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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

Title: BRIEFING ON INTEGRATED SAFETY ASSESSMENT TEAM INSPECTION (ISAT) AT MAINE YANKEE - PUBLIC MEETING

Location: Rockville, Maryland

Date: Friday, October 18, 1996

Pages: 1 - 85

ANN RILEY & ASSOCIATES, LTD.
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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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BRIEFING ON INTEGRATED SAFETY

ASSESSMENT TEAM INSPECTION (ISAT)

AT MAINE YANKEE

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PUBLIC MEETING

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Nuclear Regulatory Commission

11555 Rockville Pike

Rockville, Maryland

Friday, October 18, 1996

The Commission met in open session, pursuant to notice, at 9:00 a.m., the Honorable SHIRLEY A. JACKSON, Chairman of the Commission, presiding.

COMMISSIONERS PRESENT:

SHIRLEY A. JACKSON, Chairman of the Commission

KENNETH C. ROGERS, Member of the Commission

GRETA J. DICUS, Member of the Commission

NILS J. DIAZ, Member of the Commission

EDWARD McGAFFIGAN, JR., Member of the Commission

STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

KAREN D. CYR, General Counsel
JOHN C. HOYLE, Secretary
JAMES M. TAYLOR, Executive Director for Operations
EDWARD JORDAN, Director, AEOD
ELLIS MERSCHOFF, Independent Safety Assessment Team Leader
HUBERT MILLER, Regional Administrator, Region I
FRANK MIRAGLIA, Acting Director, NRR

P R O C E E D I N G S

[9:00 a.m.]

CHAIRMAN JACKSON: Good morning, ladies and gentlemen. Before I start talking about the purpose of this meeting I'd like to introduce our Region I regional administrator Hubert Miller, AKA Hub Miller, to the Commission; in particular to the new commissioners, Commissioner Diaz and Commissioner McGaffigan, and I don't know if you've met Commissioner Dicus.

The purpose of this meeting is for the NRC's independent safety assessment team to brief the Commission on the process, findings and conclusions of their inspection of Maine Yankee. Working with the executive director of operations, I initiated a charter for this team, which the Commission approved in late May of this year, primarily to provide an independent assessment of the conformance of the Maine Yankee plant to its design and licensing bases.

I have also personally kept in close contact with the team, having received numerous briefings over the past five months.

The Commission recognizes that much effort has been expended by this team in generating an independent assessment of the Maine Yankee facility. The inspection was unique in its scope, independence, and in its coordination with state representatives.

The Commission had the opportunity to review the report prior to my signing it out to the licensee last week and we're interested in hearing your comments on the process used and discussing the safety significant findings and root causes and their tie-in to the regulatory process.

Additionally, since much work went into coordinating state participation in this inspection, the Commission is also interested in your perception of the states and the general public's reaction to the process used.

We also look forward to discussing the aspects of regulatory lessons learned that your inspection team gleaned and which can be used to improve our own processes.

Now, I understand that copies of the presentation are available at the entrance to the meeting. If my fellow commissioners have no opening comments, Mr. Taylor, please proceed.

MR. TAYLOR: Good morning. This briefing will be given principally by Ed Jordan and Ellis Merschoff and we'll start with Ed.

MR. JORDAN: Okay. I would first introduce Ellis Merschoff as the team leader for this effort. He's also the director of the Division of Reactor Projects in the Region II office in Atlanta and he's been directly involved, fully participating in this since the month of June, through the

month of June to today.

So I'll just recount a little bit of the history. I was tasked on May 31 by the executive director for operations, Jim Taylor, to manage this independent safety assessment and to report directly to the Chairman with respect to this effort, since it was to be independent. Could I have the number 2 slide, please?

CHAIRMAN JACKSON: Are other members of the team here today?

MR. JORDAN: Yes, they are, and Ellis will go through the introductions.

CHAIRMAN JACKSON: Okay.

MR. JORDAN: The objectives of the presentation are to, first of all, describe the process that was used to evaluate Maine Yankee, to discuss the findings and conclusions, and then to discuss the regulatory lessons learned and, of course, to respond to your questions.

We're also compiling lessons learned in the conduct of this effort for the NRC and our own internal process. I think one embarrassing lesson along the way was we had difficulty with distribution of reports and I'm afraid some of the commissioners didn't get the final report in a timely fashion. So we've learned that and that was an error on my part.

In December of 1995 -- the next slide, please --

the Union of Concerned Scientists forwarded anonymous allegations to the State of Maine and the State of Maine then forwarded that allegation package to the NRC. The allegations were that the Yankee Atomic Power Company knowingly performed inadequate analysis to support an increase in rated power of the Maine Yankee Atomic Power Station.

After a technical review, NRR issued a confirmatory order on January 3, 1996 limiting power to the original license level of 2,440 megawatts while this issue was being investigated.

On May 8, 1996, the Office of Inspector General completed an inquiry that established that the Maine Yankee Atomic Power Company had made modifications to the RELAP/5YA computer code which was used in the emergency core cooling system analysis for small break loss of coolant accident. The problems were not reported to the NRC, as required, and the code was not issued in accordance with the safety analysis report and the TMI action plan. The Office of Inspector General also reported weaknesses in the NRC review and follow-up which contributed to NRC failure to detect these deficiencies.

The RELAP issue raised questions of whether similar undetected problems existed in other areas at the Maine Yankee plant. In order to address this question and

to respond to the concerns of the governor of Maine about the safety of the Maine Yankee plant and the effectiveness of NRC regulatory oversight, the independent assessment was initiated. Next slide, please.

MR. TAYLOR: May I add that the 2,440 megawatt is a thermal --

MR. JORDAN: Yes, it is.

MR. TAYLOR: Just to make the distinction.

CHAIRMAN JACKSON: It would be quite a plant.

[Laughter.]

MR. TAYLOR: Bigger than I thought it was. Excuse me.

MR. JORDAN: We started in the assessment with the objectives and I'll talk about those on the next slide, but the objectives, which were lengthy and detailed, necessitated assembling a large multi-disciplined and experienced team comprised of staff drawn from the Regions II, III, IV, the Office of Research and the Office of AEOD. And we received excellent support of these offices in obtaining highly qualified team members.

This did, then, provide independence of NRR and the individuals that staffed up the team and the Region I staff. The individuals that staffed up this team were also independent in terms of not having previous oversight of the Maine Yankee plant.

The assessment was to be coordinated with the state in order to facilitate participation by the State of Maine on the team under the provisions of the Commission's policy on cooperation with states. There were three levels of participation by the state. Ellis will talk a little bit more about them. There were three members on the technical team itself who were participants, there was a two-person process team that reviewed and observed the process and was briefed along the way, and there was a five-person citizens group that were appointed by the governor and were provided with periodic briefings along the way, along with the governor.

And I would say at this point that that was a very satisfying interchange and I came away with a very pleasant view of how that worked and a feeling that I would do it again without any hesitation.

The process was a modified diagnostic evaluation technique. We've done a large number of diagnostics in the past and we use that methodology; that is, a functional area review and a vertical slice of systems. In addition, we added the analytic code review.

Then I'd like to go to the next slide because that's the heart of the assessment, I would say, was to develop a precise mission, set of objectives. And the keys, I think, were that it was an independent assessment and it

was a review of the conformance of the Maine Yankee plant to its design and licensing basis. And, of course, this necessitated reviews at the site and corporate offices and at the Yankee Atomic facility.

The next was to provide an assessment of operational safety performance, including risk perspectives. The risk perspectives was an added feature that we had not done in that fashion previously.

The next objective was the effectiveness of licensee self-assessments, corrective actions and improvement plans, and that is an element that we normally do on a diagnostic and we followed the same methodology.

Finally, to use those findings to develop root causes of the issues and then to draw conclusions about the overall performance.

CHAIRMAN JACKSON: Mr. Jordan, before you go ahead, given that this was fairly unique, can you perhaps make a brief comment, giving your assessment of how well or how comfortable you are that the team was able to meet each of these objectives? And do you feel, in retrospect, any feeling about whether the work could have been accomplished either with a smaller team or a shorter duration?

MR. JORDAN: Okay. First, these were the major objectives and then those were broken down with more detail and they were, in fact, the guiding principle for the team

that I would follow once again for similar work.

CHAIRMAN JACKSON: And you're satisfied that --

MR. JORDAN: So I'm satisfied that these objectives were met and they're trackable through the report and, in effect, the report is structured in that very fashion.

In terms of whether the work could have been done in a shorter time or with a smaller team, the work could have been with a smaller team knowing what we know now, but the problem with each one of these is you're going in to try to understand the problems and you have to look broadly in order to identify where problems exist. Where there were no real problems, one could say that we spent resources that were unnecessary, but you don't know until you've spent the resources.

So the team could have been reduced very slightly in size. This was a very large team and was, I think, a tribute to Ellis that he managed it so well. But going in with the same mission, I don't think we could do it with a much smaller team. This was 23. Perhaps three less people could have done it, in retrospect.

In terms of the time, absolutely not. This was tight. This was a stressful thing for the team, the team leader, in order to get it done on the schedule. The schedule was laid out at the beginning. We used the

diagnostic methodology except we added another week in the on-site review, so it was two weeks on-site, two weeks off-site back here for examination of the first set of findings, and then two weeks more on-site. And that was an ideal arrangement. We learned that through time. So I would not at all reduce that.

Preparation time -- absolutely essential, so that you go in with a team that understands the plant, has obtained from paper and interviews an understanding of the previous work and hits the ground running when they get there.

I think we have some observations about the report-writing itself that would make it easier but not shorter.

So I believe that we could have completed this work with perhaps three less people but the same time, I would maintain.

Then, at this point, I'd like to turn to Ellis and let him go to slide 6, introduce the team members that are here, and proceed.

MR. MERSCHOFF: Thank you. Good morning.

CHAIRMAN JACKSON: Good morning.

MR. MERSCHOFF: It's good to be here, at the end of this process.

This was an extensive assessment by a large and

experienced team and I'd like to linger for a few minutes on this organization chart and talk a little bit about the team leaders and the depth of experience that we brought to bear on this effort.

I have the team leaders here behind me. I'd ask them to stand up as I go through each area. The operations area was led by Mr. Kriss Kennedy from Region IV. Kriss has a background as an NRC examiner and has also been a resident at a Westinghouse plant and a senior resident at a combustion engineering plant. That was an ideal background to assess Maine Yankee in that Maine Yankee is a combustion engineering plant with many characteristics similar to a Westinghouse plant and, in fact, uses Westinghouse EOPs. Kriss also has experience on a diagnostic evaluation at Zion.

Within the team, under him, represented three senior reactor operator licenses, ops management experience at a CE plant, one IIT and three DETs.

The maintenance and testing area was led by Ron Lloyd. Ron Lloyd brought shipyard experience in nuclear construction, maintenance and testing to the area, extensive diagnostic evaluation team experience. I think he's been on every one that the agency has done.

The team members in the area of maintenance and test brought resident inspector experience, architect

engineer design experience, probabilistic risk assessment practitioner level experience, and three diagnostic evaluations.

The engineering area was led by Tom Martin. Tom's a senior manager in the Office of Research. He has industry experience, operating experience and extensive engineering, inspection and assessment experience.

Within that team we had shipyard experience, industry level INC experience, architect engineer design experience, four DETs plus two people who were on the Millstone inspections, an SRO license and an RO license.

