UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
***
MEETING WITH CHAIRMAN OF NUCLEAR SAFETY
RESEARCH REVIEW COMMITTEE (NSRRC)
***
PUBLIC MEETING
***

Nuclear Regulatory Commission
Room 1F-15
11555 Rockville Pike
Rockville, Maryland

Monday, August 26, 1996

The Commission met in open session, pursuant to notice, at 2:00 p.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

STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:
JOHN C. HOYLE, Secretary
KAREN D. CYR, General Counsel
E. THOMAS BOULETTE, Chairman, Nuclear Safety Research Review Committee
DAVID MORRISON, Director, Office of Nuclear Regulatory Research

P R O C E E D I N G S
[2:00 p.m.]

CHAIRMAN JACKSON: Well, good afternoon, ladies and gentlemen.

I want to first acknowledge and to welcome our newest Commissioner, Dr. Nils Diaz. Welcome.

COMMISSIONER DIAZ: Thank you.

CHAIRMAN JACKSON: And I am also pleased to welcome Dr. E. Thomas Boulette, Chairman of the Nuclear Safety Research Review Committee. And, of course, our own Dr. David Morrison, Director of the Office of Nuclear Regulatory Research, to brief the Commission on recent activities of the committee.

The Nuclear Safety Research Review Committee advises the Director of Nuclear Regulatory Research and, through him, the Commission on the quality and conduct of NRC research activities and gives recommendations concerning the overall management and direction of the nuclear safety research program.

The Commission is interested in hearing about the committee's recent assessment of research programs as well as any concerns that the committee may want to raise with the Commission. The Commission appreciates the efforts made by this committee and its reviews of research programs that support important safety issues.

Today's briefing will provide a broad overview of many of the programmatic activities of the Office of Research. I understand that the activities under discussion will be probabilistic risk assessment, severe accidents,

instrumentation and control, as well as human factors and materials and engineering. I understand that copies of the committee's report to the Director of the Office of Research is available at the entrances to this room.

Do the other Commissioners have any opening remarks?

COMMISSIONER ROGERS: No.

COMMISSIONER DIAZ: No.

COMMISSIONER DICUS: No.

CHAIRMAN JACKSON: If not, Dr. Morrison, Dr. Boulette, you may proceed.

DR. BOULETTE: Thank you, Chairman Jackson, Commissioners.

This, of course, is a briefing of our last meeting and we have prepared a series of slides that we will walk through. I invite Dr. Morrison to help me out as we proceed and, if we go to the first slide, please?

[Slide.]

DR. BOULETTE: The first slide depicts the schedule of meetings that we have had over the last three to four months. The committee met, as you know, on the 27th

and 28th of June. That was the full committee. The way we arranged our committee is we formed four subcommittees in the four areas that Chairman Jackson highlighted and I will address each one in turn.

The committee meeting had as its principal objective the review of each of those subcommittee meetings, their specific reports and the attempt to compile any concerns or endorsements or any specific actions that each of the subcommittees may want to highlight.

The other meeting dates for the committees are listed on the slide and we will go through them but, in effect, all of the subcommittees met starting early May.

There is a correction on one of these slides, by the way. The Subcommittee on Action Analyses is the Subcommittee on Severe Accidents.

The first area I would like to cover is the one -- is the subcommittee area of probabilistic risk assessment. A few points I would like to make on that specific area is that the committee does believe and feels that the research office is fairly well integrated into the use of PRA for regulatory decisionmaking. By that we mean the development of analytical tools, the transfer of training and guidelines, lessons learned from the IPE and IPEEE have been done fairly effectively and we commend the office for that.

We do have a concern relative to some of the

initiatives that the research is focusing on in the area of updating the standard review plan and the corresponding rate guides. We believe that, as the staff tries to address that specific issue, the concern we have is that in 1986 generic safety goals were issued by the Commission and they are, as we understand them to be generic in nature. They apply to the industry.

As we get into risk in performance based regulations, how will these goals be applied to individual sites and might there be an initiative that would call for each site to have its own unique, specific safety goals? What we mean by that is if you have 57 different sites in the country, whatever the number may be, each site has its own risk level, if you want, based on its design and its operating procedure, what have you, some having higher risk than others.

If the application of a standard set of goals is applied to all of them uniformly, would that allow a certain site, a specific site, to raise its risk or not? So there is quite a bit of debate on that issue, getting into the public relations realm as well. So we are suggesting that some additional guidance may be needed to clarify that issue.

