

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Title: **MEETING WITH CHAIRMAN OF NUCLEAR
SAFETY RESEARCH REVIEW COMMITTEE
(NSRRC) - PUBLIC MEETING**

Location: **Rockville, Maryland**

Date: **Wednesday, March 27, 1996**

Pages: **1 - 41**

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2 NUCLEAR REGULATORY COMMISSION

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4 MEETING WITH CHAIRMAN OF NUCLEAR
5 SAFETY RESEARCH REVIEW COMMITTEE (NSRRC)

6 - - -

7 PUBLIC MEETING

8
9 Nuclear Regulatory Commission
10 One White Flint North
11 Rockville, Maryland

12
13 Wednesday, March 27, 1996

14
15 The Commission met in open session, pursuant to
16 notice, at 10:30 a.m., Shirley A. Jackson, Chairman,
17 presiding.

18
19 COMMISSIONERS PRESENT:

20 SHIRLEY A. JACKSON, Chairman of the Commission
21 KENNETH C. ROGERS, Commissioner
22 GRETA J. DICUS, Commissioner

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1 STAFF PRESENT:

2 JOHN C. HOYLE, Secretary of the Commission

3 KAREN D. CYR, General Counsel

4 PRESENTERS:

5 E. THOMAS BOULETTE, Chairman, Nuclear Safety
6 Research Review Committee

7 DAVID L. MORRISON, Director, Office of Nuclear
8 Regulatory Research

9 JAMES MILHOAN, Deputy Executive Director for
10 Nuclear Reactor Regulation, Regional Operations
11 and Research

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P R O C E E D I N G S

1
2 CHAIRMAN JACKSON: Good morning, ladies and
3 gentlemen. I am pleased to welcome Dr. E. Thomas Boulette,
4 Chairman of the Nuclear Safety Research Review Committee,
5 Mr. Jim Milhoan, and Dr. David L. Morrison, Director of the
6 Office of Nuclear Regulatory Research.

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

13 Today's meeting will focus on the recent
14 activities of the committee and the staff's response to the
15 NSRRC review and comments.

16 The Commission appreciates the efforts made by
17 this committee and its reviews of research programs that
18 support important safety issues. Today's briefing will
19 provide a broad overview of many of the programmatic
20 activities of the Office of Research. These activities, as
21 I understand it, include radionuclide transport in the
22 environment, aging, human factors, and instrumentation and
23 control, severe accidents, and thermal hydraulics.

24 I understand that copies of the committee's report
25 to the Office of Director of Research are available at the

1 entrances to this room.

2 Do other Commissioners have any opening comments?

3 COMMISSIONER DICUS: No, thank you.

4 COMMISSIONER ROGERS: No.

5 CHAIRMAN JACKSON: Dr. Morrison, you may proceed,
6 or Mr. Milhoan.

7 MR. MILHOAN: That's fine. I think you stated the
8 purpose of the meeting, Madam Chairman. So I will ask Dave
9 to go ahead and start our discussion.

10 MR. MORRISON: We are certainly pleased to meet
11 with the Commission today. The previous meeting that the
12 NSRRC had with the Commission was back in July. Ed Kintner
13 was then Chairman of the NSRRC. He retired from the
14 committee as well as the chairmanship. So Dr. Boulette has
15 taken over.

16 Due to scheduling conflicts, we weren't able to
17 schedule a meeting with you after our September meeting, but
18 since the subject of both the September and the January
19 meeting were so similar, this seemed to be a reasonable time
20 to have a discussion with the Commission.

21 [Slide.]

22 MR. MORRISON: I have on the first viewgraph, or
23 the second page in your handout, a brief overview of the
24 NSRRC. Since this is your first time meeting with us,
25 Commissioner Dicus, I thought you might like a little

1 background. I won't go into it too much.

2 The committee was established in 1987. That was
3 based upon a report that the National Academy of Sciences
4 published in 1986. The broad subject of that report was
5 revitalizing nuclear safety research. Robert Frosh from
6 General Motors was the chairman of that committee and it was
7 a rather distinguished committee.

8 The study had been requested at that time by the
9 then Chairman Joe Palladino to take a look at the NRC
10 research program and what is the future role of NRC's
11 research program in the agency. So going back about ten
12 years is the history of the committee.

13 Prior to the establishment of the NSRRC, the only
14 oversight of the research activities was done by a
15 subcommittee of the ACRS. Since the NSRRC has been formed,
16 the ACRS has only been meeting with me and other people at
17 the office occasionally. So it hasn't been a thorough
18 review that they have been doing. They have more or less
19 turned all the responsibilities over to the NSRRC.

20 The committee can have up to 12 members. We are
21 one or two below that number now. These are individuals
22 that have expertise in all the disciplines that are
23 important to our program. It is generally a good balance
24 between representatives from academia and representatives
25 from industry. I think we are roughly half and half right

1 now on the committee.

2 The committee generally schedules two full
3 committee meetings per year, but to get into the details of
4 the research program there are a number of subcommittees
5 that are established on the various topical areas. The
6 subcommittees meet perhaps once or twice a year to dig into
7 the issues in more detail.

8 According to the regulations that the committee
9 has put on itself, the subcommittee reports do not stand on
10 their own until they are discussed and reviewed and accepted
11 by the full committee. So there is sort of a check and
12 balance in there.

13 I would like to turn to the two meetings in
14 question, the September and January meetings. Both of these
15 meetings were set up to respond to a letter that Mr. Sol
16 Burstein sent to Dr. Boulette. When Sol retired from the
17 committee he had a lot of good questions that needed to be
18 answered, and in his own inimitable manner, he posed these
19 rather forcefully to Dr. Boulette. We set up at least a
20 September meeting to respond to those questions.

21 Also at the September meeting it was an
22 opportunity to introduce three new members of the committee,
23 Professor Bankoff, Mr. John Taylor, and Professor Christine
24 Mitchell, to the research programs. We tried to provide a
25 broad overview of the program at that meeting, addressing a

1 number of the topics at a fairly high level. The result of
2 that meeting was a greater interest on the committee of
3 getting into the details of the research program.

4 At the September meeting we did not have the
5 FY-1996 budget. It happened to be an open meeting, so
6 everything that we were talking about was against the
7 FY-1995 program that we had underway and the general changes
8 that we were going to make in the current fiscal year.

9 At that meeting I raised the key issues that were
10 facing not only the agency but the Office of Research as
11 well as the declining budgets, how we were going to plan and
12 prioritize within these declining budgets, and the overall
13 staff reduction goals that we had to meet over a five-year
14 period. Those were sort of the general criteria that were
15 laid out for the committee to take a view of our research
16 program.

17 At the January meeting we had a closed meeting
18 where we could get into the details on the plans for 1996
19 against the 1996 budget at that time as well as to look at
20 some of the out years of where we would go. I think this
21 was quite useful from the committee's standpoint as well as
22 the staff's standpoint.

23 We also got into a greater detailed discussion of
24 the research. Prior to that meeting we had broken down the
25 eight areas which you mentioned, Chairman Jackson, in the

1 introduction into 50 research topics and addressed the
2 topics in quite a bit of detail within the staff.

3 At the meeting there were in each of these eight
4 areas two to four of these topics presented. So the
5 committee had the opportunity to look at the details and the
6 procedures that we were following and attempt to set
7 priorities and look out into the future.

8 We also had the opportunity at the January meeting
9 for Mr. Jim Taylor to address the committee and give his
10 views of what directions he saw the agency would be going
11 and how he viewed the research program within the agency's
12 mission.

13 That is the general background of the two
14 meetings. I was trying to, from my perspective, get the
15 insights and recommendations from the people that are
16 representative on the committee, and I think they have given
17 us some sound advice. So I will turn it over to Tom
18 Boulette to discuss the recommendations that the committee
19 has made.

20 Tom

21 MR. BOULETTE: I should preambule my comments by
22 saying most of the committee is new in membership. I was
23 trying to reflect as Dave was talking in terms of who has
24 been there more than a couple of years. There are only a
25 couple of us. One of the issues, and we will probably

1 allude to it as we go through our comments, is a general
2 understanding of what the role of the committee is. In
3 fact, in Sol Burstein's letter to me six to nine months ago
4 that was one of the leading questions: Should this
5 committee exist? What's its role?

6 You may hear some confusing remarks relative to
7 that because the membership is new. In fact, Dr. Morrison
8 and myself have spoken a couple of times as to the views
9 expressed by the some of the committee members in terms of
10 are they talking about research and its role, or are they
11 talking about the nuclear industry itself and who they are
12 representing. Those things will come through my comments, I
13 believe.