In the area of management and organization was led by Alan Madison. Alan also brought extensive DET and IIT experience to the team. He has resident inspector and senior resident inspector experience and senior management experience in the manufacturing industry.

The team members within the M&O area brought senior resident inspector experience, regional management experience, M&O consulting experience and two diagnostic evaluations.

In the area of analytic codes, that was led by Jack Rosenthal. Jack's the senior manager in the Office of AEOD. Jack has experience at combustion engineering in the analytic code area. He has PRA experience. He led the Nine Mile IIT.

The team members in that area had combustion engineering experience in code development, utility experience and safety analyses, extensive thermohydraulic code review experience.

Ola West is the administrative assistant. Ola is back in the booth handling the slides. She's a division secretary from Region II and a veteran of the Cooper diagnostic.

The state team, the technical portion of the team listed on this slide represented day-to-day participation in the team in each of the technical areas. We also had, as Ed mentioned, two members on the process team.

The process team's goal was to assure fairness, balance and objectivity on behalf of the state of this effort. They observed the team at virtually every key point -- during the preparation phase, during the team meetings, on site, during the team meetings and root cause evaluation in Washington, and the interim exit meetings; additionally, the citizens group, which were briefed along with the governor at three different points.

Before I get into too much trouble in this briefing, I'd like to say at this point that it was really an honor to lead a team of this caliber. At times it was a little bit like herding cats but we all got to the end point. Next slide, please, Ola.

Now, as a complement or counterbalance to the team, the licensee performed support organization and that organization was intended and succeeded in providing leverage to the ISA resources in order to maximize the benefit of the assessment. They approached this assessment as a learning opportunity and maintained that approach throughout the assessment. And I think, in large part, Maine Yankee's attitude and development of this extensive support organization is as much a cause of the success of the effort as the NRC efforts were.

They had senior level counterparts to each of the functional area leaders whom I just introduced, as well as a counterpart to me. They had good sized technical and administrative staff to answer the questions and to develop the technical library of answers that ended up probably over 100 shelf-feet of formal answers to specific issues that were addressed. They provided a very effective link to the line organization in terms of assuring that the extent of condition of problems we identified were fully explored and addressed and that any safety issues that we developed through the course of this inspection were address in a timely manner and satisfied before we left the site.

CHAIRMAN JACKSON: Was there any indication from the licensee that the team's work in any way affected safety as the work was going on?

MR. MERSCHOFF: It did not. The answer is yes, the licensee indicated that it did not affect safety. That was an area that Ed and I were very concerned with, along with the licensee. We established some firm ground rules relative to the number of people in the control room and various areas, the level of impact on various key areas.

The senior managers knew that they could come to me when they saw a problem. We had numerous discussions and all were resolved to both the licensee's satisfaction and to ours. So we saw what we needed to see and did not interfere.

Next slide, please. This process started in June and represents a level of effort equivalent to one and a third times the total number of hours of inspection at Maine Yankee in an entire year, about 17,000 hours in terms of preparation, on-site inspection, documentation assessment. About 4,500 of those hours were actually in the field, on site.

The report was issued 45 days after leaving the site, which is on target for a garden variety NRC team inspection. The public entrance meeting and exit meetings also effectively enhanced visibility of this process throughout.

Key points -- the team preparation, a full month, and I think we needed every day of it. This extensive

effort was performed by knowledgeable, prepared, well supported inspectors, and that's what contributed to the success of this.

I think the public entrance and at public exit meetings were very effective, although one of the comments at the final public meeting by a member of the public was that they felt excluded, that this wasn't accessible, in particular the entrance meeting, because it was held at the site and some people were afraid to go to the site. It seemed appropriate to us then and now to hold that meeting at the site. It was a meeting with the licensee and the support group.

The exit meeting I'll talk more about later. We invested a full three hours of questions and answers with the public and addressed every question from every person that chose to speak.

There were two briefings of the governor in this process, as well, one during the second on-site period in early August and the second just following or just prior to issuance of the report. Next slide, please.

I'd like to spend some time talking about this process and what was really involved to give everyone a real sense for the depth and scope of this. In terms of the preparation, as I said, the full team, a full month, with access to the licensing and design basis information FSAR,

SERs, tech specs, LERs, IPE, as well as a continuing exchange process with the licensee in terms of requests for information.

Those areas that we were developing the preparation material for the inspection, we would ask licensees for background information for procedures, for results of tests, for drawings. We'd receive that and use that so the time spent on site was time that we were well prepared for and it was particularly efficient.

The team included both horizontal and vertical inspection methodologies. In terms of the horizontal, that was an assessment across the operational functional areas. Performance-based assessments of operations, maintenance, engineering, where we review the programs, the processes, the performance. We had extended control room observations, plant walk-downs, observation of work in the field, independent calculations to draw the conclusions on the performance in those functional areas.

In addition, we did deep vertical slices of two systems -- service water and high pressure safety injection -- and partial vertical slices of the aux feedwater system and emergency diesel. A vertical slice is a method to determine whether or not a system, as it's been modified, maintained and tested through the years, whether or not it continues to meet the original design basis.

We also added a new approach to this effort, the analytic code review area, and that can be best reviewed as a horizontal slab with two vertical supports. The horizontal slab was a look at all of the codes, the analytic codes, used to support the safety analyses at that plant as to whether or not they had appropriately met the conditions placed in safety evaluation reports. The problem, as you recall, with RELAP 5, were the 12 conditions that were not clearly met. So we looked at all the conditions for the other codes.

Additionally, we took two vertical looks at the implementation of codes. We chose two accidents. One was a steamline rupture and the other was a control element assembly drop. We chose those because for the control element assembly drop, it provided the integration and implementation of a large number of codes. This particular cycle at Maine Yankee employed Westinghouse fuel, Combustion Engineering fuel and Siemens fuel.

So it required the Yankee Atomic organization to integrate the propriety data from those three fuel vendors, along with six other code applications, to assure the adequacy of the control element assembly analysis.

The second vertical slice or pillar we chose was the steamline rupture, and the reason we selected that was it employed a complex two-phased code RETRAN that was of a

similar vintage and similar complexity with RELAP.

Additionally, we performed interviews, over 100 across the full spectrum from the president down to craft-level workers, each lasting one to two hours long, and conducted a safety assessment and root cause evaluation, the full team, for three days, in terms of assessing and arriving at the final causes. Next slide, please.

The standards we employed to come to these results were really a three-tier approach. The first, the regulations, formed the foundation of the assessment and were the primary measure in the design and the licensing basis area.

The second, in terms of assessment of operational performance, we used the NRC's existing benchmarks of performance for superior, good and acceptable in the SALP program, systematic assessment of licensee performance.

And the third of this three-legged stool was probabilistic risk assessment employed to provide perspective to the significance of the deficiencies found.

CHAIRMAN JACKSON: Let me ask you this. Under this measure of the margin of safety, is that meant to say that superior plants are those with the largest margin of safety? Or are you referring to how each licensee maintains their safety margins?

MR. MERSCHOFF: The intent of the SALP program was

to measure margin above minimally acceptable performance. So it's a margin of safety not rigorously calculated in terms of NPSH margin, for example, but in the quality of the programs and the implementation of the programs and the ability of an organization to find and fix and sustain deficiencies, typically used as an input to our inspection planning process, where a plant with a strong and superior performance that has substantial margin above the minimum requirements would receive less inspection effort.

CHAIRMAN JACKSON: Okay. So I just want to be sure that what you're looking at is programmatic performance, as opposed to a design margin in a plant.

MR. MERSCHOFF: That's correct, programmatic.

COMMISSIONER ROGERS: So these are qualitative judgments, though. They're not based on a set of specific numbers that determine what your assessment turns out to be; is that correct?

MR. MERSCHOFF: That's correct.

COMMISSIONER ROGERS: I think that's an important point to keep in mind.

MR. MERSCHOFF: And the next slide speaks to that a little more. Eleven, please, Ola.

This was the toughest part, or one of the toughest parts of this assessment in terms of being balanced and fair and objective in what was really an unprecedented effort.

We intentionally chose existing benchmarks to not invent new or establish new expectations.

Those standards that we used had been in place for a long time, since the late '70s. As I said, they represent the margin over minimally acceptable performance in a programmatic sense.

Acceptable performance may exhibit one or more of the characteristics under that column in the right in terms of programs that exhibit instances of insufficient control in important areas, a self-assessment that may not occur until a problem is apparent, and root causes that do not probe deeply.

Good represents some margin over those minimally acceptable areas but does include problems that require attention. Acceptable includes in our standards the conclusion that attention is required by both the licensee and the NRC to effect improvement because margins are small.

CHAIRMAN JACKSON: Let me just stop you for a minute. This, in a way, goes back to Commissioner Rogers' question about the qualitative judgment. This is actually beyond the scope of this briefing but since it's here, I can't resist the comment.

I think if you look at this acceptable column, it's an optics problem. Other than your safety category, I guess there's an issue having to do with pervasiveness in

the other categories because if you say instances of insufficient control in terms of programs, self-assessment may not occur until a problem is apparent, that the corrective actions are not thorough and that the root causes are not probed too deeply.

One could argue that there are some other famous examples of plants where what we're arguing is that, in fact, these, in fact, are just what lie at the root of the problems. So I think there are some issues in terms of categorization or what the qualitative judgment is that goes into that categorization.

So it's not meant to take away anything from what you're saying but --

MR. JORDAN: I agree. Maybe I could comment.

CHAIRMAN JACKSON: I know what you're doing. You're using the existing assessment, SALP --

MR. JORDAN: That's right. We wanted to have something that was comparable with previous work, a benchmark.

CHAIRMAN JACKSON: Right. No, I appreciate that. That's why I'm saying this comment is abstracted from you two.

MR. JORDAN: Yes.

CHAIRMAN JACKSON: And from the team's work. This is really an issue, I think, having to do with the overall

way assessments are done and what this, then, says to us and what it presents to the public.

COMMISSIONER McGAFFIGAN: I was going to make the same point. I had seen this chart and Dr. Diaz is about to do the same, I think. This looks like grade inflation. I mean, the acceptable is darned close to unacceptable, as the Chairman just said, and we don't have an unacceptable category. I guess we do, which is to shut it down. But you may want to have that and then tell us what the difference between acceptable and unacceptable is because it's --

MR. TAYLOR: I think we may need to schedule a briefing of the Commission. This program has evolved over how long?

MR. MIRAGLIA: Since TMI.

MR. TAYLOR: TMI.

MR. MIRAGLIA: I think the Chairman alluded to a number of issues in her comments and I think you're right. If these things are pervasive, if they're of high safety significance, they wouldn't wind up being called acceptable. It's instances and the significance of those.

There is an evaluation matrix within the context of the SALP program and I think these are very broad-type headings, and I think you're right, Madam Chairman and Commissioner McGaffigan. If all of these are there and there are significant safety --

CHAIRMAN JACKSON: Well, we have to understand what significance means, what pervasiveness means. One could say, as I say, there's another famous plant we're dealing with where basically what we're saying is all of these are tracking through but somehow we're saying it's in the nonacceptable category.

I think Commissioner Diaz wanted to make a comment.

COMMISSIONER DIAZ: It's the same comment. I was just going to say where is the nonacceptable category shown so that people can actually see it plainly and up front? That's my comment.

CHAIRMAN JACKSON: It begs the question of why is this acceptable, or when do you cross the line between what's in the acceptable column, being acceptable, versus nonacceptable.