CHAIRMAN JACKSON: Actually, that raises a question immediately. That is, do you feel the

methodologies, PRA, particularly as they relate to treatments of uncertainty is well enough or well enough developed to even be able to address that kind of a question?

DR. BOULETTE: I think --

CHAIRMAN JACKSON: Or at least is there concurrence on, because I note you have a bullet here having to do with preparation of capabilities for standardized PRA modeling and you also refer to standardized treatment of

uncertainties and it strikes me that until and unless these pieces of the PRA infrastructure it's in a sense difficult to talk about plant specific or site specific safety goals and application.

DR. BOULETTE: I think it's a good point but I think the issue the committee was struggling with was in spite of the adequacy of the methodologies and the adequacy of the databases, as we proceed down this road for developing any kind of approach, risk-informed, performance-based regulation, one of the strategic issues that has to be addressed, we believe, by the Commission, by the NRC, is do the safety goals apply uniformly to all sites and if they do will they then afford some flexibility to an existing site to change its safety standards if you want.

For example, if site A has a core melt frequency calculation that is like ten to the minus eighth but another

site has a number that is ten to the minus ninth, will that site with the lower frequent number be allowed to move up by two orders of magnitude and still meet a safety goal? It would still be the safety goal but, at the same time, it would be in effect encouraged to increase its risk. And how would that be perceived and how might that affect the regulations and how much that affect the research program. That was really the issue we were getting to.

I don't believe that there is enough detail information to be able to calculate all of these parameters adequately but the fundamental issue of how will it be applied to all the sites, I think, is still valid and should be addressed fairly soon.

I believe I am speaking for the committee at large.

DR. MORRISON: Yes, I think that is the correct interpretation of what the committee's concerns were.

I would remind the Commission that there is an issue paper due to you from the staff by the end of September that will be dealing with four issues and one of these is the use of safety goals on a plant-specific basis. So that item will be elaborated in considerably more detail and guidance will be sought from the Commission on that.

DR. BOULETTE: The other two bullets in that slide we have kind of alluded to already, the Chairman herself and

some of the comments I made.

There really is, we believe -- the committee believes there is a need for a bit more formal integration of the various activities into some sort of an overall plan. The committee feels that many of the initiatives are on track and going the right direction but, probably, a more comprehensive focus to bring all the pieces together may be very useful.

CHAIRMAN JACKSON: I think what we will probably do is to stop certainly on each topic and allow the commissioners to ask any questions they might have but why don't you finish your discussion on this particular bullet.

DR. BOULETTE: Very good. I appreciate that. I think we are down to the probabilistic risk assessment. Are there any questions on that one?

CHAIRMAN JACKSON: I do have one more and then I will ask Commissioner Rogers and the other commissioners.

I note both your committee as well as the ACRS spend considerable time reviewing the staff's PRA activities and the question is whether these reviews are complementary and supportive in nature or are they -- to what extent are they duplicative and if not -- if they are or if they are not as complementary or supportive as they could be, how can we take better advantage of the relative committees' expertise in these areas. It's really a question of getting

the most bang for the buck, as it were.

DR. BOULETTE: The subject did come up at our committee as well and, quite frankly, I don't know if I can answer your questions because the same questions were posed to the committee. I think there is a paucity of understanding as to what's going on in the ACRS relative to PRA investigation, so one of the things --

CHAIRMAN JACKSON: By your committee?

DR. BOULETTE: By our committee.

I think some of the membership of the committee are really strongly encouraging us to be more involved with ACRS either by attending some of the meetings or by getting the reports and paying more attention to that because we did share your concern that there are two entities supposedly

looking at the same activity and how are we working together, are we being cooperative and what have you. So it is a valid comment but I really can't answer it until we start pulling on that ourselves as a committee.

CHAIRMAN JACKSON: Is there a consensus that you see between the staff and industry on the meaning of risk-informed performance-based regulation?

DR. BOULETTE: I think so. I think that with some of the recent activities and some of the workshops we have had that the industry, and I can speak for the industry in any case, is beginning to get a better appreciation of

what's meant by risk-informed performance-based regulations and that whole activity.

On the other hand, I think more definition would really serve both our purposes and I think that will develop as we start putting some more meat on these bones. When you get to a lower level of detail, more and more questions pop up, I guess, is what I am saying.

CHAIRMAN JACKSON: And the last question, do you have any comments on the industry pilots in the -- in this area?

DR. BOULETTE: I don't really. I am aware that they are in place and in fact Dave and I were just talking about this before the meeting but I have no specific comments on it.