14 [Slide.]

15 MR. BOULETTE: We have enumerated the major
16 comments on the last slide in the package, and I can walk
17 through those rather briefly and invite questions or
18 comments as we go.

19 One of the concerns that was expressed by many of
20 the members, and it is focused principally because of the
21 budgetary constraints that the agency is facing now, is the
22 need for a long-term view in research. There is a concern
23 that as we continue to squeeze the budgets and the resources
24 available that will be the first thing to go. The members
25 have expressed some real concern about that and in fact have

1 identified some examples of why they are concerned.

2 The steam generator tube degradation process at
3 Maine Yankee was a good example of the need to continue to
4 try to anticipate some issues that may be coming down and
5 depending on the staff to identify those areas that may not
6 have direct applicability right now but in the long-term
7 view may serve the agency very well. We did debate that at
8 some length, and in fact some of us even tried to quantify
9 what we mean by a certain portion of the research should be
10 focused on long-term views. Dr. Morrison has responded to
11 that.

12 There is a question on exactly what is meant by
13 risk-informed, performance-based regulation and how that
14 might impact the research program. We have in fact made, I
15 think, some sort of a commitment to the committee members to
16 have a fairly detailed presentation on that in the June
17 meeting coming up on the 27th or 28th of June.

18 I am convinced that the membership around the
19 table has very different opinions and definitions of that
20 term. I happen to be the only member on the committee that
21 is utility based at this point in time. My views are
22 probably at odds with some of the professors. I don't know.
23 At odds may be a strong statement, but clearly I think I may
24 be seeing the world a bit differently than some of the
25 others. On the other hand, I think there is very little

1 unanimity on what that really means.

2 So I think it is important that we hear more about
3 that and what the NRC means by that in some detail, and then
4 we will be able to, I think, more formally and more
5 deliberately try to address the research needs in that area.

6 COMMISSIONER ROGERS: Excuse me. Didn't one of
7 you say today that the committee was roughly half and half
8 something and something else? What is this balance that you
9 referred to a little earlier if you are the only one that
10 comes from the industry?

11 MR. MORRISON: I raised the point. Dr. Boulette
12 is right. He is the only one that is active in one of the
13 utilities that is operating nuclear power plants. We have
14 John Taylor, for example, who just retired from EPRI, and I
15 kind of put him in industry. We have Sumio Yukawa, who
16 basically came from General Electric. Those are the people
17 I put in the "industry" category.

18 MR. BOULETTE: Sol Burstein, for example, was a
19 retired exec from the utility business. But there is
20 nothing like being intimately involved on a day to day basis
21 to color your view of what research ought to be and what the
22 NRC should be about. That was the only point I was making.
23 And many of the other members are from academia and
24 laboratories.

25 Another issue that we did spend some time talking

1 about, and I think I speak for the committee at large,
2 probably unanimously, is a concern that we have in terms of
3 the reduction of emphasis on high level waste, trying to
4 separate my views as a utility person and trying to remain a
5 bit objective about this. This is viewed on the part of
6 many members of the committee as the issue facing the
7 nuclear power industry, and clearly if there is to be some
8 sort of solution to this, the NRC will more than likely have
9 a major role in that whole process. So anything that
10 impacts on the ongoing efforts in that area concerns the
11 committee significantly.

12 CHAIRMAN JACKSON: We do have the Center for
13 Nuclear Waste Regulatory Analysis in San Antonio. So I'm
14 not sure I understand what you mean when you speak of
15 reduction of high level waste.

16 MR. BOULETTE: I think we are talking principally
17 of the in-house capabilities and the budgetary resources
18 committed to that effort. It's our sense that some of those
19 numbers are going to be decreasing this year and the next
20 couple of years.

21 CHAIRMAN JACKSON: Resources devoted in research
22 or resources devoted overall?

23 MR. BOULETTE: In research. We understand the
24 commitment to the center, but we are concerned as to whether
25 that is adequate or not.

1 CHAIRMAN JACKSON: You are concerned as to its
2 adequacy from the point of view of whether the Center is
3 adequate or the support for the center is adequate?

4 MR. BOULETTE: Support for the center.

5 CHAIRMAN JACKSON: Thank you.

6 MR. BOULETTE: The next item is one that has been
7 raised for a couple of meetings and in fact predates
8 yourself, Dr. Jackson, and that is an issue that Ed Kintner
9 was quite vocal about, the need as we see it to look at the
10 human factors and I&C in a more integrated fashion. Ed was
11 a champion of that. I know Commissioner Rogers has some
12 interest in that whole area. We understand that there is a
13 lot of research being done in both areas separately, and we
14 are concerned as to whether there shouldn't be a more
15 integrated approach to that.

16 There have been some changes in the program in the
17 last several years that address our specific concern, but we
18 will continue to delve into that to make sure that we are
19 comfortable with where that is going.

20 Finally, some of the more traditional areas that
21 have been on the plate for many years warrant some
22 additional attention because of where the industry is going.
23 Increasingly the industry is looking at longer and longer
24 fuel cycles. We at Boston Edison, for example, have a
25 program going with MIT right now looking at four-year cycles

1 and longer, which calls for longer burnup, et cetera, and
2 then some different phenomena occurring between fuel and
3 cladding, et cetera. There is a need to maintain the
4 expertise to be able to respond to some of those changes in
5 the operating practices of the nuclear power plants.

6 We do share a concern, and we have expressed it a
7 couple of times, as to the maintenance of the computer codes
8 and the modeling that traditionally has been done by
9 contractors at laboratories which will be shared by the
10 staff at this point in time. That, in our view, requires a
11 training program, a refocusing of the staff and its skills
12 and competencies in a slightly different direction.
13 Although that is clearly doable, it does pose another
14 problem for Dr. Morrison to manage. We have expressed that
15 concern also.

16 That pretty much summarizes where the committee is
17 at. We do acknowledge that the subcommittees as they get
18 into these various areas may raise more issues. We expect
19 that to happen. We are very sensitive to the budgetary
20 constraints and want to make sure that we serve Dr. Morrison
21 appropriately by helping him to prioritize all of the task
22 forces and task groups and task areas that he is trying to
23 manage given the fact that like everybody else the dollars
24 are going down.

25 CHAIRMAN JACKSON: Let me ask you a couple of

1 questions. With respect to human factors and I&C, can you
2 provide a little more specificity with what aspects or what
3 areas you feel need more integration, what may be missing?

4 MR. BOULETTE: I think it was in our report. One
5 of the suggestions we made to Dr. Morrison is probably a
6 more deliberate approach to actually looking at a control
7 room or a work station in a plant and looking at not only
8 the hardware and the software present in that facility
9 separate from the operators who interface that facility, but
10 looking at the combination of the two. It is our view that
11 some other industries do that very deliberately. The
12 aviation industry, for example, does a lot of human factors
13 and controls and instrumentation kinds of assessments. That
14 is kind of the focus of our concern: Should there be a more
15 deliberate focus on the actual interfacing of these two
16 functional areas?

17 CHAIRMAN JACKSON: Do you feel that has
18 implication for some of the backfitting that certain plants
19 are doing with digital control systems?

20 MR. BOULETTE: That is part of the issue. I think
21 another larger issue is implications on safety specifically,
22 and there are probably quite a few questions that will come
23 out of that endeavor, if we go down that road, that should
24 be focused on and may shape the research program.

25 CHAIRMAN JACKSON: Down the road of?

1 MR. BOULETTE: Of integration of these two
2 functions and looking at them holistically.

3 CHAIRMAN JACKSON: The staff is working on a
4 standard review plan having to do with digital controls. Do
5 you feel that your concerns have implications for the
6 development of that?

7 MR. BOULETTE: I think so, yes. Again, it's in
8 the lines of the aging issue. You don't really know quite
9 what you are going to get into until you really start to
10 open those doors. We are concerned that the two doors have
11 been opened separately and probably there should be a bit
12 more focus on opening them together and seeing what issues
13 may come out of that.

14 CHAIRMAN JACKSON: Is the committee giving any
15 thought to how it might help define what some of the broad
16 range of issues are, where that kind of integration is
17 really necessary?

18 One can talk broadly about it, but in terms of
19 designing an actual research program or creating priorities
20 as well as having it inform other aspects of our regulatory
21 program, such as the development of the standard review plan
22 in this area, it is important to have a better sense of the
23 whole human factors area, human-machine interaction, et
24 cetera. It's a huge area. The question is, what are the
25 critical aspects of it from a safety and a regulatory

1 viewpoint?