But let the record show, Mr. Hoyle, that we are going to have a Commission meeting on this.

MR. TAYLOR: I suggest we do that.

COMMISSIONER McGAFFIGAN: This will lead you into the next page, but having used these categories on this page, you get to the next page and you get to generally in conformance, and I wasn't sure whether that was acceptable, good or what you were getting at, since you create a new category as soon as you turn the page.

MR. MERSCHOFF: Well, I'll refer you to the previous one. I laid the groundwork for that, or attempted to, Commissioner McGaffigan, in that the regulations form the foundation of the assessment and were the primary measure in the design and the licensing basis area. And so we measured against conformance to the regulations in that area and the assessment adjectives for the functional areas aligned with operations, maintenance, engineering, testing.

COMMISSIONER McGAFFIGAN: And very good is between superior and good?

MR. MERSCHOFF: Yes, sir. We equivocated substantially. But in terms of the assessments, we have been careful to not impose rising standards and maybe it's time to rethink whether 1970s expectations are appropriate for 1990s operations.

MR. TAYLOR: I don't think we apply 1970 standards.

CHAIRMAN JACKSON: Mr. Taylor is taking issue.

MR. TAYLOR: I take issue with that.

MR. MIRAGLIA: I think what Mr. Taylor is referring to is the SALP evaluation program, as most of our programs, are not static programs. We have our own self-assessments. We have improvements. We've come to the Commission at least two or three occasions with changes to the SALP program and the evaluation and the matrices and

that type of thing. I think that needs to be put in some kind of --

CHAIRMAN JACKSON: I think, first of all, it's clear that the way the assessment categories are laid out, it makes it hard for those of us who are not down into the grass to really assess the significance of it and when the line gets crossed. From the point of view of our jobs as regulators, where does the line get crossed and is it time to relook at the categories somehow?

MR. TAYLOR: We did start the SALP system because we really didn't have any systematic way. As the number of nuclear power plants grew and to reach its current population of 110, that was a clear post-TMI activity. Special group was put together, labored with commissions past, to run this program.

And, of course, what you do in a specific area, you can't just read the word. You have to go into the narrative, which usually has the details of what is wrong. And as we all know, there are various problems that can be very significant and problems that aren't that significant, and that's where the judgment and evaluation process comes in.

So I think what I'm leading to is I think it is important to have a briefing on this subject and with examples. It is employed throughout the regional system and

I think it's a very important program to make us sit down, on a regular, periodic basis, and evaluate each individual plant. That's what this whole program was set up for.

So I think it's an important enough topic to --

CHAIRMAN JACKSON: And yesterday, and I don't want to belabor this any longer, but about our changing and change being built on the foundation of our past, so we have a SALP process. The question really is one of looking at it, looking at perhaps some sharper delineation or some other measures that would allow us to do some fine-tuning and make it transparent to those of us, as I say, who are not down into the grass, as to what is going on.

MR. TAYLOR: This subject of when is it unacceptable has been discussed at numbers of Commission meetings through the years and I think --

CHAIRMAN JACKSON: I think what we'll do is we'll discuss it at a new Commission meeting.

MR. MIRAGLIA: May I make one more point? I know you don't want to belabor this. I think the SALP process is just one tool.

CHAIRMAN JACKSON: I appreciate that.

MR. MIRAGLIA: It's a continuum. Our assessments of it are a continuum. This is just one point.

CHAIRMAN JACKSON: All right. I think the point is -- I think where we're coming down is that we're going to

have a meeting to discuss this.

MR. TAYLOR: We'll prepare for that.

MR. JORDAN: Could I make sure that you understand that we really were standing on the three legs --

CHAIRMAN JACKSON: Absolutely.

MR. JORDAN: The one of conformance with requirements, the one of the SALP process, and then one associated with risk.

CHAIRMAN JACKSON: Absolutely. And I think when we have the follow-on discussion, in fact, that's a very nice way for us to have that discussion, so thank you.

What you're telling us is that you actually did use the three legs?

MR. JORDAN: Yes.

CHAIRMAN JACKSON: That's fine.

MR. MERSCHOFF: Now having laid the groundwork in what we did and the criteria we used, I'd like to move on to the results, slide 12.

Overall, we felt the performance was adequate for safe operation at Maine Yankee and the constituent parts of that assessment which led to the conclusion of adequacy were the design and licensing basis generally in conformance, as I said, measured against the regulations, and I'll discuss each of these in a little more depth.

Operations, very good. Maintenance, good.

Testing was acceptable with significant deficiencies noted, both compliance and safety. Engineering was good and self-assessment and corrective actions also acceptable, with significant weaknesses noted, both in the compliance and safety issues -- as a matter of fact, issues being both.

COMMISSIONER ROGERS: Before you move on, I don't want to get into it now but if you are going to talk any more about maintenance and testing, there is a question in my mind how one can come to a conclusion that maintenance is good and testing is no good. I mean, if the testing is no good, how do you know the maintenance is good?

I know you say it's acceptable. I'm just trying to illustrate the point that if testing is flawed, how does one know that the maintenance is good? You may have a maintenance program that looks good but testing, in a sense, is supposed to reveal whether the things are being maintained properly.

So I think if somebody could speak to that during the course of this, that would be good.

MR. JORDAN: I'd like to make one comment before we leave that slide, though, because we used much the same slides at the public meeting and you asked what the public reaction was.

The discussion was insufficient for the public and so I ended up giving my judgment and saying that in this

particular case, based on other diagnostics that we've done and other plant reviews, that my judgment was that the plant was average or slightly below with a declining trend, and that was understood better than the words here.

And when pressed further -- there were other people that weren't fully satisfied -- I made the statement, "This is a plant I wouldn't mind living near," and that was a compelling statement to make to the public.

So there is a problem in communicating between ourselves, communicating with the utility, and then communicating with the public. There are different perceptions there that we struggle with.

MR. MERSCHOFF: And that was tough. In order to assure the consistency, tying it to the SALP made sense. But, just as Ed said, sometimes those adjectives were troublesome in conveying --

CHAIRMAN JACKSON: I also think Commissioner Rogers is making a point that in some sense what you say about maintenance and what you say about testing seems to be an oxymoron.

MR. MERSCHOFF: I will attempt to address that oxymoron.

Slide 11, the licensing and design basis. We found it generally in conformance with the requirements in the regulations.

What we looked at, in terms of the licensing basis, were the tech specs, the FSAR, the regulations and written commitments. And although in general conformance, we found a lack of specificity and consistencies and generally not well maintained, types of specificity problems, many tech spec interpretations to clarify the meanings of their tech specs, some of which were inappropriate. A very small FSAR, lacking detail, lacking of detail in testing and operability definitions.

Inconsistencies, instances where stroke time for a valve, you can find four different numbers in four different places, two of which are in the FSAR, one in the IST program, and one in the design basis calcs. Differences between the tech specs and the FSARs for numbers on given attributes.

In terms of not well maintained, the licensee had had a program in place to look at their FSAR. They accelerated that within the areas chosen for the vertical slice by the ISA and found over 100 discrepancies in their FSAR, requiring 50.59 reviews or changes to the FSAR.

In terms of the design basis, we found that generally the quality of information was good, the availability was good, the information was retrievable and understandable.

In terms of the code work aspect of this, and

remember I described the horizontal slab with the two vertical supports, the slab was to take a look at the SERs. There were, in fact, 66 conditions imposed on the use of 13 codes. We determined that all of those 66 conditions had been met, although none had an audit trail to show that they were met.

COMMISSIONER ROGERS: Could you indicate just what a condition is?

MR. MERSCHOFF: A condition might be use a given time step in performing the computation of a millisecond or to assume that only steam is released with no water in the steam line rupture, or to assure that the computer is validated against separate effects.

There are conditions that the NRC imposes through the SERs. There are conditions that the authors impose, boundary conditions essentially, for the use of these, and there are author conditions and NRC conditions.

None of them had an auditable trail to show they were met and some of them required new and original work that relied on existing conservatisms and margin in the calculation to show that they had been met.

Additionally, in the two vertical legs, we found different results in the two. In the vertical leg for the control element assembly that required the integration of a large number of codes, we thought that work was excellent.

The codes are generally cycle-specific, meaning the analysis used and applied every fuel cycle.

They tended to be simpler codes, single phase application, and amenable to validation. Through the course of the fuel cycle you can validate the predictions in terms of the nuclear physics for those codes well. And the incentive for precision is high in that these codes could be used to calculate cycle length, fuel loading, et cetera.

So it was relatively straightforward codes. It was important to get it right. They were used often and they were done very well.

The other leg, the steam line rupture, was a more complex code, two-phased application, used infrequently, not each cycle but only when something significant changes in the design to redo the calculation. That was handled weakly, we thought. There were errors in the code. The code was not well validated. But the errors did not affect the end result, so that the result was acceptable, but the knowledge and use of that code was substantially weaker than for the control element assembly drop.

COMMISSIONER DIAZ: Excuse me a second. Did the licensee themselves make changes to RETRAN or did they do them through a contractor?

MR. MERSCHOFF: They applied it for the site-specific application, so within the boundary conditions and

the inputs, they would make unique inputs for application of Maine Yankee. In terms of rewriting code, no, I'm not aware of any rewritten code.

COMMISSIONER DIAZ: They did not go into RETRAN and change any conditions in RETRAN?

MR. MERSCHOFF: Jack?

MR. ROSENTHAL: That's right.

MR. MERSCHOFF: Okay. Additionally, since this was a new area in terms of the inspection program, we formed a panel of outside experts within the area of code development and code application to critique the work of the team in this area. The members of those panels were Dr. Marvin Thurgood, former Pacific Northwest Laboratory employee and developer of the COBRA code; Dr. Lothar Wolf, University of Maryland and an expert in phenomenology for code applications; Dr. Harold Sullivan from Los Alamos Laboratory, developer of RETRAN and TRAC; and, as an observer to that process, to the panel, was Dr. Novack Zuber, ACRS and an expert in two-phased flow. That panel concurred in all of the findings and conclusions of the ISA.

MR. JORDAN: But with a lot of discussion, I would say.

MR. MERSCHOFF: It was easier to say that than to do it. It was a good investment of time.

MR. JORDAN: Absolutely.

MR. MERSCHOFF: We had them at two points in the process, one at the midpoint of our assessment, after the first two weeks on site, and one at the final point, after the second two weeks on site, when we had the outline of our report and conclusions written, so that it could be critiqued and peer-reviewed by the panel.

CHAIRMAN JACKSON: When you said that the quality of the design basis was good, what do you mean?

MR. MERSCHOFF: The calculations were current, accurate, retrievable.

COMMISSIONER DIAZ: Excuse me. Sorry to go back but when you were talking about the very good results and agreements on the control element assemblies for three different vendors, were you referring just to the calculation of the issues for the inventory? Was that the main thing?

MR. MERSCHOFF: No, these were the calculations for DMV, the cycle length, the full sweep of reload analysis calculations. And, in fairness, that was a very challenging application for Yankee Atomic, to integrate the three fuel vendors' information in the codes that needed to be applied.

In terms of design deficiencies that were identified, there were significant deficiencies identified that are both compliance issues and safety issues. The next page deals with them at some length.

The last point is that the team concluded that the design basis supported operation at the current power level of 2,440 megawatts thermal but that eroded margins prevented the team from concluding that operation at 2,700 megawatts thermal was appropriately demonstrated. And those problems were in the areas of net positive suction head for the containment spray pump and heat load removability for component cooling water.