CHAIRMAN JACKSON: Okay. Commissioner Rogers?

COMMISSIONER ROGERS: Just in the human factors area, I know you will probably touch on it a little bit later but in one of your meeting reports you mentioned that in connection with PRA work you did consider some of the problems of organizational factors in the human factors area.

I wonder if you -- the committee has brought the human factors considerations and the PRA work together in your oversight of our research programs? It is clear to me that the human factors area is the big one that needs --

that has the biggest uncertainties in it with respect to PRA and the question is what aspects of human factors can one tackle and how much reliability can one place on a bottom line PRA number just because of the big uncertainties in human factors performance and whether the negative comments elsewhere in the report on organizational research are the whole story as far as the committee is concerned, including the PRA part of your committee?

DR. BOULETTE: I believe I've heard two or three questions in that question.

COMMISSIONER ROGERS: Yeah, there's probably about half a dozen.

[Laughter.]

DR. BOULETTE: Basically, it is my belief that the committee strongly supports the human factors and the control room human factor interface and what have you. And I think that the initiatives that the research organization has on that will pay off and we have confidence in some of that, even though there is some question about how to obtain reliable databases and what have you. But the man/machine interface kinds of issues we see some promise there and something going on.

On the other hand, in the area of organizational issues, culture issues, what have you, I am sure you saw some comments in the report that demonstrates that the

committee has significant reservations about the ultimate fruition of this effort. Again, David and I were talking about it this morning.

It is one thing to be able to define a good operator and the kinds of competencies and characteristics and strengths that he or she should have and how they might interface with machinery and panels and what have you. It's another thing to talk about culture.

From my perspective, my own personal perspective, what is a good culture for a certain site in the spring of the year may not be a good culture for another site in the winter of the year. I think it is so situationally dependent I am not sure that we can collect enough data to make it meaningful.

I think I am expressing the view of the committee as I speak that way. I am aware that the NRC or Dave's staff doesn't quite agree with that and I think that kind of tension may be useful for us.

COMMISSIONER ROGERS: Well, I guess the point,

just the point, I don't want to belabor it, but the point, I think, is that when everything else is fine tuned to a degree that one feels pretty comfortable with the human factor that is going to dominate the performance of the plant and that means that even after you've got your control room all finely tuned up and you've got the best people

operating in the best possible way and so on and so forth, there are still other aspects of the organization that can cause the trouble. I mean, we've seen it.

And yet, how can one deal with those issues in a quantitative way so that they can be included in a PRA?

DR. BOULETTE: And those are the questions that the committee is pushing at. Absolutely.

I do know from my own personal experience that many of the errors that are being committed, many of the problems that the sites have seen, obviously, are human performance errors more than anything else.

So we recognize the need, we recognize the effort that is going on and support it. On the other hand, the organizational part, the cultural part, we have some reservations about how that may be managed.

CHAIRMAN JACKSON: Commissioner Dicus?

COMMISSIONER DICUS: No.

CHAIRMAN JACKSON: Commissioner Diaz?

COMMISSIONER DIAZ: No.

DR. BOULETTE: Okay.

Next slide, please.

[Slide.]

DR. BOULETTE: The next area we spent some time discussing is in the area of severe accidents and a couple of bullets that I might emphasize on that, we strongly

endorse and we know the staff supports this position --

CHAIRMAN JACKSON: The Commission supports the position.

DR. BOULETTE: The Commission does?

CHAIRMAN JACKSON: Has supported it.

DR. BOULETTE: Continued participation in the OECD/NEA activities. Again, not only to be able to take advantage of the research taking place everywhere but as much an image kind of issue that would continue to give the U.S. NRC the position that it deserves in the overall industry.

We endorse and gave kudos to Dave's staff in the area of high burn-up fuel and its effects on cladding failure modes and the evaluations that were done. We are encouraging and support the consolidation of thermal hydraulic codes. We believe that that is one way in which resources can be made to be focused and taking advantage of so that as any kinds of budgetary constraints may come across, this is one way that may be able to accommodate some of those issues.

Likewise, we support the maintenance and the whole suite of severe accident codes. Along the same lines, there is a package of three or four or five major codes that are going to need to be maintained and also important that the NRC maintain that kind of expertise, so we support that.

We also noted that the X reactor series of core melt experiments were coming to a closure and we supported that as well as endorse that. So no real surprises in this area.

Any questions or comments?

CHAIRMAN JACKSON: Let me ask you a few questions.

What capability, in the committee's opinion, currently exists within the staff to run, update, interpret output from the suite of severe accident codes that exist?

