of the same stakeholders who have criticized us for allowing these documents to remain on the web site. And I have to express some frustration on my part. And I know staff is under the burden for this.

That in our great efforts to meet our strategic goals of being open and then trying to respond to the calls of the news media and others to make sure that we don't have any information on our web site that would be of use to Osaka Bin Laden and his elk, we are now yet again criticized because we're not being open and we have our web site down for some purpose of scrubbing.

I wanted to make that comment public, Mr. Chairman. It's frustrating.

CHAIRMAN DIAZ: Thank you, Commissioner Merrifield. I think we all know we are always between a rock and a hard place. The problem with that is that the rock and the hard place sometimes can get together because there is a vice that keeps turning and making it more difficult.

I appreciate your comments. And with that we're adjourned.

(Adjourned at 2:40 p.m.)