CHAIRMAN JACKSON: And those are what they would have to deal with to operate at 2,700?

MR. MERSCHOFF: From this assessment. There are, of course, other issues -- the RELAP 5 issue, the containment pressure issues -- that are on the table, as well, but those are the two issues that came out of this assessment, yes, ma'am.

CHAIRMAN JACKSON: Okay.

MR. MERSCHOFF: Page 14, significant instances were identified where Maine Yankee was outside its licensing and design basis. Some of those instances were identified by Maine Yankee; some of them were identified by the ISA. Many of them were identified jointly as a result of that leverage I described from the licensee support organization.

I'd like to go through them. They give you a sense, in terms of safety and compliance, with the licensing basis.

The first one was identified by the licensee in the area we had selected for the vertical slice review just prior to the team coming on-site. It was the lack of thermal reliefs in the component cooling water system. It would be a vulnerability during a LOCA and was fixed. The plant was shut down and reliefs installed.

The second involves reactor water storage tank level transmitters. The enclosure containing those transmitters was maintained at too high a level, resulting in an inaccurate level indication. It would be a loss of coolant accident-related problem. You may not inject enough or too much water and cause a problem in the inventory of water inside containment. That issue has been fixed.

Equipment qualification was an issue in terms of submergence of key instruments. During the loss of coolant accident, of course, the inventory of primary coolant plus the water injected from the water storage tank resides in the sump, ultimately for recirc. There were key instruments that were located too low, such that they would be submerged by that inventory of water -- steam generator level, vessel level indication and some containment isolation valves. It's a LOCA-related issue and has been fixed.

Ventilation area, a number of deficiencies noted, one involving ventilation to the building that contains the low pressure safety injection and containment spray pumps.

It would be a loss of coolant accident vulnerability, and compensatory measures have been put in place to address it.

CHAIRMAN JACKSON: But no fix yet?

MR. MERSCHOFF: Not yet. That's one where exhaust dampers are blocked open.

The second is protected switch gear, a vulnerability to a high energy line break, and it, too, is being addressed with compensatory measures.

Control room ventilation had failed the test in that it did not have positive pressure, as required. It would be a vulnerability for a loss of coolant accident and has subsequently been retested and passed.

And finally, emergency diesel generator ventilation would be a vulnerability for loss of off-site power and it has been fixed.

The next bullet down is logic circuitry. Many systems were not adequately tested. This is obviously both a compliance and a safety issue. When the systems were tested, four problems were noted, the most significant of which was a section of the wire that would give an actuation signal for one of the high pressure safety injection pumps had been mistakenly removed. So in the event of a loss of coolant accident, where off-site power remained available, that pump, the A high pressure safety injection pump, would not have received an auto-start signal. It would have been

capable of being started manually.

In terms of risk base, that component -- and it had been that way for a number of years -- would have raised the risk for that plant about 6 percent, a very significant change for one component.

The containment spray pump, adequate. Net positive suction head for 2,700 was not demonstrated and that would be a loss of coolant accident-related issue.

Service water was a material condition issue. Poor material condition, missing hanger affecting one train. It was addressed and really provides an indication of standards and threshold of problem identification for the licensee.

And finally, an issue of check valve testing, where the tests performed on important systems -- high pressure safety injection, low pressure safety injection, component cooling and emergency feed -- were essentially meaningless tests and did not, when completed, provide indication as to whether or not the check valve would work or would not. Each of those systems were retested and performed satisfactorily.

CHAIRMAN JACKSON: Let me ask you this question. With these various issues that were identified during the course of your review, either by the team or by the licensee, and if they involve regulatory issues these are

being followed up in enforcement?

MR. MILLER: Yes, ma'am.

CHAIRMAN JACKSON: And the issues, in terms of how they were addressed, they were addressed to justify continued operation, either with the compensatory measures or the actual fixes?

MR. MILLER: Yes. There was great independence, of course, of this team but the one thing that the region stayed very close to were those issues that could threaten -- impact on operability and functioning of equipment. On that, there was very close coordination as the team did its work, with long discussions with the licensee to assure in every case that as these things surfaced, that the equipment was operable, either by fixing it or by an appropriate compensatory measure.

CHAIRMAN JACKSON: And what about these ones where there were compensatory measures taken? Are we going to be following up or are we just going to let them stay in the compensatory mode?

MR. MILLER: No, ma'am. We will follow up. The utility owes a response by December 10 and we will most assuredly be following up on that and devoting resources to it.

MR. JORDAN: And maybe we should explain how that process works. When the team finds an operability issue,

they advise immediately both the licensee management and the regional management and then the follow-up with respect to the legal license and the issue of compensatory measures falls back to the region and to the licensee.

So we had a continual handshake on each of these issues as the thing progressed, so it was not when we finished the work we told everybody what we found. As each one of these unfolded, we immediately communicated with the licensee and with the region and NRR to make sure that it was handled.

CHAIRMAN JACKSON: Let me ask you three questions. One, which of these are the most safety significant, just a tick-off?

MR. MERSCHOFF: The ventilation issues and logic circuit testing with the high pressure safety injection are very significant and NPSH on containment spray may be, when the final answer is learned.

CHAIRMAN JACKSON: And which ones involved what you'd call compliance issues?

MR. MERSCHOFF: All three. There's a close linkage between compliance and safety in these findings.

COMMISSIONER DIAZ: But they are all safety significant.

MR. MERSCHOFF: Yes, sir.

COMMISSIONER DIAZ: Every single one of them.

MR. MERSCHOFF: Yes, sir.

One more thought on the hand-off in that the team leader for engineering, Tom Martin, M&O Al Madison and I went to Region I on Monday and invested the day with the Region I folks to turn over these issues just so that items wouldn't be lost in the hand-off. And Jack Rosenthal and Tom Martin and I sat down with NRR on the key issues on net positive suction head and, to some extent, CCW, for the same reason. So we're working hard to assure that that hand-off does occur.

I wanted to invest a significant amount of time in the presentation up to this point to understand the background and the design and licensing basis. I'm going to try and go through quickly the areas, lingering a little on maintenance and testing for the oxymoron issue, to get to the lessons learned before the time expires.

CHAIRMAN JACKSON: Well, the time won't expire until you're done.

MR. MERSCHOFF: Well, thank you. That could be a big mistake.

[Laughter.]

CHAIRMAN JACKSON: But I'm assuming that you're going to move along.

MR. MERSCHOFF: Yes, ma'am. I learned never to say that with my team.

In terms of operations, as we said, overall performance was very good. Start-up, shutdowns, routine operations, command and control, use of procedures all handled well. Good AO rounds. Good response to equipment problems. Use of risk, on-line safety, shutdown safety assessments we all thought were effectively implemented.

The problems in that area can be grouped into an acceptance of existing conditions attitude, and that's what you see in terms of the workarounds and compensatory measures that unnecessarily burden the operator during events or normal operation.

CHAIRMAN JACKSON: How significant were the problems in those areas and how many workarounds are there, compared to what you would find at some other typical -- whatever that means -- plant?

MR. MERSCHOFF: We found about 13 of some significance. Plants have workarounds and compensatory measures in place, so it's not grossly out, but it's on the high side. Things like operators have a 350-foot extension cord to rig temporary ventilation to the protected switch gear room in the event of a loss of one of the fans. An overloaded plant computer that causes them to lose the automatic rod sequencing in a shutdown and have to go to manual sequencing.

CHAIRMAN JACKSON: Say that one again.

MR. MERSCHOFF: They have a plant computer that helps them control the rod sequencing so in the shutdown you have rods step in in the right order, in the right arrangement to suppress the flux. The plant computer is heavily loaded and tends to lag in real time that need. And during a shutdown that we observed, it was not effective, so the operators had to resort to their procedures, which they had, to manually perform that function, to sequence the rods.

They did it properly and shut down, although it slowed them up to the point that they felt the need to manually trip the reactor to meet the timeliness of the action statement.

CHAIRMAN JACKSON: Let me ask you this question. You mention they make good use of risk information. If you looked in the workarounds area and you looked at how one workaround might complicate another, do they look at that from the point of risk?

MR. MERSCHOFF: Not necessarily. They are very knowledgeable of risk. They integrate it into their day to day operations in terms of emerging problems and --

CHAIRMAN JACKSON: I understand it's a typical way that you make the assessment of good use of risk information. I'm actually asking a different question, which specifically relates to workarounds and the

interaction of one workaround with another.

MR. MERSCHOFF: I can't tell you that they've looked, in the risk sense, for the sum total of the effect of their compensatory measures and workarounds. I don't think they have.

MR. JORDAN: But I think it would be fair to say that you didn't note interactions between the workarounds.

MR. MERSCHOFF: That's true.

MR. JORDAN: So they were each independent. But if you summed the workarounds, then that, of course, leads to one of our root causes, that the plant was wiling to live with a large number of workarounds which, then, burdens the operator and --

CHAIRMAN JACKSON: But an honest and fair answer is that nobody's really there looking at the interactions of workarounds from a risk perspective particularly in some kind of a transient or accident condition. Is that correct?

MR. MERSCHOFF: They are looked at as they come up individually. I don't know that they look at the sum. I suspect not, but I don't know for certain.

CHAIRMAN JACKSON: It's not just the sum; it's the interaction, from a risk perspective, that is of interest to me.

MR. TAYLOR: That may be something we'll have to follow up on through the region system because I understand

we're not prepared to say they do it or don't.

MR. JORDAN: We could follow up on that.

MR. MILLER: That's a tough issue in all plants. What is the significance of workarounds? That's something we struggle with significantly.

CHAIRMAN JACKSON: I appreciate that but I think that in terms of living with workarounds, you know, one has to understand --

MR. TAYLOR: It's the sum total.

MR. MERSCHOFF: We developed proposed staff action as a result of this, things that should be looked at and, in fact, workarounds is on that in terms of the total and guidance provided to the inspection area for what's acceptable in manual versus automatic operations.

In terms of post-trip review, we found a lack of rigor and completeness. The overloaded plant computer had a role in that, as well, in terms of providing them all the information they needed and had somewhat of a common theme in terms of testing and a trip being a missed opportunity to determine whether or not all your equipment is performing as you expect it to perform.

In the area of maintenance, overall performance was good. We saw good communication, coordination, effectively identifying deficiencies, although some were missed. The knowledge and use of risk was strong in this

area in terms of the planning and dealing with emerging work.

We found a motivated and dedicated workforce across the board, in all the areas at the site, including maintenance. Good control of temporary repairs, very little use of temporary repairs in safety systems.

We thought the quality of maintenance was good in terms of limited rework, in terms of the performance of most of the pumps in the valves and performance of containment during ILRT. We drew a distinction from that from the testing. When testing was done, some deficiencies were found, but when I get the testing and speak to it, it's not that there was no testing; there's a lot of testing done and a lot of transients and opportunities for equipment to be challenged. And typically the equipment performed well historically at Maine Yankee. So that provided some input to the team in terms of the quality of the maintenance.

Now, good means there's a margin above minimally acceptable; there are important problems that needed to be addressed. We felt, with a lot of debate, that good was the proper characterization.

There are significant problems, though. The declining material condition. Material condition is good now but the trend is in the wrong direction. The service water condition bay that we discussed. The auxiliary

feedwater, the steam-driven auxiliary feedwater pump's performance was poor. And equipment has been adversely affecting plant performance in terms of feedwater reg valves, feedwater pumps, leaking valves, particularly after the year-long shutdown for the steam generator sleeving effort, and that was the basis for our conclusion of a decline and the inconsistent equipment reliability.