And if the committee has an opinion or you have an opinion that the current capabilities are not where they should be, you know, what should the requirements be to establish such a capability?

DR. BOULETTE: I believe the committee would say that the capabilities do exist within the staff. There is some upgrading of that capability that will be needed and probably some transfer of skills and talents from individuals to other individuals and possibly some training. But we do not see a major concern as to whether the staff will be able to meet that challenge and make that work.

CHAIRMAN JACKSON: The ACRS has raised some concerns about the ability of the currently existing thermal hydraulic codes to assess the failure of the reactor coolant system or steam generator tubes coincident with a severe

core melt accident.

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Does your committee have any opinion on that, whether that capability exists or not?

DR. BOULETTE: I'm not sure whether that has come up or not. Do you remember, Dave?

DR. MORRISON: No, I don't think that item was discussed. I don't recall, either at the subcommittee meetings or at the committee meeting as a whole.

CHAIRMAN JACKSON: Maybe I might commend that to you because it is an issue that relates to ageing issues.

I note that in your report that a number of severe accident program areas are, in fact, reaching a certain level of maturity. In your opinion, what role does risk analysis play or should play in the planning or sunsetting of severe accident research?

DR. BOULETTE: In the closure of some of these initiatives? I think that is going to be a key aspect of how we address those questions in the future.

CHAIRMAN JACKSON: But it is not something you have explicitly --

DR. BOULETTE: We have not addressed that explicitly but my own personal view, and again, just from the discussions that we've had as a committee, we see a lot of longer term benefit associated with risk informed performance based regulations that will impact a lot of these areas.

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CHAIRMAN JACKSON: Commissioner Rogers?

COMMISSIONER ROGERS: No, I think we've covered everything I had.

COMMISSIONER DICUS: No questions.

CHAIRMAN JACKSON: Okay.

DR. BOULETTE: In that case, slide number five, please.

[Slide.]

DR. BOULETTE: I think I can say that this area, the area of instrumentation and control of human factors continues to be probably the more dynamic area that we look at. It is new technology, it is change, it is some vagaries associated with human performance, what have you. So we did spend quite a bit of time on this specific area.

The committee endorses the continuation of control room staffing studies as done at the Halden project, highlighting the need to recognize that these studies will be design dependent but also dependent upon whether it is a one-unit site or a two-unit site, just because of the way the control room is run and operated.

We do support the research being done on the hybrid control room operator performance however we are concerned, in fact, that there is enough emphasis placed on the hybrid nature of the problem, specifically. By that, the committee means that when you look at operator

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performance and base it upon your design basis, the way the plant has been built and try to assess how that's going and the relative risks and what have you, that's one issue. But as the plant evolves and changes and becomes more of a hybrid system, we believe that the hybrid nature itself has to be emphasized and looked at more carefully, in particular the unique failure modes and effects that comes from the hybridization of the system itself.

So we did express a concern as to how much emphasis was being placed on that specific area.

COMMISSIONER ROGERS: Excuse me.

Could you just elaborate on that just a little bit? I think that's a very important area.

DR. BOULETTE: I can try.

COMMISSIONER ROGERS: It certainly caught my attention. Are you thinking about the hardware aspects of hybridization as well as or in addition to the difficulties that control room operators may have when they are faced with a combined system of digital and analogue --

DR. BOULETTE: My recollection was more along the lines of the hardware. In other words --

COMMISSIONER ROGERS: Itself.

DR. BOULETTE: Itself. In other words, you are changing the overall system. You now have part of an old system and a new system, the interfacing of the old and new,

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is that being accommodated and accounted for when you do your performance evaluations of the man/machine interface.

COMMISSIONER ROGERS: Fine.

CHAIRMAN JACKSON: What do you think is the likelihood of obtaining useful results in the near future in this particular area?

DR. BOULETTE: In the human -- man/machine interface area?

CHAIRMAN JACKSON: Right.

DR. BOULETTE: I think you would get differing opinions from some of the committee members. Christine Mitchell has a significant experience in other fields, non-nuclear, NASA and the aviation industry. I believe that she speaks very positively about the potential for getting some useful information. On the other hand, she does state fairly strongly that the NRC -- the nuclear power industry is far behind the curve on this issue relative to other industries.

It is her view that the encouragement has to take place within the industry to step outside itself and look at the other industries and learn the lessons that are to be learned so that we can make some progress there. So I think it's hopeful but we are slow at coming there as an industry.