2 MR. BOULETTE: I will ask Steve to add to this,
3 but one of the principal reasons that we got Christine on
4 board on this committee is her strong expertise in that
5 area. She has already expressed some concerns that, let
6 alone the NRC and the research arm of the NRC, the nuclear
7 industry itself, in her view, has not paid nearly as much
8 attention to this integrated approach as other industries
9 have. She has a broad based experience. That certainly
10 makes her uncomfortable with the fact that there is not
11 enough activity there.

12 I think they have appointed her as chairman of the
13 Human Factors and I&C subcommittee. I suspect that is what
14 she will be driving at over the next couple of months, to
15 try to define more what those concerns are and what the
16 possibilities are and the potentials are for how it may
17 impact on the research program of the NRC.

18 CHAIRMAN JACKSON: Commissioner Rogers.

19 COMMISSIONER ROGERS: I have so many things I am
20 interested in I don't think we have time to delve into them
21 all. Just a couple of questions to begin with.

22 In your report on the September 25th and 26th
23 meeting -- I think that is it -- there is a statement.
24 Let's see if I can give you a page. I guess it is page 2,
25 if you have that handy. Near the bottom. "Tom King

1 provided a brief discussion on several areas within the PRA
2 program. The Committee expressed some concerns as to the
3 probability for adequately-defined key parameters for input
4 to the process of methods developments. In addition,
5 several sub-areas (organizational factors, equipment aging,
6 and digital I&C) were viewed as having relatively low
7 success probabilities given the projected monetary and
8 timing budgets."

9 I wonder what the thinking there was about the
10 relatively low success probabilities comment. I'm not sure
11 where that came from, whether that is a committee view or
12 whatever, but it is in your report. I think at the
13 Commission level over the years we have had a great deal of
14 uncertainty with respect to how valuable research in
15 organizational factors might be. That has always been a big
16 question, how to deal with that. That is a very big area.
17 Lots of difficulties in measuring things, and so on and so
18 forth.

19 On the other hand, equipment aging and digital I&C
20 are prime areas, I would think, for research success
21 probabilities. Maybe I&C has got some difficulties in
22 reliability measurements and things of this sort because of
23 the different nature of digital systems, but equipment aging
24 certainly doesn't.

25 I was wondering if you could explain a little bit

1 the thinking behind that paragraph.

2 MR. BOULETTE: Let me try, and again I will invite
3 Dave to add to that since he is president of all of our
4 meetings. I think we lumped these areas together for the
5 same reason, and that is that there is a sense of vagueness
6 to all the three areas in terms of what exactly are we
7 focusing on. It relates to your question, Chairman Jackson,
8 that until you really can define the problem, it gets very
9 difficult to try to address a solution. In the area of
10 digital I&C, I think one of the issues there is, relating
11 back to our previous discussion, do you look at digital I&C
12 in and of itself? Do you look at its interface with human
13 factors?

14 There is a vagueness, it is my sense -- I think I
15 am reflecting the committee's view -- to all three of those
16 programs. For example, thermal hydraulics. I think there
17 is a real good sense of what the issues are and what is
18 going on. You have all of the equations, and what have you.
19 So you have a sense of what you are doing. In these three
20 areas it is sort of like roping some new baskets and some
21 new research areas. That is a concern.

22 CHAIRMAN JACKSON: Is the vagueness there because
23 the expertise is not there or there hasn't been sufficient
24 time to formulate coherent programs? Or is it money? Those
25 are different questions.

1 MR. BOULETTE: I think it's the latter. I think
2 it's the newness of the issues. It hasn't been too long
3 that we have been talking about aging issues. It probably
4 started in the realm of Yankee Rowe, for example, as we got
5 into licensing. I think that is really the issue. Many of
6 the other research efforts that are underway are 20 and 25
7 and 30 years old. These are all relatively new.

8 CHAIRMAN JACKSON: How does money impact it? That
9 is really what I am trying to understand.

10 MR. BOULETTE: I think the money part or the
11 budgetary part forces you to try to focus quickly, to get to
12 the more important issues, and when you do that, because the
13 scope is so broad and so vague, you might focus in a
14 slightly wrong direction. With unlimited funds you tackle
15 them all. You hire up and off you go. That is the concern
16 I think that has been reflected here. In the areas of
17 aging, what subsets of the aging issue should you focus on?
18 Because you can't tackle it all.

19 CHAIRMAN JACKSON: Dr. Morrison looks like he
20 wants to say something.

21 MR. MORRISON: I would comment that there were
22 three items mentioned, as you identified there, Commissioner
23 Rogers, the organizational factors, equipment aging and
24 digital I&C. Unfortunately that is kind of a mix of apples
25 and oranges.

1 COMMISSIONER ROGERS: Is it ever.

2 MR. MORRISON: I think one of the concerns that we
3 have had in the past, and that probably goes back several
4 years now, is in the organizational factors area. Several
5 approaches we have tried from a research standpoint to get
6 our hands around the organizational factors have not yielded
7 us anything.

8 The other side of the coin there is how far should
9 NRC go looking into the organizational issues, which are
10 really the purview of the industry. They are the ones that
11 are staffing and managing the plants. So there is a dilemma
12 that we kind of face. We haven't been terribly successful
13 in the research to date, but I think we have a few things
14 coming down the path now that look a little brighter than
15 they did a couple years ago.

16 Timing is more the issue than money. I think we
17 could find the money available. If there were a good idea
18 out there to fund, we would reprogram money.

19 The equipment aging is more tied to, is the
20 database really adequate? We know a lot about the equipment
21 that is being replaced, and we assume that if you replace an
22 active component that you almost go back to square one with
23 regard to the reliability.

24 On the other hand, if you have an active component
25 that has been there 30 years, do you still have the same

1 performance expectations?

2 I don't think we have a good handle on that. This
3 is showing up now in what we are taking a look at, just
4 beginning to talk about, structuring a program that looks at
5 the aging of structures per se. They were built with
6 quality design criteria in mind. Obviously they had good
7 margins when they were originally built, but 30 or 40 years
8 later, if you are subject to a different kind of stress or
9 subject to a stress, say a seismic loading, do you still
10 have that margin available? There is a database lacking
11 there that you can really factor in, especially to an IPEEE,
12 what the likely response would be.

13 The digital I&C area. The environment in which
14 some of these systems have to operate is different in a
15 nuclear power plant than you find in many of the other
16 applications of digital I&C. Perhaps some in the chemical
17 industry process controls have the same harsh environments
18 of temperature, pressure, humidity, and that sort of thing,
19 but in a nuclear power plant you have a lot different
20 environments, plus the radiation and other effects in there
21 that you don't normally have. The general reliability data
22 is a good indicator of what is likely to happen, but I think
23 we would feel more comfortable if we had additional data,
24 and there just isn't enough information out there yet.
25 There aren't enough of these digital backfits put into

1 plants to give us a warm feeling.

2 COMMISSIONER ROGERS: That is my understanding of
3 the characterization of these areas that you have made, but
4 I have a little trouble with the statement "having
5 relatively low success probabilities." I would certainly
6 accept a view that organizational factor research has a
7 relatively low success probability under any circumstances,
8 money or no money.

9 On the other hand, equipment aging is clearly very
10 much on our plates and very important. It seems to me that
11 it has got to have a relatively high success probability.
12 We can't accept it as something having relatively low
13 success probability, because that would tell us then that we
14 shouldn't do anything in that area, and it seems to me we
15 have to do something in that area.

16 It is just a question of what actions one should
17 take based on the characterization of these three areas as
18 having relatively low success probabilities. Even with
19 limited funding one then has to focus, as you have said.
20 There are important issues. I think that we have to be able
21 to defend what we are doing as having some relatively good
22 success probability. Otherwise I think we are really in
23 trouble in devoting very scarce resources to anything that
24 has a relatively low success probability.

25 I am just taking the words very literally. I

1 think that maybe some elaboration on your thinking there and
2 what you pointed out, Dr. Morrison, that we really have to
3 start to learn how to characterize these areas in some way
4 that we can begin to make some progress, that is all part of
5 the RES activities here at NRC.

6 MR. MORRISON: On the top of page 3 of my response
7 to the committee's letter I address many of those same
8 comments that you have just made. I think it says that we
9 need to have considerably more discussion with the
10 committee. That will probably happen through the
11 subcommittee. I think there are some meetings scheduled in
12 May for the various subcommittees. The Human Factors and
13 I&C Subcommittee will get together and that is a good time
14 to discuss this in more detail.