As part of this effort we took a real hard look, in a probabilistic sense, at the reliability of equipment within our vertical slice systems to determine, if needed, is equipment available or is it in maintenance? And if it's available and called on to start, will it start? And if available and called on to start, will it continue to run for its mission time? And we used plant performance data to establish those conditions and we found, as I indicated, the steam-driven auxiliary feedwater pump was quite poor, down around 76 percent, when 91 percent was the assumed number in their IPE.

COMMISSIONER DIAZ: Excuse me. That is a very safety-significant component, isn't it?

MR. MERSCHOFF: Yes, sir.

COMMISSIONER DIAZ: Very, very?

MR. MERSCHOFF: Yes.

CHAIRMAN JACKSON: Following on that, not wanting to give you a hard time, but I must say this, given your

answer to the question that Commissioner Diaz just raised and given that my statement is that excellence is as excellence does, and you say the quality of maintenance is a strength but you have inconsistent equipment reliability, including in a system that you said is very safety significant, that's an oxymoron.

MR. JORDAN: But I would comment that it's not necessarily how it was maintained but it has some engineering maybe changes that need to be made, rather than simply maintenance. So it has some sensitivities --

CHAIRMAN JACKSON: I guess what I'm trying to get at is some subtleties perhaps having to do with what we call engineering versus what we call maintenance and how that tracks to equipment reliability.

Hub is smiling because he knows that he and I have had 1,000 discussions along these lines. And I guess it's the kind of thing that --

MR. MILLER: The perennial problem is we lump and split when we go to the categories in SALP. Every SALP meeting has a long discussion over terms.

CHAIRMAN JACKSON: Okay.

MR. MIRAGLIA: These are not separable.

COMMISSIONER DIAZ: They're not separable but I'm trying to make a point because for years I've been considering the auxiliary feedwater pump as one of my last

lines of defense if I lost cooling water to the steam generators and that is one pump and probably supported by two centrifugal pumps, but if that pump is not working at what it should be, then we have a problem. I think that that should be in a category, and probably we'll get to that sometime, but that jumps at me. It really jumps at me.

COMMISSIONER McGAFFIGAN: Could I ask a question? The debate that you had internally, was that between good and acceptable, in terms of what your bottom line was going to be in this category?

MR. MERSCHOFF: The debate dealt largely with the boundaries between maintenance and testing and engineering. Engineering is responsible for a lot of the testing problems; maintenance is responsible for some of the testing problems, and how to best characterize fairly and objectively the performance.

So yes, we weren't -- well, there was some debate on the superior side but it was really between where the testing problems ought to reside. And if they resided in maintenance, it's clearly an acceptable versus good argument.

COMMISSIONER McGAFFIGAN: Just a process point, Madam Chairman. It strikes me if there's a significant range of view on a team, it would be interesting to know that. We end up with a chart that has a good or acceptable

or whatever in it and it might be interesting -- maybe this gets to the briefing you're going to have on to SALP process, but getting some of the range of views to be brought to our attention.

CHAIRMAN JACKSON: I think that's an important issue and we'll note that for the briefing on to SALP process and other performance evaluation processes.

MR. MERSCHOFF: One of the strengths of this team was the diversity of views. We had 25 people with 25 strongly held views and we achieved consensus at the end. The consensus, with no disagreement, was good, but there was a lot of healthy discussion along the way.

CHAIRMAN JACKSON: But I think Commissioner McGaffigan's point is a valid one in terms of how the diversity of opinion gets resolved. I think that's what we're talking about here.

MR. MERSCHOFF: Moving on to testing --

MR. JORDAN: Before we leave that, since this is one of my pets, the issue of reliability of equipment. We did apply the methodology that we're proposing planning to use on the reliability rule and the collection of data, we applied that same methodology here. And it was through the analytical method and showing an actual PRA-type reliability value that the licensee recognized that that piece of equipment wasn't performing to the level that they wanted it

to perform.

So they were very responsive to the clear understanding that between availability, failure to start and failure to run, there was a problem with this system.

COMMISSIONER ROGERS: Just one question on that. Was there any evidence that it ever was better than it is right now?

MR. JORDAN: Yes. I would say that the value that you get from reliability estimates is -- you're doing some averaging and you're making some analyses. It had been better, I guess, a couple of years ago than it was at that particular time. So it's a value that does change with time.

The other equipment at the plant, the safety systems that we reviewed, were well within the range of their PRA statements but this piece, this piece of equipment, was having a problem and had continued to have a problem for a year and a half.

MR. MERSCHOFF: We looked from '92 on during this time and the performance of this was a sawtooth variance.

MR. TAYLOR: That's why you back up with electric pumps, too.

MR. MERSCHOFF: This plant has two electric emergency feedwater pumps and it also has electric main feedwater pumps, so it has some diversity of supply for

feed.

COMMISSIONER DIAZ: If you lose your --

MR. TAYLOR: I agree with that.

COMMISSIONER DIAZ: It's very important to the steam-driven auxiliary water level.

MR. TAYLOR: That's right.

COMMISSIONER DIAZ: And therefore that component becomes a major safety --

MR. JORDAN: Loss of off-site power with DC only or total loss of power, black-out --

COMMISSIONER DIAZ: This is it. That's the last line of defense.

MR. JORDAN: Yes, we see it the same way.

COMMISSIONER DIAZ: So that just jumps at me.

MR. MERSCHOFF: To move on to testing, overall performance was considered acceptable, although significant deficiencies exist that require attention.

They did some things well. The steam generator tube testing applied state-of-the-art techniques, found problems before they became self-revealing. And in-service testing for the pumps and valves that are in the in-service testing program were done well. Very few of the pumps were in the alert range, indicating a good degree of maintenance for the pumps and the valves governed by IST.

Our problems were with the rest. The scope of

their testing program was inadequate. The problems they described with logic testing, diesel generator time delay relays for block loads were not tested. Reg. Guide 197 instrumentation for power, not tested, although a lot of instrumentation, however. Several instances of instrumentation not in a calibration program.

Before we left the site a very extensive testing program was implemented on key safety systems to assure that the components would work as designed, and that's where the four problems surfaced, from that testing program.

We saw weak rigor within the program, as well, in terms of the test valve checking, testing that I've described. For example, a test was done for years and signed off; yet it was a meaningless test. Another test on the recirc actuation signal switch that they performed, when you get into the logic drawings you see that that test had an automatic signal imposed, so you would have never known if that switch was working or not when they performed the test that they thought was testing the switch.

Then finally, in terms of evaluations, post-trip reviews, control room ventilation where tests are performed, in the case of control room ventilation, had failed, yet that was not picked up and acted on in the evaluation.

Weaknesses in those three areas are very important and very significant. They represent compliance issues and

safety issues.

CHAIRMAN JACKSON: Compliance issues are safety issues.

MR. MERSCHOFF: Yes, ma'am. They're one and the same.

CHAIRMAN JACKSON: I'm talking particularly with these examples that you've been citing. It's not compliance issues or safety issues.

COMMISSIONER DIAZ: Excuse me. Can I go back to the logic circuitry? I'd like to understand when you see failures or lack of appropriate testing, was it shown in the reactor protection system and during safety injection and actuation?

MR. MERSCHOFF: Yes, sir. The systems involved were the -- actually, I've got a long list somewhere but it was reactor protector system, safety injection actuation system, emergency feedwater, main steam isolation. It was all the key safety systems.

COMMISSIONER DIAZ: And that's major.

MR. MERSCHOFF: Engineering. Overall performance mixed with good overall. We thought that the quality of engineering work was good. The calculations were detailed, comprehensive. Good day-to-day communication, coordination.

The electrical design work survived a very hard scrubbing. We found problems but none that rose to the

point of operability. We found very strong support by the Yankee Atomic organization, as compared to a typical nuclear steam supplier. Yankee Atomic had an excellent knowledge of the plant and a close relationship with Maine Yankee in terms of providing the support.

But the weaknesses constituted another one of the key problems and that's the inconsistent problem identification and inconsistent problem resolution. They failed to identify some significant problems and failed to correct some significant problems that had been previously identified. Those we've discussed along the way. The ventilation examples fall into that category. The high pressure safety injection cut wire does, as well.

Additionally, there was a limited ownership of programs there within engineering. Equipment qualification, for example, an area we found problems, there's no assigned staff engineer for primarily responsibility for EQ.

The testing responsibility is distributed within the organization. You'll find no clear advocate for a given system. Is its testing thorough? Is it evaluated? Will it work?

COMMISSIONER ROGERS: So they don't use a system engineer arrangement?

MR. MERSCHOFF: No, sir, they don't. And fire protection is an area that recently is receiving more

attention and more people from the licensee.

In terms of the third mission area, self-assessment and corrective actions, overall the performance was acceptable but significant problems identified.

Self-assessment was mixed. It's a fragmented program, 29 different systems to identify problems that have caused some confusion in the site -- which ones to use, threshold too high. But they have made good use of some of their external audits. The cultural assessment team that they formed and implemented in early '96 was the right tool at the right time to find problems at the site, and they make pretty good use of outside experts on their audit teams to get a different view of their problems.

They identified their fragmented problem identification process, although other organizations helped them, and have been addressing it over the course of about the last year to develop a new program that was supposed to be implemented in October. I understand it's now December that the new program will be implemented to bring these systems down to a fewer number.

The corrective action area is a key problem. Weak implementation, fragmented, occasionally ineffective. We saw backlogs there that were increasing, a large number of late items within those backlogs, a weak trending of corrective action problems. Twenty-one different systems,

in terms of their corrective action program, and ineffectiveness in terms of correcting known problems, the ones we've discussed along the way.

Now, improvement programs, they had many and results mixed. They had good success in terms of things like their shutdown risk, their use of risk, their industrial safety program, maintenance reliability, the learning process, which is the name they apply to their corrective action and problem identification, new program that will correct this fragmented issue.

We put it good in that they've maintained committed to it over the whole year, in spite of the steam generator shutdown. It has not yet been implemented but it continues to receive attention, to be implemented.

In terms of the weaker ones, design basis reconstitution, air-operated valve testing has been delayed, erosion and corrosion, specialty training. And if you look at the difference between these two, the ones that are well implemented seem, at least to us, to be ones that the licensee believes in, that they see as risk-significant, that they bought into, that are important.

The ones, on the other side, that are weaker tend to have regulatory roots that they're doing but don't necessarily believe in and we need to be especially vigilant to the response to this effort, that it falls into the

former, one that they believe in, rather than the latter.

CHAIRMAN JACKSON: How much of the issues in these areas are due to the procedures, due to the organization or organizational structure, or the management?

MR. MERSCHOFF: Well, it all falls to management. Their procedures were in place for these programs. I would put them under the management in terms of continuing to stress them. These are programs that when the organization came under stress, particularly the year outage for the steam generator tube sleeving, they were shelved; they were held in abeyance, and the more successful ones, that were seen as important, continued on. So it was management decisions.

CHAIRMAN JACKSON: Do you know why they're programs as opposed to part of the way they do business?

MR. MERSCHOFF: Well, I didn't really necessarily try to distinguish between the two. Some programs do become your culture and some don't. The question is why are they different? I think the answer is there wasn't full buy-in at all levels.