CHAIRMAN JACKSON: Dr. Morrison, how large a program is there in research at this point in this

particular area?

DR. MORRISON: In the broad area of instrumentation and controls and human factors or just this narrow slot?

CHAIRMAN JACKSON: The broad area.

DR. MORRISON: The broad one. It ranges about around $4- to $5 million a year. Roughly a quarter of that is in the Halden project itself. It ranges somewhere between 750,000 and a million dollars.

I would also point out that Professor Mitchell is going to have an opportunity to visit the Halden project in around the middle of September so that she will get a first-hand feel of what the capabilities are there and can compare those with the experience from the other areas that she is familiar with in this country. So we should get a good benchmark based upon her visit.

DR. BOULETTE: She spent a week at my station last week, just being in the nuclear area, she had never seen a nuclear simulator, for example. So she has to come up to speed also but she has a lot of experience.

CHAIRMAN JACKSON: One other question in this area.

Does the staff have any plans to pursue development of approaches for addressing software reliability?

DR. MORRISON: Oh, yes. We have had a major activity under way over the last I suppose year-and-a-half to two years and there are reports either in draft form or just nearing completion covering I think a half-a-dozen topics if I am right in the area of software reliability, software engineering verification and validation methods, use of case tools, the kinds of things that one is going to be required to really take a look at the software part of this problem.

CHAIRMAN JACKSON: Are there any particular outcomes at this point from that research?

DR. MORRISON: I think most of these can be embodied in regulatory guides that will be available to the industry as they develop both the hybrid concepts as more of the advanced concepts, seeing where software enters into the thinking.

CHAIRMAN JACKSON: Commissioner Rogers?

COMMISSIONER ROGERS: Well, it does seem to me that this question of the plant performance when it's operating in a hybrid mode in a sense, combined digital and analogue systems, is something that we really ought to make sure somebody is paying attention to. I don't know that we have the funds to do a lot ourselves but I think it is very important for us to understand what the industry is doing here, our own industry, the nuclear industry, because it

does seem to me that that may be a place where there really are some sleepers.

That may appear, and I think it is very, very interesting that you have brought that up and I was thinking more along the lines of the challenges that a hybrid control room places on an operator who has had a lot of training in an old analogue system and now has to deal with a combined collection of instruments that are partly digital and partly

analogue and there may be some special features of that that challenge the operators.

But certainly what's going on in the plant, how the control systems behave, is -- may pose some really new kinds of problems that we hadn't anticipated and I do think it is very important that there be several research efforts in this area in the United States and certainly they are not all going to be funded by NRC.

So I would urge you to try to see that we understand what is happening and try to make our concerns known to the industry that this is not an area that could just be dealt with on an ad hoc basis. It really needs some kind of a broad overview, I think.

The other -- the comment on the Halden work, I was at Halden about two weeks ago, my second visit there, and I have always been quite impressed with the quality of their efforts. But one of, of course, the important things about

the Halden project is that it is supported by many different countries so that I am just a little concerned that if we try to establish a U.S. effort here with NRC funding, which could be a real challenge to us to carry out, that that doesn't cause us to drop out of the Halden project because I think that it has some very great benefits because of a number of participants and because of the benefits we get because we put in a little bit and we get a lot back.

DR. BOULETTE: I feel sure the committee supports your view on the Halden project. On the other hand, the committee did raise the concern for the lack of capability within the United States.

COMMISSIONER ROGERS: Absolutely.

DR. BOULETTE: Coming back to your earlier point, Commissioner Rogers, if I could, the hybridization that we're talking about, I am sure you are aware that the industry is accustomed to plant modifications and hopefully the updating of their FSARs, their documentation and the whole kit and caboodle. The focus here, of course, is instrumentation and control and control in particular and how pervasive it might be as you incorporate a digital system into your plant.

COMMISSIONER ROGERS: Right.

DR. MORRISON: If I might come back for just a moment to comment on the Halden project, it is certainly not

our intention to abandon our participation in the Halden project. It was my understanding that the committee was raising the issue, especially, when you looked at operator performance first of all in a simulator environment, secondly with Finnish operators dealing with a Russian reactor that there may be a culture problem associated if you bring it back to a U.S. system with U.S. trained individuals involved.

COMMISSIONER ROGERS: Yes.

DR. MORRISON: So it was really the human side of that more than the questions with regard to the man/machine interface or the machine side of it.

CHAIRMAN JACKSON: Okay.

Any other questions on this area?