15 MR. BOULETTE: If I could add a comment. I don't
16 believe that the subcommittee was implying that the
17 initiatives in research in those areas would not be
18 fruitful. It's a question of whether it addresses the
19 entire scope of the problem. I think we are satisfied that
20 the actions taken by Research in the defined areas, in these
21 three areas are well done and well managed, and what have
22 you. The question is, because of issues that are relatively
23 new, and the timing, and what have you, is that scope broad
24 enough to catch all of the issues?

25 COMMISSIONER ROGERS: I would hope in the future

1 maybe you will be able to clarify exactly what your concerns
2 were there. I think that can be very helpful as we go back
3 and look at these comments: What are we doing with them?
4 How are we following them?

5 It does seem to me that the integration of human
6 factors and digital I&C research is very important, but it
7 suffers from the fact that classically these are not
8 academically linked together. The folks that do human
9 factors research and the people that do I&C digital research
10 usually are in different parts of the university; they don't
11 talk to each other. Yet we know this is where they have to
12 come together. So there is that problem of bringing
13 together human factors people and hardware people, if you
14 want, in this area. Unfortunately, that is hampered, I
15 think, by a kind of mindset of academic classification of
16 areas of interest that doesn't link these two together.

17 MR. MORRISON: We are hoping that Professor
18 Mitchell brings that kind of focus back to the committee.
19 Professor Woods from Ohio State was on the committee
20 earlier. We have had about a two-year gap without a good
21 human factors/digital I&C person. Woods had that focus, and
22 Christine Mitchell comes from sort of the same mold in that.

23 COMMISSIONER ROGERS: There are a few places that
24 have recognized the importance of linking those two
25 together, and it is very important, but I think there is a

1 hurdle to get over here in that the backgrounds of people
2 that can contribute to this very often come from very
3 different parts of the academic spectrum.

4 MR. BOULETTE: But we shouldn't miss the point. I
5 think the point the committee was trying to make in this
6 area was that in some other industries integration of these
7 two functions seems to be taking place and being done well.
8 So I wouldn't want to scapegoat on academia, to say that
9 because of academia this is not happening. In the aviation
10 industry it is working very well.

11 CHAIRMAN JACKSON: I agree with you, Dr. Boulette.
12 [Laughter.]

13 MR. BOULETTE: Thank you.

14 COMMISSIONER ROGERS: I'm happy to say it's
15 academia. I spent 30 years there and I know where all the
16 dirty linen is.

17 [Laughter.]

18 MR. BOULETTE: It is working in some places.

19 COMMISSIONER ROGERS: At any rate, I do think that
20 is a bit of the problem.

21 You have used some words in your report that I
22 wanted to understand a little bit better, and that was
23 "regulator basis," where you felt there was a regulatory
24 basis that exists or that didn't exist. I wasn't quite sure
25 what you were saying when you used that term. It seemed to

1 me that one could interpret it in several different ways. I
2 don't know if I can put my finger on the use of it here
3 directly, but perhaps you know what I am talking about.

4 MR. BOULETTE: I don't, but I am scanning it
5 quickly. One of the difficulties of being a chairman of a
6 committee is that the report is written to reflect the views
7 of everybody. It's a difficult position to be in, because
8 as an individual I may not totally share that view.

9 COMMISSIONER ROGERS: It was a term that was used
10 a couple of times in here. It seemed to me that it perhaps
11 meant that we had some strength at NRC in this area, and
12 that was what you meant by a regulatory basis. Or maybe you
13 meant something totally different. I am sorry that I didn't
14 highlight it here, because I thought it might be something
15 that would be right on the top of your thinking. We may
16 have to pass that over.

17 MR. BOULETTE: It is not generating any reaction
18 on my part.

19 COMMISSIONER ROGERS: I'll have to go back at it
20 later then, because I don't want to delay everything.

21 MR. BOULETTE: At the risk of going down the wrong
22 alley, one of the things that has been expressed by this
23 committee as well as previous committees is in fact the
24 relationship between the various parts of the NRC in terms
25 of communications and what have you.

1 MR. MORRISON: I found it. It is on the very last
2 page of the handout. It is from the September meeting.
3 It's the top of page 2. It's limited technical bases.

4 COMMISSIONER ROGERS: Yes, it was the September
5 report in which you at the bottom of page 1 said,
6 "Specifically, some areas have ongoing substantial R&D
7 efforts by the industry and the DOE and have strong
8 regulatory bases. Examples are severe accidents,
9 containment performance, reactor aging, et cetera. The
10 Committee recommends that opportunities to reduce efforts in
11 these areas be further seriously explored."

12 That is really what I was trying to get at. What
13 did you mean by "strong regulatory bases"? Did that mean
14 that you have an effort ongoing here? We are the regulatory
15 outfit. DOE is not and industry is not. Did you mean that
16 there is enough going on combined in industry and DOE and
17 NRC that these areas should be reduced? What is the message
18 there? I just didn't understand it.

19 "The Committee recommends that opportunities to
20 reduce efforts in these areas be further seriously
21 explored." Are you advocating reduction, or are you saying
22 watch out, don't reduce? What is the message there about
23 those areas, severe accidents, containment performance,
24 reactor aging?

25 MR. BOULETTE: Let me caveat this with I'll review

1 the question later, and if my recollection changes, I will
2 address it at some further meeting.

3 COMMISSIONER ROGERS: Sure.

4 MR. BOULETTE: One of the concerns that we have
5 expressed at several committee meetings is how effectively
6 is the research arm of the NRC using the information that
7 comes out of other agencies and other organizations,
8 including industry, to form a base of technical data that
9 could be used to reduce the need for further research.

10 COMMISSIONER ROGERS: You are talking about a sort
11 of codification for regulatory purposes, a sort of database
12 in some cases, a knowledge base that is identified, defined
13 and structured. Is that what you are talking about?

14 MR. BOULETTE: It's along those lines. Is there
15 enough effort on the part of NRC Research to look at other
16 organizations, say in the geological investigations? Other
17 entities are doing this worldwide as well as within this
18 country. The concern, I believe, at least part of it, was
19 are we taking advantage of those other databases, these
20 other resources effectively, and if we did, might that not
21 reduce the pressure on the specific agency for conducting
22 research?

23 COMMISSIONER ROGERS: I think there are some
24 important thoughts here that maybe we need to explore
25 further.

1 I want to make sure I don't monopolize everything,
2 but I've got a lot of things I want to hear about today.
3 I'm happy to give up and go back, if we can.

4 CHAIRMAN JACKSON: We will pass the token back
5 around.

6 Commissioner Dicus.

7 COMMISSIONER DICUS: Do you receive the reports
8 and correspondence from the other advisory committees?

9 MR. BOULETTE: Such as ACRS?

10 COMMISSIONER DICUS: Yes.

11 MR. BOULETTE: Not on a routine basis. They are
12 made available to us if we request them, or if Dave may see
13 an issue that he thinks should come to our attention, or
14 Jose or somebody like that, and we would get copies of them,
15 yes.

16 COMMISSIONER DICUS: Some of those reports or
17 correspondence will on occasion, I've observed, suggest
18 either a research project or imply perhaps an area of
19 research. I just wondered if you got them, if you had a
20 mechanism in place to review those, and then what sort of
21 review or comment or action you might take on them.

22 MR. BOULETTE: At the risk of putting Dave on the
23 spot, I believe that he and his staff would be sensitive to
24 that and as they run across these topics in his reports he
25 would make them available to us. It has happened in the

1 past.

2 MR. MORRISON: I think that is true. Very often
3 these subjects are brought up, particularly at the
4 subcommittee meeting. I am thinking right now about the
5 thermal hydraulics area since that was one of the most
6 recent reports that ACRS published on the AP-600 and the
7 analyses we were doing in support of that. That happened to
8 be a complimentary one that the program was moving in the
9 right direction with the technical issues. The only
10 question ACRS had was the timing, if we were going to be
11 able to complete it.

12 I suspect if I go back six months to a year ago
13 and look at an ACRS report in the thermal hydraulics area
14 there would have been some real questions about the
15 priorities and what was being done in the research program,
16 and I think we have responded to that, and hence their
17 turnaround.

18 I'm sure the committee probably looked at it back
19 in the early days when the program was sort of stumbling a
20 year or so ago trying to get their hands around the most
21 important issues.