CHAIRMAN JACKSON: Okay.

MR. MERSCHOFF: And that brought us to the root causes. The first one was the economic pressure to be a low cost energy producer, limited available resources to address corrective actions and plant improvements.

The map through that that's illustrative of that cause are the inadequate testing program that's a significant problem in terms of safety, long-standing design deficiencies, equipment qualification issues, willingness to accept existing conditions, operator workarounds, et cetera. A strong linkage between issues that are important safety and represent compliance problems supporting this cause.

CHAIRMAN JACKSON: I have a question for Mr. Miller and Mr. Miraglia. Do you believe that our current inspection and oversight programs and processes are capable of detecting adverse trends due to economic pressure?

MR. MIRAGLIA: I think that our view and focus has been on the safety performance and we look for that impact. In terms of issues, when we know there's economic pressures or announced lay-offs and things of that nature, we try to increase our attention to safety issues and look for those sorts of things.

I don't know if we have programs looking at precursors or performance indicators to say, "Are there prewarning signals that we could use on these kinds of things?" I think we're mindful of it, we've sensitive to it, and it's the focus on the safety performance and changes in the safety performance in the look-back kind of mechanism.

CHAIRMAN JACKSON: Mr. Miller?

MR. MILLER: Well, I want to say I think so but it's beginning more of a challenge, quite honestly. I think, as Frank said, we're not out looking, taking polls of people to judge what people's attitudes are and the like but I think clearly we are mindful that the competitive pressures are out there and we have charged the staff with, as a by-product, really, of every inspection, to make some assessment what the root cause is, not to go press the licensees on this sort of thing -- it's got to be something that they bring back to the region and discuss, but it's a growing challenge.

CHAIRMAN JACKSON: I guess what I'm really getting at is do we have some systematic way of, say, looking at programs or plans that have been postponed and how they track into what comes out of inspection or other oversight findings, so that one knows that there is such a linkage?

MR. MILLER: Well, we're always looking for trends and patterns and where there's a trend in the negative direction with respect to compliance and execution of programs, then I think there is a point there where we express concern. But is there a systematic way of evaluating this with the question being what impact are economics playing on it? We don't have anything in a formal and rigorous way.

CHAIRMAN JACKSON: Commissioner Dicus?

COMMISSIONER DICUS: My question is following up on this. It's a little more perhaps general in nature but were we looking at this plant with concern about safety issues prior to the time we got the allegation?

MR. MIRAGLIA: The best of my recollection, we saw this as kind of a middle of the road plant in that kind of regard. I don't think it had come to significant discussion with the region or headquarters.

MR. MILLER: I was obviously in Region III so I can't really answer.

MR. JORDAN: I can say from the performance indicators program and the measures, it was an average plant.

COMMISSIONER DICUS: Which brings us to the discussion we've been having -- you know, what is average?

MR. TAYLOR: This is a very important question that as the divestiture and the change in utility system comes to bear, it's something we've got to do a lot of thinking about.

Now, we have on occasion seen -- you know, you raise the question, why are you living with all these operator workarounds? Because one of the things we go to is safety of operations and everybody knows if you have a lot of workarounds and the operators get a big event, then they've got to remember all of the things that have to be

either manually initiated right or have some compensating action for. That's always a bothersome thing.

I've been at plants and said, "Why are you living with all these workarounds?" and part of it was the pressure of money. I mean, it's come up before. That could be a way.

We need to do more thinking on that because I think it's going to get more prevalent, where the financial pressures -- and they get translated. The management of the company sort of sends signals and then you really find out what's happening down on the plant floor, so to speak, where things aren't getting fixed. Operators are very well trained people, they want to make the plant run, and they adjust their standard when they're told, "Hey, we're going to put that one off up until the next outage and subsequent outages."

Your question is a good one and I think we need to do a lot more reflection ourselves.

CHAIRMAN JACKSON: Thinking about operational safety, we'll go into a control room and observe the decorum. We'll look at how they respond to transients, how they control and go through mode changes and so on, and we say, "Well, the operations are good." But there are workarounds that are being lived with that no one seems to have looked at the potential intersection and interaction

of, which would compromise the ability, however well trained or however dedicated the operators are, and I agree with you -- that's where we and the industry have focussed in terms of their training, et cetera.

But if, in the end, you have conditions that are allowed to exist and no one has even looked at whether or not they net-net, increase the difficulties, as opposed to one at a time at a time, then I have questions about what we mean when we say operational safety is good because that's the way we get ourselves into these valleys, these traps. Good is as good does and --

MR. MILLER: We've got to be looking at the precursors. I think that one thing that is of concern to me is not so much situations where management is telling staff to cut corners but where staff is, on their own account, knowing the bigger picture and the kinds of pressures that are out there, and I think we see that.

CHAIRMAN JACKSON: Commission McGaffigan.

COMMISSIONER McGAFFIGAN: I just want to call attention to one part of your report that I thought provided a lot of insight on this matter, on page 68. I'll just read it.

"Unlike most utilities, Maine Yankee does not retain earnings and does not set aside reserve funds for unplanned requirements except those required by law." Then

the paragraph continues and it says just the decommissioning fund, the pension fund and the nuclear waste trust fund.

It struck me that this owner-operator interaction here is really sort of the heart of the matter, to some degree. If they could retain some earnings, if it didn't always go back to the owners instantaneously, which must come from pressure from the owners, then some of these workarounds might have been addressed earlier.

My worry, which follows up on something Mr. Taylor said and the Chairman said, we may have more of this as time goes on in the deregulation context because you're going to have increasingly owners distant from operators, perhaps, and demanding instantaneous return of earnings and all of that.

So I thought that one of the biggest insights in your paper really was on page 68.

MR. TAYLOR: That's a little bit of an unusual financial arrangement. I don't remember when this plant was licensed. It was many, many years ago.

MR. MIRAGLIA: I guess early '70s.

MR. TAYLOR: I can tell you I didn't understand that until I read this report. I don't look at all the financial data. Maybe we --

COMMISSIONER McGAFFIGAN: I'd suggest -- you say unlike most -- it's something you may want to look at. If

there are any other utilities in this circumstance where the owners demand the earnings back and don't have operating funds, I'd like to know how they're doing.

CHAIRMAN JACKSON: Also, going forward, as the new institutional arrangements are made, I think in your shop or somewhere we're supposed to have hired some new people with certain kinds of backgrounds. I don't know where that stands, but it's this kind of thing that we need to monitor, coupled with an ability, which you've managed to pull off, to track back some of these issues to economic constraints, and that gives us something that we have to look at.

We're not economic regulators and we're not trying to get into that but we need to understand where there are these pressure points. And if we can make these clear linkages, then we're going to have to address them, but we ought to make sure that we are sensitive to look for them and that we have the requisite competencies to be able to pick this out of what we've examined.

MR. MIRAGLIA: I think you've hit two points in terms of looking at the economics for where potential pressure points lie, and I think Hub used a key word. It's the trending.

In terms of operator workarounds, plants are going to have them, but the question is do they live with them? Are they the same 13 for a long period of time or are they

getting fixed? Maintenance backlogs -- are they growing? Are they prioritized in the right kind of way?

I think this is the focus of our program and I think perhaps we need to look at that and the trending of that and integrate it perhaps with a front-end look at some of the economic considerations that are mentioned here, to at least look in the areas of concern.

COMMISSIONER ROGERS: Just before we leave it, I don't want to be the skunk at the picnic here on economic issues, but I think we have to be a little bit careful here. I think we've seen, over the years, that some of the most expensive plants that operate are the worst ones and that there has not been a clear connection between how much money is spent and how well the plant runs.

I think we have to keep that in mind because I think there is a management issue that's very important here and I'm just a little hesitant to immediately jump to the conclusion that it was economics. I'm not denying that we have something to be very concerned about with the change in the industry coming about and the effect of economic pressures, but it's very easy to assign that as the root cause when maybe that hasn't come about yet; maybe it has.

I'm not disagreeing with you, but I think it's just very easy now for us to draw the conclusion that the root cause is an economic one. It may very well be, but if

you want to draw that conclusion you'd better look to see what they're spending their money on in totality. Then you're going to get into the micromanagement of that organization.

So we all know that there are lots of places where money gets spent very often in systems that it didn't have to be spent and yet a problem is not solved because of economics.

So I just think we have to keep going at our technical analysis here and get at it. I think the way you're getting at it is very proper. I'm just saying that I think we should be a little bit careful before we are sure that the problem is purely economics. It may very well be. With the same resources available, some of these problems might have been solved.

CHAIRMAN JACKSON: That's why I asked the question about management, process and organization because if there is an economic constraint, the issue is what the response is to it. And it's certainly true there are many licensees who throw good money after bad and it doesn't result in any improvement. But I think it is a heightened sensitivity and not a one-for-one map, and I think that's what we're really talking about.

MR. MIRAGLIA: And I think our focus ought to be in trends of safety performance, declines in safety

performance, from a whole range of contributing factors, including economics, and it's a sensitivity issue.

COMMISSIONER DICUS: You also have the ability to read those trends. The point here is if we had not had the allegation, from my view, and then responded to it, we wouldn't be sitting here today with this plant, and that is a concern.

COMMISSIONER DIAZ: In support of what's been said, I think there is a wonderful table from OECD that looks at different plants in different countries and how much they spend in O&M and the status of the plant and it shows that our plants spend a lot more money than our colleagues in many different places.

So it might well be that it's a management process issue, one that's impacted by the economics at a particular point in time, rather than the entire economic picture.

MR. JORDAN: Maybe I can hopefully clear the confusion rather than add to it.

CHAIRMAN JACKSON: We're the ones adding to it.

MR. JORDAN: This is a very tightly managed economic operation. It has a small staff. It has a small budget. It's one of the lowest cost producers of electricity among the nuclear plants. So it's a very frugal operation. The expenditures they have seem to be very well prioritized and my perception is that they're limited

economically on what they can do.

So we see that there is a residual of things that really need to be done that haven't reached their prioritization. So I don't think we have an argument about where they spent the money they had or even a concern that they're not relatively efficient with the resources they have. It's tight resources.

CHAIRMAN JACKSON: So that does track in this case --

MR. MERSCHOFF: And we said that in the root cause. We didn't see a whole lot of wasted money

Commissioner McGaffigan's point found its way into the second root cause, that says there's a lack of a questioning culture, complacency, and there does not appear to be a clear incentive for improvement. That was the point where if you have an organization that's particularly efficient, the profits don't come back to Maine Yankee with the incentive to do better. It's out at the owner level. So it's clear that there's a close linkage between these two.

To move along, the public meeting was an awfully good investment in time. It went from 6:00 to 10:30 on October 10 in the Wiscasset Middle School gymnasium, well attended -- my guess is 250 people. I went with 250 hand-outs and didn't come back with any. Roughly evenly split

between employees and supporters of Maine Yankee and concerned citizens.

The first part of the meeting was the ISA team -- Ed and I, NRR and Region I -- meeting with the utility to discuss, much as we have here, the results. The second part of the meeting was question and answer with the public. All people with questions were heard. Both meetings were transcribed by a court reporter.

In terms of the licensee, after we presented our findings, the licensee indicated they thought it was an excellent effort, it was balanced. They had no significant disagreement with the technical facts, that the root cause statements were reasonable when viewed in the context of the report, and they'd developed a commitment to excellence program to address the findings and achieving excellence, which would be submitted by December 10, as required.