COMMISSIONER DIAZ: Just a comment or a question really. It says in here that you provide issue prioritization and guidance in 1997. In -- in what form is that going to be? Is that going to be something submitted to the NRR? Is this what the committee is working on or is this what NRR is working on? I was kind of confused on that.

"Research on hybrid control room, operator performance is proceeding and should result in issue prioritization and guidance in 1997."

DR. MORRISON: That is an anticipated product from

the research effort that is under way in trying to come up with a better rank ordering of the issues that we should be addressing and that that would serve then as guidance to FY '98 and beyond programs, so this will carry -- this will be done in '97 and will be available then for future research programs.

COMMISSIONER DIAZ: So it is kind of a first cut at --

DR. MORRISON: Well, I would say well beyond a first cut. I think we have done the first cut. This is trying to get down into a better understanding of the issues and what are the prospects of being able to answer some of the questions through additional research.

DR. BOULETTE: Okay, next slide, please, materials and engineering.

[Slide.]

DR. BOULETTE: The committee does express a concern with the long-term availability of radiation damaged testing facilities in the country and I think the concern is obvious.

There is a concern expressed on the part of the committee that there may be a better coordinated effort to determine the requirements of a database for PRA for the -- for the ability to do PRA analyses to pressurized thermal shock events. There is a typo there; that "and" should be

"for" or "of", either one.

Basically what we are looking at is, how do you incorporate the results of PTS event into PRA analyses and the inadequate database that currently exists and we flagged that as a concern.

Finally, in this area, there is a growing concern for how the NRC will address the possible growth of high-level waste sites in the country. As the industry and the NRC and the country tries to resolve this issue, we believe, the committee believes, there is potential for this -- the solution to grow to more than just one site at Yucca Mountain and, given that potential, we are encouraging that not only the expertise be maintained but that resources be looked at very carefully in that area to make sure that the NRC can respond to that.

Questions on this area at all?

CHAIRMAN JACKSON: Commissioner Rogers?

COMMISSIONER ROGERS: No, just that I think it is lamentable that we are getting down to one reactor in the United States that can be suitably used for material studies of radiation damage in the civilian sector and that even that one looks like it's on shaky ground.

DR. MORRISON: It seems to be on very shaky grounds. In fact, just before the committee met, in fact, last week or the week before last we received a letter from

the University of Michigan and through the Vice President of Research and Development at the university, they are taking another look at this question of whether they should maintain the Ford Research Nuclear Reactor as an operating facility. And we are in the process of trying to prepare a response to their request and strongly urge them to keep it operating because it is the only one that we have available for irradiation of the kinds of material samples that we need to irradiate.

There is, of course, the advanced test reactor out at Idaho but there is some question of how much longer the Navy will sustain that under the Naval Reactors Program and that is not quite as flexible a facility for our use as the one at the university is.

CHAIRMAN JACKSON: My understanding is there is a joint NRC/DOE working group looking at this issue. What is the status and what are they actually doing?

DR. MORRISON: Well, if it is the working group that I am thinking of, it is broader than just this issue. We are trying to look at what are the core capabilities within the national labs that need to be maintained that are of interest to both parties. I have a draft report on my desk. I assume that the final report is going to be available for publication within about a month.

Tom?

MR. KING: Yes.

DR. MORRISON: About a month? So that that report will be available.

CHAIRMAN JACKSON: That report will be making specific recommendations?

DR. MORRISON: Yes, they are making specific recommendations, first of all, on the kinds of capabilities that need to be maintained. They will not go so far as to recommend which laboratory should be maintained if there are more than one laboratory that have that kind of capability. Haven't gone quite to that depth. So it is sort of in between the very specific and the needs in areas that are common to both of us.

Research reactors were one of the topics in that report.

COMMISSIONER ROGERS: Have we tried to put together a kind of inventory of possible research reactors worldwide that we might be able to turn to if a U.S.

capability disappears?

DR. MORRISON: Yes, such an inventory is available and, in fact, one of those is at Halden, which we are using now.

CHAIRMAN JACKSON: Commissioner Dicus?

COMMISSIONER DICUS: In your June '96 report, it was indicated that a representative from NEI made several

comments about the NRC research program which were not particularly complimentary. I think such things as "lacks effective management oversight" that some programs may have outlived their usefulness and the research should be better coordinated with the industry.

So I've got a series of questions regarding that. We could maybe wipe them all out with the first one.

Does the committee agree with what the NEI said?

DR. BOULETTE: To some extent. I think some members of the committee have voiced similar concerns in the past and in particular in the area of how much use the research arm of the NRC is making of information that exists within the industry.