22 MR. BOULETTE: But there is no formal mechanism in
23 place that has all the committee members receiving tons of
24 reports. We sort of depend on Dave and his staff to make
25 sure that these things are caught and we have a chance to

1 review them and integrate them into our assessment of the
2 research program of the NRC.

3 COMMISSIONER DICUS: If I heard you right, I think
4 in one of your comments earlier on you mentioned that on the
5 performance-based, risk-informed concept there seemed to be
6 perhaps a difference of understanding or opinion between the
7 reactor side of the house, the materials side of the house
8 and your committee on what that meant. Did I hear you
9 right? If so, what is the core difference? I was sort of
10 curious about that.

11 MR. BOULETTE: When you are a licensee like myself
12 and you undergo routine inspections, your views of
13 risk-informed, performance-based regulations are certainly
14 very different from Mike Golay's views, who is a professor
15 at MIT. I think what I was trying to say there is it is
16 very important for the committee to hear some sort of a
17 consolidated presentation on this and get the NRC's views.
18 We can argue it out.

19 I know that one of the concerns that Dave and I
20 have is, where are these committee members coming from?
21 Sometimes they sound like proponents for the nuclear power
22 industry, and what we are really after is assessing the
23 NRC's research program to see if it is focused properly and
24 it is done to the extent it should be done.

25 That is the only point I was trying to make, that

1 we come from different places when we look at that statement
2 and we interpret it differently, and as we do that, we may
3 have different views as to what kind of research should be
4 done and which way it should go.

5 Does that help to answer your questions?

6 COMMISSIONER DICUS: I was still curious about
7 what a difference is, though. I don't think I got that
8 answer.

9 CHAIRMAN JACKSON: Maybe you could put that on for
10 an answer for the next time. Perhaps this can come after
11 you have some input from the NRC.

12 MR. BOULETTE: As a part of the response, my focus
13 is on performance-based. Mike Golay, whose background is
14 PRA and those kind of things, his focus would be on
15 risk-informed. I am sure that if we wrote a brief thesis on
16 this statement it would be biased in those two directions
17 because of where we are coming from.

18 CHAIRMAN JACKSON: I think the Commissioner is
19 also interested in whether there is a difference of opinion
20 between those who have operated in reactor space versus
21 other nuclear licensees.

22 MR. BOULETTE: I believe the answer is yes, but we
23 will amplify on that. It's a good question. We know that
24 we have to dig into that area.

25 CHAIRMAN JACKSON: I have a follow-on question for

1 you. This doesn't really relate to that. I note that the
2 committee expressed some concerns over the longer term
3 viability of the national laboratories. The question is,
4 why did that come up specifically within the context of this
5 committee?

6 MR. BOULETTE: I think probably because the
7 majority of the members have either strong affiliations with
8 those laboratories or have a history of having been there.
9 I spent 12 years at national labs, and in spite of how
10 objective you try to be when you look at the needs of an
11 agency like the NRC and the research arm, it is still
12 disturbing to me that some of the technology and some of the
13 expertise that used to exist at Hanford Labs in Washington
14 State is decaying away and dying.

15 Dave points out to me, and rightly so, that the
16 impact of NRC research on the long-term viability of the
17 labs is minimal, is very, very small. But I think the
18 committee as a whole are concerned from a national
19 standpoint that the expertise and the brain power and the
20 creativity is decaying. And it is.

21 I am almost regretting that the comment was in the
22 report, but it was something that was spoken to by several
23 members and I felt compelled to put it in there.

24 CHAIRMAN JACKSON: I too may have a broader based
25 public policy concern about maintaining various kinds of

1 skills and levels of expertise in various parts of our
2 economy and society. However, from where I sit here I have
3 a parochial view in terms of asking you to address the
4 question from the perspective of the relevance to NRC's
5 regulatory needs and its interface with or impact on our
6 ability to do the kind of research that we need to do. I
7 think that is the kind of question your answer to which I
8 think would be helpful not only to Dr. Morrison but to the
9 Commission.

10 MR. MORRISON: I should step up and take blame for
11 raising the issue with the committee, because I have great
12 concern about the research program as some of the
13 capabilities in the laboratory disappear, or if we, NRC,
14 have to pay for the whole capability. That's an issue that
15 I have under discussion with DOE right now.

16 One of the areas, for example, is if we need a hot
17 cell, which we do, to look at steam generator tubes we pull
18 from service or look at some of the irradiated vessel
19 samples that we get. As long as DOE is using that facility,
20 I only pay my share. If I have to pay for the whole
21 facility, I probably won't be able to do that kind of work.
22 It's just too expensive to maintain a hot cell facility. And
23 there are other things that get into that.

24 I think I was the one that probably raised the
25 issue and then it got broadened in the discussion of what

1 about the whole future of the labs. The committee members
2 are certainly aware of what is happening to DOE's budget.

3 MR. BOULETTE: That is one side of the coin. As
4 the resources diminish, support in these laboratories and
5 the expertise disappears as well. The fast breeder program
6 that we had back in the 1960s and early 1970s, even though
7 there is still some activity going on there, it is pretty
8 much gone. That was my beginning. You are hearing some
9 frustration on the part of people who remember the good old
10 days.

11 CHAIRMAN JACKSON: Those of us who live in the
12 real world have to try to deal with these things.

13 I will pass the token back around. Commissioner
14 Rogers.

15 COMMISSIONER ROGERS: Thank you.

16 I think that your comment that most of the
17 committee members are new is something that needs some
18 focus. It is my view that research at NRC plays a somewhat
19 different role from research in most other organizations.
20 To be most valuable to us, the committee has to really
21 understand how research should be used at NRC and how it
22 should be integrated into our total program.

23 I think that is going to take some time. You
24 don't automatically come with that understanding when you
25 come from industry or from academia or from a national lab.

1 How to sort out the features of research which are important
2 for regulatory decision-making is a complicated business
3 that comes from experience in working in the area.

4 I think one of the values that the committee
5 brings is, of course, the external view and experience from
6 outside of NRC. On the other hand, it has to try to
7 understand how those views and areas of expertise can in
8 fact be most useful to us here for regulatory
9 decision-making purposes. That means you have to understand
10 something about how regulation takes place and how it
11 actually works. That is only going to come with time. I
12 don't think there is a crash course in that.

13 I am just urging the committee to somehow try to
14 educate itself in how we have to use the results of research
15 and how they can be most effectively used and integrated
16 into our regulatory decision-making, because that is why we
17 have research here at NRC. I would urge you to try to take
18 some steps in that direction. I don't know how, but I think
19 Dr. Morrison can assist in this.

20 MR. BOULETTE: One of the things we might consider
21 is rotation of these individuals. I haven't spoken to Dave
22 about this, but I'm sure it occurs to him as well. When I
23 look at the list of the membership, there are only two or
24 three of us who have been on the committee for more than two
25 years. In fact, probably a year and a half. I think that

1 is just the way it fell out, because we weren't conscious
2 about that concern.

3 I think if we think about this in the future,
4 rather than rotate out nine members at a time and bring in
5 over the course of five or six months nine new members, we
6 might be a bit more deliberate about it and make sure there
7 is more continuity.

8 You are absolutely right. I've been in the
9 commercial power business for 15 years. It was still a
10 steep learning curve for me when I came on board the
11 committee.

12 COMMISSIONER ROGERS: I think one of the things is
13 your perception of how well we are integrating research
14 activities into our regulatory decision-making. I think
15 that your following that from the research end is very
16 important and can be very useful to us. I would just urge
17 you to think not only about the truly technical aspects of
18 research at NRC but how it actually links and can serve a
19 useful purpose here.

20 Many of us have research backgrounds and we
21 understand research in the classical sense, but I certainly
22 have come to the view that at NRC there is something more
23 involved than what one normally thinks of as research in a
24 national laboratory or in an industrial laboratory or in a
25 university. It has a unique quality. With resources as

1 scarce as they are, I think we have to make sure that we are
2 getting as much as we possibly can from our investment in
3 what we call research in that respect.

4 MR. MORRISON: I have two brief comments. It has
5 been my experience in being on the committee and observing
6 it now that it takes an individual about two years to get up
7 to speed on the committee. If they go to the full six years
8 that they are allowed, we have got four very productive
9 years.

10 I tried something at this last January meeting,
11 which is the first time in my recollection we even briefed
12 that subject, which was what we do in the Office of Research
13 in regulation development. All of the rules, reg guides and
14 all of that sort of thing essentially get their origins
15 within the Office of Research. That was a very difficult
16 concept for the committee to understand. In fact there were
17 some comments in the report from the committee on that.
18 Mainly, why should that function be there?