The second part of the meeting, with the public, was an investment of three hours to hear about 40 speakers. Large number of topics covered, from the FastNet '79 offshore sailboat race with the force nine gale that showed that sailboats had been optimized for speed and suffered in a design basis condition for storm and are nuclear power plants now optimized for cost, was the analogy.

Most of these -- not most -- many of these statements were rhetorical or statements, as opposed to

questions. Comparison with the Titanic and knowledge of use of lifeboats versus evacuation at Maine Yankee. Are the evacuation procedures well known and can it be done? How can the NRC ask for a corrective action from a plant that has identified corrective action problems -- were issues brought up.

Price Anderson limitations were discussed. Economic comparisons between oil spills and those disasters versus nuclear were discussed, with the thought being that nuclear is safe and efficient.

Comments that the plant is safe, that workers are not complacent, that post-trip reviews are thorough, that conservative decisions are made, that operators would shut this plant down long before management if they felt it was unsafe were made on the pro side.

All in all, where was the NRC? Why didn't our inspection program pick these up? NRC doesn't treat allegers very well. These were the kinds of issues that were discussed.

On the whole, it was very professional. I think we, as federal regulators, were treated extremely well by a concerned and involved citizenry at the meeting.

MR. JORDAN: And I would comment that we did have one of the state representatives, in fact, one of the team members from the state, as well as one of the program or the

process persons, who also participated in the meeting with the public, very positively, and that was a benefit, I believe.

MR. MERSCHOFF: And finally, we recognized five regulatory lessons learned in the report itself because they were linked to the findings and discussions in the report. We have an additional five that are being addressed, all 10 in a memorandum that's being circulated will be generated to follow up on these issues, and I can go briefly through them if you'd like.

CHAIRMAN JACKSON: Yes.

MR. MERSCHOFF: Analytic code validation, we found inconsistency. We found that our requirements were not clear and inconsistencies in our implementation, and we need to determine what are the appropriate standards and make them clear.

In terms of compliance with safety evaluation reports, the regulatory stature of those SER commitments is not clear and we found inconsistencies in terms of what we've accepted from different plants under the same conditions.

Licensing reviews for power upgrades. The process, scope and extent of the review for power upgrades should be relooked at in light of the problems identified at Maine Yankee.

Net positive suction head requirements for plants are established in Safety Guide 1 and there were some inconsistencies in that safety guide in terms of whether or not credit can be taken even for the saturation pressure of the fluid, which would be a very realistic assumption, but the safety guide would tend to indicate that you could not use that. And if that's the case, there may be more problems with net positive suction headed plants that we need to look at.

Inspection program issues -- is it adequate in the testing area? Are we looking hard enough in the assessment of design basis area? Could you put back-up slide 4 on, please, Ola?

Other ones not addressed in the report are the adequacy of the expectations for performance along the lines of the SALP discussion we had, to rethink that. Agency policy on the design basis reconstitution we need to look at, along the lines of the 50.54(f) letter. The cumulative effect of operator workarounds that we discussed and what is a clear definition of acceptable for manual versus automatic action.

In terms of the state participation, we thought the lessons there was it worked very well and the three-level -- technical, process, oversight -- give us a great deal of credibility and established an exceptional working

relationship with the State of Maine that just would not be achievable through another way.

In terms of the conduct of the team itself, we learned a lot of things about a team that large and how best to manage it and to write the report. The analytic code area was very useful and needs to, as we did here, have practitioner level inspectors involved in it.

The use of the peer panel that we had, the outside experts, was very useful and provided good insights and a sanity check for what we were doing. And the use of PRA, in terms of the third leg of that stool we discussed, and to view equipment reliability was a very useful tool.

That concludes my planned remarks, Dr. Jackson.

CHAIRMAN JACKSON: Thank you. I guess my question is what is, then, the follow-up that's going to happen now?

MR. JORDAN: The comment I would make is that that's really why Hub and Frank are at the table, as well, is because this really is a hand-off and the hand-off was made in front of the public, as well, to say that these findings were conveyed to the licensee, the licensee is to submit a response by December 10, and that the review of that response, of their plans for action, lies with the Office of Nuclear Regulation and with Region I.

And so we've communicated with both offices the findings and we can provide additional support, but now it

really is theirs to follow.

MR. TAYLOR: I think we'll have to provide you, when all this is worked on, we'll provide you with some periodic reports of activities, either through Commission papers --

CHAIRMAN JACKSON: Okay. I was going to put these in my --

MR. TAYLOR: We'll have to lay that out between the program office and the region.

MR. MIRAGLIA: And the generic issues are also going to be tasked as appropriate. Most of them will be coming to the office and we'll have to develop plans for responding.

CHAIRMAN JACKSON: Well, I'm going to mention something in my closing comments.

Any more questions?

COMMISSIONER ROGERS: Yes, a couple of things. One is it sounds to me like there's a serious management problem here because when I hear about meaningless procedures for testing valves that are being religiously followed, faithfully followed and they're meaningless, it seems to me that the coordination between engineering, testing and maintenance just is not there, that there ought to be some engineering evaluation of testing procedures that would turn that up.

So it seems to me that there is -- and the fact that they don't have system engineers -- well, that's a choice, an organizational choice, but certainly system engineers, properly employed, would turn up something like that, it seems to me.

So at any rate, it does appear to me that there is a management deficiency here that I don't know that, in terms of linking various functions together, that I haven't heard anything about explicitly. Could you comment on that?

MR. MERSCHOFF: It's clear that management is responsible for the lack of a questioning culture and the complacency, and for changing that. So the roots for that second cause or the solution resides with management effecting change throughout all levels of the organization.

CHAIRMAN JACKSON: Any others?

COMMISSIONER ROGERS: I have another point, and that is that in the report, on page 59, you referred to an inputs and assumptions source document that they started in 1986 and then set aside, and it seems to me that that might be a very important kind of exercise, not only for them but for other plants, as well, particularly when we address the kinds of concerns that we talked about yesterday with respect to is there an adequate basis for applying PRA?

And what are the assumptions, inputs and assumptions that they're living with? Those should be

explicit and I just don't know that it has to do with this particular team's report, but it came out of that and turning that up I think was very interesting. I don't know if that is a report or a document that is generally being produced in plants or not. Could you comment on that? Perhaps Mr. Taylor, do you know whether --

MR. TAYLOR: I can't comment on that.

MR. MERSCHOFF: I can't tell you if it's common among plants but this was an instance where, back in the early '80s, due to problems recognized by the NRC, that they developed, embarked on a course to establish, collect in one place their input assumptions. The results of that had errors. It was not well done, so they embarked on the second, the safety assumption input document, which they set aside, due to the financial complaints, but have reestablished.

So it has its roots in a regulatory requirement.

One of my team members mentions that it's a reflection of a three-volume FSAR. When you're dealing with an FSAR that lacks specificity, you need another level of detail to impose that specificity and discipline.

COMMISSIONER DIAZ: That leads me to precisely the word that I wanted to use, which was specificity. Just a very simple comment. I believe that we have been hearing about lack of consistency or inconsistency, lack of

reliability, lack of performance, lack of this.

I think that basically, with the superb staff that we have and the great job you have done in analyzing these problems, that providing the specificity in whatever we're recommending is of incredible need.

And I want to piggy-back on two issues. One is the automatic initiation of the high pressure coolant injection pump and the steam-driven auxiliary feedwater pump. I mean, those are items that I believe once you identify them, we should be very specific and indicate, "This is not acceptable," and I'm sure you have, but I haven't seen it reflected in here, those items not being acceptable. Those are not acceptable from a safety viewpoint; they're certainly not acceptable to me as a commissioner trying to ensure adequate protection of the public health and safety.

I think the licensees actually appreciate that specificity. If we can be more specific in a series of issues, I think they will actually love it.

MR. TAYLOR: This goes to the enforcement side, too.

CHAIRMAN JACKSON: Thank you.

I'd like to thank you for briefing the Commission on the results of a very important inspection job. And on behalf of the Commission, it's been a vigorous discussion.

I would like to thank the members -- we all would -- of your team for your dedicated work and effort. You've done quite a job.

We realize the many stresses that inspections of this length and this nature place on you, particularly with the unusual way it came about and the unusual format that it took. But I have to tell you that the governor of Maine has expressed his appreciation for your team's experience and for your professionalism.

Today you've presented a summary of your team's work that, taken in concert, in fact, with the in-depth inspections of the Millstone and Haddam Neck facilities, Mr. Virgilio's team, has helped to clarify for the Commission the picture of the status and the problems of not adequately maintaining design bases. And the inspection findings have helped us in those areas.

As you know, the Commission's approval of the recent 10 CFR 50.54(f) letters that we sent to licensees requesting information having to do with the adequacy and availability of design basis information, in effect, was an affirmation of your recent inspection findings and underscores the Commission's resolve to ensure that there are adequate processes in these areas that work, et cetera, and that, in fact, the lessons learned from your review will help to inform our review, NRC's review of licensee

submissions.

Now, as you indicated, I understand that you're generating for the EDO a tasking memo that will help direct the program offices to follow up on the specific inspection findings and potential enforcement issues, as well as the regulatory lessons learned.

With respect to NRC follow-up with Maine Yankee, I think it would be useful for the Commission to be briefed by Maine Yankee on their plans to respond to the inspection findings and the root causes. I think perhaps at that time, after the gentlemen from Region I and from NRR have had a chance to get this hand-off and put their heads together, that as part of that, that I think we would like to hear from you, in terms of regulatory follow-up.

And we've already talked, in terms of regulatory lessons learned, that we obviously need to figure out an appropriate way, not simplistic, to assess whether our current inspection program is capable of detecting the various issues and root causes, some of which you've identified, of the type you're identified today.

And based on our discussion today, I have one additional item to add for consideration, and I think it's clear from the very extensive discussion you heard today, and that is that we need to have a review of our assessment categories in SALP -- we're already looking at the senior

management meeting process -- to look at these categories and ask ourselves whether they appropriately categorize performance in a way that gives the specificity that is needed, that gives the consistency that is needed, and does not allow things to go along in a subminimal state for an unduly long time and resolves what I call some of these oxymorons that can perhaps contribute to sending inconsistent messages to licensees.

It's hard to say that the quality of maintenance was good, and that was one of the conclusions, and that there were mixed results in engineering but overall, it was good, but yet you have the problem with something like the steam-driven aux feed pump.

Those are the kinds of things that I think when we go about doing our assessments, that those kinds of disconnects need resolution.

MR. TAYLOR: May I add something?

CHAIRMAN JACKSON: Please.

MR. TAYLOR: First, I think bringing Maine Yankee, the thought occurred to me as you were speaking. I fully support that.

I think one of the things that I would add from my experience is that this is again a demonstration of the effectiveness of an overarching team inspection, through the years, as we have faced various problems, the benefit of

putting together teams with various degrees of expertise. In this particular case, the adjunct of the code examination is a good example where we took typical team-type operations and added to it.

So I would only point to the Commission this type of review by the agency, we can't do it everywhere, at every time or moment, but I think for a number of years there was a regulatory impact survey. Commissioner Rogers will recall that. When was that? About 1990 or so, was it?

MR. MIRAGLIA: 1989, '90.

MR. TAYLOR: And the industry said these were very expensive and onerous to a degree. I think what we're seeing today, and even for a plant such as Maine Yankee, is the great benefit that comes from it. This is costly but there is a great regulatory and frankly, potential safety benefit through the operation of team inspections.