It has always been, and I am probably overstating this and Dave can help me out here, it has been an issue on the committee as to what kind of separation is required between the NRC's confirmatory research arm and the industry and it is not infrequent for a committee member to raise that point, not only in hardware research but in software research. You know, why do we have to have different families of codes, et cetera, et cetera.

So I think that Mr. Simard expresses concern probably a bit more vocally than some of us would have but, at the same time, there is at least on the part of some of the committee members some truth to some of what he was

saying.

Dr. Morrison, do you agree?

DR. MORRISON: Yes, I think it is a fair statement.

COMMISSIONER DICUS: Okay.

You had mentioned then a couple of the programs in particular. So were the statements, and I guess my next question was whether the statements were generic or really very program specific?

DR. BOULETTE: I think more generic than program specific. I am sure that if Ron had been pushed, he might have been able to give some examples, thermal hydraulics, for example. There are some folks in the industry who believe that there is enough progress made in that area.

In light of some of the recent issues that we have been facing and some of the new things coming out of high burn-up fuels and what have you, I think some of us would reconsider that position. It was not too long ago that some of us in the industry thought there had been enough research done on steam-generated tube ruptures and with Maine Yankee's recent event a year-and-a-half ago, I think some of us would reconsider that too.

COMMISSIONER DICUS: What do you think should be done to try to resolve industry's concerns about the research programs?

DR. BOULETTE: This is another issue that Dave and I have talked about and worked on in the last couple years. I think we need to get them more involved with what is actually going on in the research arm of the NRC and we have over the last year-and-a-half or so been trying to get them involved in the light water reactor safety presentations and events that will be happening in October.

When the Towers-Perrin report came out about a year ago, I guess it is now, one of the issues that came out of that report -- this was, by the way, in some sort of an industry assessment of the effectiveness of the NRC, et cetera, et cetera, one of these that came out was the real strong lack of understanding on the part of the nuclear power industry as to research, what it does and why it does it. I think a very large number of executives hardly knew that this even existed, let alone what it was about.

So that is a big part of what we are trying to do, to make sure that the industry knows more about what's going on so that their judgments may be a bit more sound.

CHAIRMAN JACKSON: It would be fair to ask Dr. Morrison for his comments.

DR. BOULETTE: I think so.

DR. MORRISON: I'll try to keep my comments in a

positive vein.

I think there has been considerable progress since

the Towers-Perrin report has come out and that was almost two years ago, October of '94 that that report was published. One of the efforts, certainly, that is under way is the periodic meeting that Mr. Taylor convenes with the senior management staff of the NRC and the NEI also comes in with their senior management. And research is a topic of discussion at each of those meetings, so it is on the agenda, at least it is brought up periodically to them.

The same thing happened in a meeting at INPO a couple weeks ago. We have periodic meetings again with NRC's senior management and INPO's senior management. Research was on the topic there, so at least two major arms of industry that are involved in topics that are of relevance to our research program are being at least made aware of these activities on a regular basis.

I think that most of the presentation that NEI made at the NSRC meeting had its basis in the Towers-Perrin report and in the reports from the Inspector General that date back several years on the research program. So I would say he was building his comments on outdated information. I wouldn't go so far as to say we have corrected all of those deficiencies but we are moving in the direction of doing that.

I believe that our outreach program is starting to have some success. It is -- as Dr. Boulette mentioned, last

year, I think, was the first year in many years we had had utility participation in a water reactor safety meeting and you, Chairman Jackson, in that introductory address, were followed by two utility executives that were there talking about the annealing program.

This year, we have asked Commissioner Rogers to give the keynote address and participate in a panel again with two senior utility executives dealing with the role of research and performance-based regulation, so I think that is starting to set the ball moving.

There will be a second plenary session where we are trying to deal with the role of research in a regulatory agency. I have asked for support from NEI in that session and we are still trying to identify the right individual within NEI, so that will be moving along.

It has been a disappointment that our showcase for research has been that meeting and there has been very limited utility participation over, I would say, the last five to ten years in it. So they received the invitations but they don't take them -- or avail themselves of the opportunity for two or three days to see what's immediately going on and rather date back into some earlier published information.

COMMISSIONER DICUS: One more question and a real quick comment.

The other question has to do with are there some areas of research that you think the NRC should be involved in which we are currently not doing?

DR. BOULETTE: We have looked to that question for a good year-and-a-half now fairly deliberately and I think the answer, straight answer is, no. There may be some areas where we can reshape it so that some issues can be closed, et cetera. But I think the committees we have put together were put together with the intent of trying to cover the entire scope of research and make sure everything was done so nothing really stands out. I'm speaking for the committee.