19 It is there and I have to address it as part of my
20 responsibilities, but it is a very integral one that fits
21 into all the rest of the activities of the agency.

22 COMMISSIONER ROGERS: I think there is a general
23 lack of understanding of why NRC should be doing research of
24 any kind in this town. You don't have to go very far away
25 from here to find that question asked. Why do you do

1 research? Do you do research? Why should you be doing
2 research?

3 There is an assumption about what that word
4 "research" means. For us it has a very special meaning and
5 a very special importance that I think is not appreciated
6 outside the agency. I think we have to understand it very
7 well and be able to support and defend what we know to be
8 the importance of research at NRC, and it means really
9 understanding how it does support the regulatory efforts.

10 MR. BOULETTE: I think you may remember the Towers
11 report that came out about a year ago.

12 COMMISSIONER ROGERS: I think I heard of it, yes.

13 MR. BOULETTE: One of the things that came out of
14 that report was the strong lack of understanding on the part
15 of the utility executives that even a research arm existed
16 let alone what it might be doing. We have talked about that
17 on the committee several times. In fact, we are inviting
18 some industry representation to our next meeting not only to
19 impress upon the committee the utilities' concerns but to
20 try to indoctrinate the utility as to what happens at these
21 meetings, what they are about. So it's a serious issue.

22 CHAIRMAN JACKSON: I want to thank Drs. Boulette
23 and Morrison and Mr. Milhoan for a very informative
24 briefing. As Commissioner Rogers has said, our research
25 program must provide a strong, independent technical

1 capability for our regulatory programs. As such, the
2 Commission appreciates what your committee does in this
3 regard. I encourage you, Dr. Boulette and the committee, to
4 continue to work with the staff to resolve issues but also
5 to focus in on a number of the comments that Commissioner
6 Rogers has made.

7 I also appreciate the timeliness of having this
8 briefing now as opposed to a four to six month delay. It is
9 consistent with my perspective about timeliness in all we
10 do. We are trying to not have these undue delays between
11 the committees' deliberations and meetings where we hear the
12 results of those.

13 Do my fellow Commissioners have any further
14 questions or comments before we close?

15 COMMISSIONER ROGERS: No, thank you.

16 COMMISSIONER DICUS: No.

17 CHAIRMAN JACKSON: We stand adjourned.

18 [Whereupon at 11:30 a.m. the meeting was
19 adjourned.]

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CERTIFICATE

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

TITLE OF MEETING: MEETING WITH CHAIRMAN OF NUCLEAR
SAFETY RESEARCH REVIEW COMMITTEE
(NSRRC) - PUBLIC MEETING

PLACE OF MEETING: Rockville, Maryland

DATE OF MEETING: Wednesday, March 27, 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: Michael Paulus

Reporter: Michael Paulus



REPORT ON NSRRC MEETINGS
September 25-26, 1995, and January 25-26, 1996

David L. Morrison
Director, Office of Nuclear Regulatory Research

E. Thomas Boulette
Chairman, Nuclear Safety Research Review Committee

March 27, 1996

ROLE OF THE NSRRC

- **Established in accordance with the Federal Advisory Committee Act in 1987**
- **Membership: up to 12 individuals with expertise in the range of disciplines relevant to nuclear safety research**
- **Scope: provide advice to the Director of the Office of Nuclear Regulatory Research, and through him the Commission, on matters of overall management importance in the direction of NRC's program of nuclear safety research**
- **Operations**
 - **Full committee usually meets twice per year**
 - **Subcommittees meet 1-2 times per year**

AGENDA ITEMS - SEPTEMBER AND JANUARY MEETINGS

- **Role of research within NRC**
- **Overview of NRC research program**
 - **Mission requirements**
 - **User needs**
 - **Exploratory research**
 - **Budget outlook**
 - **Plans and priorities**
 - **Research areas**
 - **Contractors**
 - **RES staff**
- **NSRRC insights and recommendations**

NSRRC FINDINGS AND RECOMMENDATIONS

- **Need for a long-term view**
- **Expand research in support of the implementation of risk-informed, performance-based regulation**
- **Concern over the reduction of high-level waste research**
- **Need for a wholly integrated human factors and I&C digital research program**
- **Require expertise for thermal-hydraulic and severe-accident code development and maintenance as dictated by changes in reactor performance and operations**

BRIEFING PACKAGE

MEETING WITH THE NUCLEAR SAFETY RESEARCH REVIEW COMMITTEE

March 27, 1996 10:30 - 12:00

CONTENTS:

- **Scheduling Notes**
- **NSRRC Member List**
- **NSRRC Charter**
- **September 25-26, 1995 and January 25-26, 1996 NSRRC Meetings: Committee Reports and Staff Responses**

SCHEDULING NOTES

Title: Meeting with the Nuclear Safety Research Review Committee
(NSRRC)

Scheduled: 10:30 a.m., Wednesday, March 27, 1996 (PUBLIC)

Duration: Approximately 1-1/2 hours

Participants: E. Thomas Boulette
NSRRC Chairman

David L. Morrison, Director
Office of Nuclear Regulatory Research

Document: Briefing package due 3/20

MARCH 1996

NUCLEAR SAFETY RESEARCH REVIEW COMMITTEE (NSRRC)

Dr. E. T. Boulette, NSRRC Chairman
Sr. Vice-President, Nuclear Operations
and Station Director, Pilgrim Station
Boston Edison Co.

Dr. S. George Bankoff
Professor of Chemical and Mechanical Engineering (Emeritus)
Northwestern University

Professor Anthony J. Baratta
Professor, Department of Nuclear Engineering
Pennsylvania State University

Professor Michael W. Golay
Professor of Nuclear Engineering
M. I. T.

Professor Robert D. Hatcher, Jr.
Professor, Department of Geological Sciences
University of Tennessee

Professor Charles Mayo
Associate Professor of Nuclear Engineering
and Director, Nuclear Reactor Program
North Carolina State University

Professor Christine M. Mitchell
Professor, School of Industrial and Systems Engineering
Center for Human-Machine Systems Research
Georgia Institute of Technology

Professor Fred J. Molz, III
Westinghouse Professor
Environmental Systems Engineering Department

Mr. John Taylor
Vice President, EPRI (retired)

Dr. Richard C. Vogel
Sr. Scientific Advisor, EPRI (retired)

Dr. Sumio Yukawa
Consultant (metallic materials, components)

NUCLEAR REGULATORY COMMISSION
RENEWAL OF CHARTER FOR NUCLEAR
SAFETY RESEARCH REVIEW COMMITTEE

AGENCY: Nuclear Regulatory Commission

ACTION: Notice of Renewal of the Nuclear Safety Research Review Committee.

SUMMARY: The Nuclear Safety Research Review Committee was established by the Nuclear Regulatory Commission as a Federal Advisory Committee in February 1988 to provide advice to the Director, Office of Nuclear Regulatory Research, on matters relating to NRC's nuclear safety research programs. The committee is composed of experts capable of providing a wide variety of technical and managerial viewpoints drawn from industrial national laboratory, university and not-for-profit research organizations.

In accordance with the Federal Advisory Committee Act (Pub. L. 92-463), and after consultation with the General Services Administration, the Nuclear Regulatory Commission has determined that there is a continuing need for the Nuclear Safety Research Review Committee and that renewal of the committee for a two year period beginning February 9, 1996 is in the public interest.

FOR FURTHER INFORMATION CONTACT: Dr. Jose Cortez, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, (301) 415-6596.

Date: February 9, 1996



Andrew L. Bates
Advisory Committee Management Officer

NUCLEAR REGULATORY COMMISSION

CHARTER

NUCLEAR SAFETY RESEARCH REVIEW COMMITTEE

1. Committee's Official Designation

NRC Nuclear Safety Research Review Committee (NSRRC)

2. Committee's Objectives, Scope of Activities, and Duties

On a continuing basis, NSRRC will provide advice to the Director of the Office of Nuclear Regulatory Research and through him the Commission, on matters of overall management importance in the direction of the NRC's program of nuclear safety research. Matters requiring NSRRC's attention will be posed by the Commission by the Director of the Research Office, or as an outcome of prior NSRRC deliberations. Nuclear safety research is understood to encompass technical investigations of the implications for public health and safety of the peaceful uses of atomic energy and the reduction of those investigations to regulatory practice.