Mr. Virgilio's inspection was geared to a different set of issues but again unearthed problems that would have been very difficult for the individual small resident staff and others to unearth.

So again, I would tell the Commission I think that through the years, utilization of teams has been very beneficial to the agency.

CHAIRMAN JACKSON: I think what we're trying to get at, and I think it's already under way, is a

rationalization of how the various pieces of the program -- the resident inspection, the other oversight and inspection functions that come out of NRR -- how all of these things link, how they are rationalized, how they feed up the line in terms of our overall assessment, and how the special team investigations and inspections feed into that, what triggers them. You know, what do we hope to learn? How do they then feed back into these various parts? That's the task ahead of us.

But in terms of specific follow-up here, we will have Maine Yankee come in to talk about their response to the findings and at that time we also would like to hear wherever you are at that point in terms of the follow-up for our regulatory program.

If there's nothing else, we're now adjourned.

[Whereupon, at 11:08 a.m., the meeting was adjourned.]

CERTIFICATE

This is to certify that the attached description of a meeting of the U.S. Nuclear Regulatory Commission entitled:

TITLE OF MEETING: BRIEFING ON INTEGRATED SAFETY ASSESSMENT TEAM INSPECTION (ISAT) AT MAINE YANKEE - PUBLIC MEETING

PLACE OF MEETING: Rockville, Maryland

DATE OF MEETING: Friday, October 18, 1996

was held as herein appears, is a true and accurate record of the meeting, and that this is the original transcript thereof taken stenographically by me, thereafter reduced to typewriting by me or under the direction of the court reporting company

Transcriber: Susan Harris

Reporter: Susan Harris

THE INDEPENDENT SAFETY ASSESSMENT

OF

MAINE YANKEE ATOMIC POWER STATION

Edward L. Jordan

Ellis W. Merschoff

October 18, 1996

PRESENTATION OBJECTIVES

- Describe the Independent Safety Assessment process used to evaluate Maine Yankee
- Discuss the findings and conclusions of the Maine Yankee Independent Safety Assessment
- Discuss Regulatory Lessons Learned

SELECTION OF MAINE YANKEE

- o Allegations Regarding RELAP/5YA
- o Office of Inspector General Inquiry
- o State of Maine Concerns

INDEPENDENT SAFETY ASSESSMENT

o Large Experienced Team

o Independent of NRR and Region I

o Participation by State of Maine

- Technical Team
- Process Team
- Citizens Group

o Modified Diagnostic Evaluation Technique

INDEPENDENT SAFETY ASSESSMENT MISSION

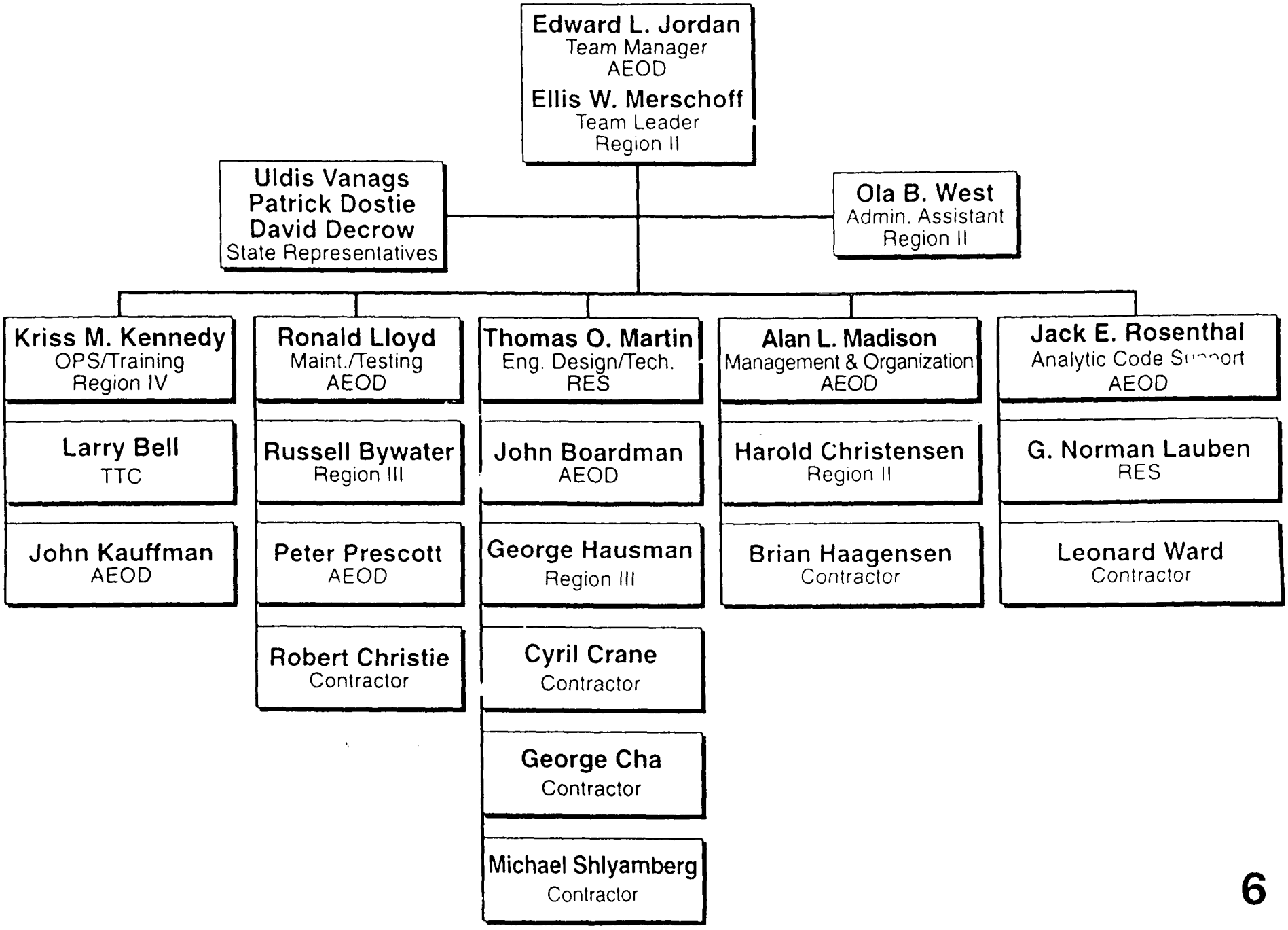
- Provide an independent assessment of the conformance of Maine Yankee Atomic Power Station to its design and licensing bases including appropriate reviews at the site and corporate offices.

- Provide an independent assessment of operational safety performance providing risk perspectives, where appropriate.

- Evaluate the effectiveness of licensee self-assessments, corrective actions, and improvement plans.

- Determine the root cause(s) of safety significant findings and draw conclusions on overall performance.

Maine Yankee
Independent Safety Assessment Team



LICENSEE SUPPORT ORGANIZATION

o Senior level counterparts

o Staff

- Technical

- Administrative

o Development of extensive response library

o Effective link to line organization

o Thorough extent of condition reviews

SAFETY ASSESSMENT SCHEDULE

- o June 17-July 12 - Team preparation
- o July 15 - Public entrance meeting
- o July 15-26 - First onsite evaluation period
- o August 12-23 - Second onsite evaluation period
- o October 7 - Issue report
- o October 10 - Public exit meeting

SAFETY ASSESSMENT PROCESS

- o Extensive preparation
- o Horizontal assessment across functional areas
- o Vertical slice reviews for selected systems
- o Analytic code review
- o Interviews
- o Safety assessment/root cause evaluation

SAFETY ASSESSMENT STANDARDS

- o Regulations - Measure conformance
- o Assessment - Measure margin of safety
  - Superior
  - Good
  - Acceptable
- o Probabilistic risk assessment - Provide perspective

NRC ASSESSMENT STANDARDS

	SUPERIOR	GOOD	ACCEPTABLE
Safety	Properly Focused	Normally Well Focused	Acceptable Performance
Programs	Effective Control	Some Deficiencies Exist	Instances of Insufficient Control
Self Assessment	Effective	Some Issues Not Identified	May not Occur Until Problem is Apparent
Corrective Actions	Comprehensive	Some Not Complete	Not Thorough
Root Cause	Recurring Problems Eliminated	Normally Thorough	Do Not Probe Deeply

SAFETY ASSESSMENT RESULTS

o Overall Performance Adequate for Operation

- Design/Licensing Basis - Generally in conformance

- Operations - Very good

- Maintenance - Good

- Testing - Acceptable

- Engineering - Good

- Self Assessment/Corrective Actions - Acceptable

LICENSING AND DESIGN BASIS

o Licensing Basis

- Generally in conformance
- Lacks specificity
- Contains inconsistencies
- Not well maintained

o Design Basis

- Quality good
- Availability good
- Design deficiencies identified
- Supports operation at 2440 MWt

LICENSING/DESIGN BASIS OPERABILITY ISSUES

- o Component cooling water
- o Reactor water storage tank
- o Equipment qualification
- o Ventilation
- o Logic circuitry
- o Containment spray pump
- o Service water
- o Check valve testing

SAFETY ASSESSMENT OPERATIONS

o Strengths

- Operator performance
- Use of risk information
- Management involvement
- Shift turnovers
- Pre evolution briefs

o Weaknesses

- Workarounds and compensatory measures
- Post trip reviews
- Log keeping

SAFETY ASSESSMENT MAINTENANCE

o Strengths

- Knowledge/use of risk
- Motivated/dedicated work force
- Control of temporary repairs
- Quality of maintenance

o Weaknesses

- Declining material condition
- Inconsistent equipment reliability

SAFETY ASSESSMENT TESTING

o Strengths

- Steam generator tube testing
- Inservice testing
- Containment leak rate testing

o Weaknesses

- Inadequate scope
- Weak rigor
- Weak evaluations

SAFETY ASSESSMENT ENGINEERING

o Strengths

- Quality of engineering work
- Qualified capable staff
- Electrical design work
- Support provided by Yankee Atomic

o Weaknesses

- Inconsistent problem identification
- Inconsistent problem resolution
- Limited ownership of programs

SELF ASSESSMENT/CORRECTIVE ACTIONS

o Self Assessment
- Internal/external effectiveness mixed
- Fragmented problem identification process

o Corrective Actions
- Weak implementation
- Fragmented
- Occasionally ineffective

o Improvement Plans
- Limited effectiveness
- Many individual plans
- Results mixed

SAFETY ASSESSMENT ROOT CAUSE

- Root Cause 1

  Economic pressure to be a low cost energy producer has limited available resources to address corrective actions and some plant improvement upgrades. Management has effectively prioritized available resources, but financial pressures have caused the postponement of some needed programs and actions.

SAFETY ASSESSMENT ROOT CAUSE

o Root Cause 2

There is a lack of a questioning culture which has resulted in the failure to identify or promptly correct significant problems in areas perceived to be of low safety significance. Management appears complacent with the current level of safety performance and there does not appear to be a clear incentive for improvement.

SAFETY ASSESSMENT PUBLIC MEETING

o With Licensee

- NRC presented results
- Licensee senior management responded

o With Public

- Overall impressions
- Key concerns

REGULATORY LESSONS LEARNED

- o Analytic code validation
- o Compliance with safety evaluation reports
- o Licensing reviews for power uprates
- o Net positive suction head requirements
- o Inspection program issues