COMMISSIONER DICUS: Good. And a final comment, I would encourage communication, dialogue between your committee and the ACRS. I think that would be very important. You seem to have consistent concerns and I think it would be useful.

DR. BOULETTE: Thank you, we agree.

CHAIRMAN JACKSON: Commissioner Diaz.

COMMISSIONER DIAZ: It seemed to me like it was such a long time ago that I was doing research on radiation damage that I probably was in kindergarten if I tell you how long ago it was.

Is there -- and maybe you both can answer this -- is there an updated database that shows time-dependent,

dose-dependent experiments data, you know, radiation damage and safety significant systems that we can access in

determining what is missing or what has been done, because I haven't seen it?

DR. MORRISON: Well, there is a database relating to the components that are in the primary system and particularly the pressure vessel and the internal components. It is hard to tell exactly from that what is missing or what more needs to be acquired.

It would seem that over the years, as our understanding of the problem grows, the understanding of the uncertainty also grows. One can look at the Russian data, for example, on reactor pressure vessels and you find out that the composition of material has a large amount of phosphorous, which is -- seems to be a major factor determining the performance of those vessels. Within the U.S. vessels, it gets down into the copper and nickel concentration with lack of phosphorous so you've got two databases, not necessarily the same, obviously complementary in terms of trying to understand the mechanisms of the radiation damage.

COMMISSIONER DIAZ: Are we also talking of instrumentation when we are talking about the materials? You know, are we talking of qualifying instrumentation for radiation damage?

DR. MORRISON: Well, we are initiating a program that was stimulated by Chairman Jackson's request to determine is there a nondestructive evaluation technique through which one can measure the material's properties directly rather than indirectly as the measurements made now through surveillance samples? And so we are initiating that program. In fact, sometime later this fall we are inviting anyone who has a technique to come, use that technique to measure the materials properties of a suite of irradiated materials and well-characterized materials that we have from vessels.

COMMISSIONER DIAZ: Yes, it might be a good idea to prepare a matrix that shows what is it that we actually know, because that certainly will be a guidance document for the future.

DR. MORRISON: Fine. We will be pleased to get additional information on that for you.

CHAIRMAN JACKSON: Well, I thank you very much Doctors Boulette and Morrison for a very informative briefing. I don't need to tell you that our research program must provide and is designed to provide a strong, independent technical capability for our regulatory programs and so the Commission appreciates the committee's efforts in this regard.

I would encourage you and your committee to

continue to work with the staff to push for resolution of these issues and concerns that you've raised. I also note that we appreciate the timeliness of recent briefings as opposed to the long delays that we have seen and sometimes experienced in the past.

In further closing, let me just reiterate a few of the points that commissioners have made. I think the issue of ACRS, NSRRC interaction and complementarily is an important one because you are obviously dealing with similar issues and that is a way to ensure consistency of how these issues are viewed.

Secondly, Commissioner Rogers raised the issue of what aspects of human factors can be factored -- can be tackled within a PRA context and that, I think, in and of itself, is an important question but I think it actually leads in a derivative fashion to the following kind of issue and that is I think with a committee like yours made up with the kind of expertise that it has, there is an opportunity to perhaps address these things or help the staff address them with a higher degree of specificity because there is a lot of discussion, for instance, in the human factors area about difficulties.

But in the end, the human factors, aspects of plant operations are there. They are probably predominant in a certain sense. But the issue becomes, how does one

make progress and in this case within a PRA context? And so unless one can begin to break off pieces and illuminate or help the staff illuminate what aspects can be really dealt with realistically and what can't, it's very difficult to make progress.

So I encourage you, not only with respect to this particular question but with respect to all of the kinds of

issues that you raised in the various areas to try to help in that regard. I think particularly in the PRA area where, at least, my perception is that there is some struggling going on.

And I think you raised a good issue which the Commission is already beginning to discus having to do with site-specific application of safety goals, both from a public policy point of view, but it also is going to be informed by the status of the development of PRA methodology and so it is important to try to come to some understanding of what the current limitations are or what fundamental limitations would have to be overcome in the application of PRA methodology to having site-specific safety goals.

So, again, it is that kind of thing in terms of not just discussing it at large but really where one can make progress on the regulatory front and I thank you again.

If my fellow commissioners have no further comments, then we are adjourned.

[Whereupon, at 2:53 p.m., the meeting was concluded.]