NSRRC activities will include assessment of and recommendations concerning:

- a. Conformance of the NRC nuclear safety research program to the NRC Philosophy of Nuclear Regulatory Research, as stated in the Commission's Strategic Plan, and to specific Commission directions.
- b. Likelihood of the program meeting the needs of the users of research.
- c. Appropriateness of the longer range research programs and the correctness of their direction.
- d. Whether the best people are doing the work at the best places; whether there are other options, including cooperative programs, that would yield higher quality work, or otherwise improve program efficiency.
- e. Whether the program is free of obvious bias, and whether the research products have been given adequate, unbiased peer review.

In addition, NSRRC will conduct specialized studies when requested by the Commission or the Director of the Office of Nuclear Regulatory Research. If appropriate, these studies will be published as reports.

3. Time Period Necessary for the Commission to Carry Out its Purpose

In view of the goals and purposes of the Committee, it is expected to be continuing in nature.

4. Official to whom this Committee Reports

The Director of the Office of Nuclear Regulatory Research and, as appropriate, through the Director to the Commission.

5. Agency Responsible for Providing Necessary Support for this Committee

Nuclear Regulatory Commission. Within the Commission, support will be furnished by the Office of Nuclear Regulatory Research.

6. Description of Duties for which the Committee is Responsible

The duties of the NSRRC are solely advisory and are stated in paragraph 2, above.

7. Estimated Annual Operating Costs in Dollars and Man-Years

\$185,000; 0.8 person-year.

8. Estimated Number and Frequency of Committee Meetings

The Committee will meet at such times and places as it deems necessary, but not less than once a year. Subcommittees may meet as deemed necessary to achieve their assigned tasks.

9. Committee's Termination Date

Two years from the filing date, subject to renewal by the Commission. See also, paragraph 3 above.

10. Members

- a. Committee members, including the Chairperson, shall be appointed by the Commission following nomination by the Director of the Office of Nuclear Regulatory Research.
- b. Approximate number of Committee members: 9 to 12.
- c. Members will be chosen to ensure an appropriately balanced representation of the research management community, taking into account: (1) demonstrated experience in high-level management of programs in

applied research; (2) demonstrated expertise in one or more disciplines of applied science and engineering; (3) broad acquaintance with the public health and safety issues associated with the peaceful uses of atomic energy, and (4) a balance of experience in the academic, industrial, and national and not-for-profit laboratory environments.

11. Date of Filing:

February 9, 1954.

Andrew L. Bates

Advisory Committee Management Officer

NSRRC MEETING: COMMITTEE REPORT AND STAFF RESPONSE

JANUARY 25-26, 1996



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 28, 1996

Dr. E. Thomas Boulette, Chairman
Nuclear Safety Research Review Committee
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Dr. Boulette:

I am responding to the revised final copy of the NSRRC meeting minutes, "Report on the NSRRC Meeting, January 25-26, 1996," that was sent to me by facsimile on February 14, 1996. My comments are divided in two groups: first, there are some substantive comments on the concerns and recommendations expressed by the NSRRC; and second, there are some factual corrections that should be made in the Report.

Substantive Issues

RES and the Committee are in agreement that "some research with a longer-term view is a necessary element of the agency's program." In FY 1996 approximately 15% of the research budget is devoted to exploratory research, i.e., research exploring issues of an anticipatory nature with potential safety significance. While this percentage is at the lower end of the desirable range for longer range research, it is acceptable to me during a period when RES must remain responsive to short-term regulatory needs while downsizing the overall research program.

At the bottom of the first page of the Report, the NSRRC "recommended that a significant portion of our next meeting should be devoted to the clarification of" the shift of the agency to risk-informed, performance-based regulations. It is not clear from the report whether the Committee's interest is in the regulatory process or in the implications of this process on the research program. If the emphasis is to be on the regulatory process, I remind the Committee that its charter is research and not the regulatory process. NSRRC can add value to the agency's activities by focusing its attention to the implications of the shift on the research program. The NRC's Advisory Committee on Reactor Safeguards (ACRS) has a broader purview, and has had extensive discussions of risk-informed regulation. The subject of PRA and its use in the regulatory decision-making process is a part of the ACRS agenda on March 8.

At the top of page 2, the Committee "expressed some concern for the longer-term viability of the national laboratories." While I share this concern, NRC has little influence over the future of the national laboratories as a whole. NRC funding of national laboratories represents only a very small portion of their total budgets. Through our research planning process and in coordination with DOE we are attempting to identify the expertise and experimental facilities at given laboratories that are critical to our current and anticipated research needs. To the extent that we can, we are structuring our research program to maintain these capabilities. In some cases, however, NRC does not have sufficient resources to maintain the full range of capabilities that we have used in the past and has focused on other sources such as collaborative international programs.

I believe RES has taken "a deliberate approach...to integrate as much as possible the various program tasks, thereby eliminating possible redundancies and inefficiencies." Each project and task has been scrutinized by Division and Office management, and a review of the program at the research topic level was held with the Deputy Executive Director for Nuclear Reactor Regulation, Regional Operations and Research, the Controller, and the user offices on February 22.

Rulemaking is a distinct function of the NRC that has been assigned to RES. Funding for rulemaking would follow this function regardless of its organizational location. Additional funds would not be available for research even if the rulemaking function were not assigned to the Office of Nuclear Regulatory Research (RES). NSRRC focus may be better directed to the effectiveness of the research program in support of rulemaking.

NSRRC expressed "some concern...with what seems to be a de-emphasis on the high-level waste area." The decrease in budget that the agency has received for high-level waste is a fact-of-life change that has been dictated by Congress. Adjustments were made by the agency to focus on the highest priority activities within the available funds and as a result, future RES efforts in high-level waste are being terminated.

Funding for human factors and I&C is projected to remain constant through FY 2000 at approximately \$4-million per year. This funding level is sufficient to respond to requests from the user offices. In FY 1998 and beyond, about half of this budget is to be used for exploratory research. Our plans for this exploratory research include assessing empirical human performance data to determine measures of human performance that can be used in future assessments and improve investigations of root causes of human error (in an integrated manner). In addition, we are developing technical bases and guidance in the I&C area that considers the total system (hardware, software, human). Regarding simulation of control rooms and other work stations, it is the industry's responsibility to demonstrate the adequacy of their control room/control station designs. In addition, it is not practical for NRC to simulate control rooms and work stations considering the need for qualified operators and the many variations in design that would need to be considered. NRC does, however, have access to studies on an advanced control room design through the Halden Project, which provides qualitative insights and information on safety issues associated with an advanced design.

The areas identified for improved PRA methods development are those where known deficiencies exist in current models or where there are large uncertainties due to lack of analytical methods. Not all of the areas identified for methods development have the same likelihood of success, as was discussed with the Committee; these are not necessarily due to budget and timing, but rather to the difficulty of quantifying the effects of such factors as organizational influence and aging. Also, for new technologies (like digital I&C) failure modes and reliability data are not sufficient for a good empirical data base. Although obtaining the data is part of our program, the degree of success is yet to be determined. When initial work is completed in these areas, the usefulness and need for additional funds or time can be assessed.

The U.S. funded PRA work (training and trial application) on the Kalinin Power Station and the Kola Power Station, both VVER-1000 plants in Russia is being led by NRC and DOE, respectively. NRC and DOE are coordinating and sharing information on these programs. For example, the PRA procedure guides developed under the NRC program for use in training the Russian participants were recently given to DOE for use in their program. It is expected that other information and experience useful to both programs will also be shared.

Our plans in both severe accidents and thermal-hydraulics provide for maintenance of expertise for code development. This includes maintaining a cadre of code development staff who will assess and improve the codes in light of new experimental data and code applications and also fix problems uncovered by users. New experimental data will be obtained through our participation in cooperative experimental programs (such as RASPLAV and FARO) or through maintaining our own experimental facilities (such as the T/H loops at Purdue and Oregon State Universities). We also plan to maintain our CAMP and CSARP programs which promote feedback from users of our codes.

NSRRC expresses concern with respect to the adaptability and flexibility of the staff to be retrained for significantly different jobs, such as project managers becoming analysts. This is a major concern and considerable management time and attention is being given to the subject. The broad plan for thermal-hydraulics and severe accidents was described in the preceding paragraph. Other areas are under examination. I expect that in some cases, it could take up to five years to make the needed transition for RES to perform analytical work in lieu of contractors. At each step of the transition we will have to seek the balance between contractor and staff efforts to assure the technical quality and credibility of our products.

I appreciate the willingness of the Committee to examine the overall research needs of the NRC and to address what should be done that is not being done. Subcommittees are the appropriate level to address this subject and to focus on the prioritization process.

I believe the NRC does appreciate the needs and pressures on the nuclear power industry. Regularly scheduled meetings are held between the senior management of NEI and the senior management of the NRC. A number of ad-hoc meetings are held as issues arise, and the Commission has requested briefings by NEI on major issues facing the industry. I would be pleased to invite NEI to address

Dr. E. Thomas Boulette

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the NSRRC and to work with you to identify pertinent representatives given the topics of most interest to the Committee.

With regard to the concern expressed by the Committee on insufficient activity in the national/international scene in the area of human factors, I would welcome NSRRC's specific comments on where more interaction should occur. This would seem to be a topic that should be discussed in a subcommittee meeting.

Editorial Comments

Page 1: James Milhoan is the Deputy Executive Director for Nuclear Reactor Regulation, Regional Operations and Research.

In the third paragraph, "RES" should be replaced by "NRC" and the last two lines should be revised to read "an implementation plan for revised NRC operations."

Page 3: In the sixth paragraph, the report to the EDO was made on February 22 and no briefing has been planned for the Commissioners.

In the last paragraph, I believe that the last part of the underlined sentence should read "what should be done that is not being done."

Sincerely,

for Joseph L. Morrison
David L. Morrison, Director
Office of Nuclear Regulatory Research

cc: NSRRC Members

REPORT ON THE NSRRC MEETING January 25-26, 1996

A closed meeting of the Nuclear Safety Research Review Committee (NSRRC) was held in Bethesda, MD, on January 25 and 26, 1996. Present at the meeting were Chairman Boulette and members Baratta, Bankoff, Golay, Mayo, Mitchell, Molz, Taylor, Vogel, and Yukawa. The meeting was also attended by the Director of RES, David Morrison, and members of his staff. The NRC Executive Director for Operations, James Taylor, accompanied by his assistant, James Milhoan, addressed the Committee on the 26th.

The meeting was opened by the Chair with a brief review of the agenda and comments on logistics for the meeting. The Director of RES then reminded the Committee of its requests from the September 1995 meeting for a more in-depth briefing on the various research program areas being supported by RES as well as the process for prioritizing the various programs. These two subject matters constituted the principal objectives of the meeting.

The first presentation was made by Mr. Morrison and addressed current issues of significance to RES. The first issue reviewed by Morrison addressed the content and schedule of the NRC strategic assessment requested by Chairman Jackson. Morrison indicated that the first phase for RES was nearly complete and included a review of all activities (approximately 5,000) being conducted by RES, asking why are they being done and what, in fact, needs to be done. A draft report of the first phase of assessment is to be presented to the Commission in February 1996. The second phase of the assessment is to focus on identifying the external drivers for RES activities and review the responses to these drivers. This phase is expected to be completed in 3-to-6 months, followed by the formation of an implementation plan for the revised RES program.

Committee discussion followed this briefing focusing on the general consensus that research is a must for the agency and that because of current budgetary restraints, a fine balance must be maintained between "proactive" research activities, and activities responding directly to technical needs as the needs are identified. The Committee endorses the position that some research with a longer-term view is a necessary element of the agency's program.

The second current issue discussed by the Director was the subject of risk-informed, performance-based regulations. This was portrayed as a significant shift in operational mode for the Agency, and much discussion ensued as to the meaning of the terms and the implications for RES. It was recommended that a significant portion of our next meeting should be devoted to the clarification of this view of regulations.

Two other "current issues" were discussed; our international research program and the appointment of a new Commissioner Greta Dicus in February. The RES Director continued his opening presentation, with a review of budget projections for 1986 and 1987. As some of the programs are winding down (AP800, some aspects of severe accidents, etc.), the realignment of HLW focus and the "restructuring" of DOE, the Committee expressed some concern for longer-term viability of national laboratories.

There followed a presentation by Lloyd Donnelly on RES' task group evaluation process. The process had as its primary objective, a review of RES' major activities and a prioritization of the top 50 activities. The Committee saw value in the process and suggested that a more in-depth review of these programs should be pursued by the applicable subcommittee of the NSRRC. In addition, the Committee recommends a deliberate approach be undertaken to integrate as much as possible the various program tasks, thereby eliminating possible redundancies and inefficiencies.

Bill Morris then discussed regulation development. Much discussion ensued as to whether rulemaking should reside in RES. The Committee will revisit this issue in light of its possible impact on the RES budget.

Program description presentations were then made in six key research areas. They include radio-nuclide transport in the environment, aging and structured research, human factors and I&C, probabilistic risk assessment, severe accidents, and thermal hydraulics.

The radio-nuclide transport area is intended to preserve some expertise in the waste area with specialized focus on transport in the environment. Some concern was expressed with what seems to be a de-emphasis on the high-level waste area.

In the area of human factors and I&C, the Committee was concerned as to whether enough funding was devoted to this area. The Committee continues to emphasize the need for wholly-integrated approach in this area. Should more complete integration include simulation of control rooms and other work stations?

Tom King provided a brief discussion on several areas within the PRA program. The Committee expressed some concerns as to the probability for adequately-defined key parameters for input to the process of methods development. In addition, several sub-areas (organizational factors, equipment aging, and digital I&C) were viewed as having relatively low success probabilities given the projected monetary and timing budgets.

A briefing was also provided on RES' program support for the Lisbon initiative. This is an international commitment supporting program improvement for the former Soviet Union's VVER-1000 program. The Committee recommends that the DOE be invited to play an active role in this endeavor.

There followed a presentation in the areas of severe accident research and thermal/hydraulics. In both these areas, the Committee's principal concern is the maintenance of expertise for code development as dictated by changes in reactor performance and operations. For example, ever increasing burn-up with longer cycles requires code modeling revision and subsequent validation and verification of the changes.

Following the presentation described above, the EDO reviewed with the Committee the major issues of concern for the NRC in the next few years. This included some discussion of budgetary and staff size constraints anticipated over the next few years. If the NRC is to continue its budget reductions as currently planned, the research program would suffer a disproportionately larger impact than the rest of the agency. The Committee continues to express serious concern with regard to the projected cuts in the RES contract budget, seemingly to preclude staff reductions. The Committee is concerned as to the effectiveness of this approach for managing the budgetary constraints.

The EDO also briefed the Committee on the efforts under way to investigate a regulatory process for the DOE. Some significant activities with which the DOE is involved are the clean-up of waste tanks at several DOE facilities including Hanford, WA; the disposition of Pu stockpiles; and the resolution for tritium production.

The Committee appreciated Jim Taylor's brief on NRC concerns, and we welcome more frequent interactions with the EDO.

Following the EDO's briefing, the Committee convened to summarize its major issues and/or concerns. Also discussed were the current formation of active subcommittees of the NSRRC and the scheduling of future meetings.

In general, the Committee judged the RES program task prioritization process as sound. We were reminded that the product of this prioritization process is a report to the EDO on February 12th, with a briefing to the Commissioners on February 18th.

The recent budgetary constraints in RES are encouraging a changing role for the technical staff. Committee members are concerned as to the adaptability and flexibility of the staff to be retrained for significantly different jobs: e.g., project managers becoming analysts.

Some amplification of the prioritization process would be useful. In particular, what are the overall research needs of the NRC, and what should be done that is being done? Some of the questions and concerns will be addressed at the subcommittee level.

Committee members expressed a deep concern that the NRC does not appreciate the needs and pressures of the nuclear power industry. It was suggested that the Nuclear Energy Institute address the Committee in the very near future.

We are concerned that the NRC as well as the nuclear power industry are not active enough in the national/international scene in the area of human factors. The Committee continues to encourage more emphasis on human factors and I&C.

A concern was expressed in the thermal hydraulics area for the apparent lack of ability to deal with low pressure, low temperature events. The Director indicated that the emphasis was there and further briefing would be available.

The remainder of the meeting focused on subcommittee definition and assignments. The next NSRRC meeting is tentatively scheduled for June 13-14, 1986.

A meeting with the Commissioners is scheduled for March 27, 1986. The RES Director and the Chair of the NSRRC will present.

Meeting was adjourned at 1540.

NSRRC MEETING: COMMITTEE REPORT AND STAFF RESPONSE

SEPTEMBER 25-26, 1995



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

January 22, 1996

Mr. E. Thomas Boulette
Senior Vice President, Nuclear
Pilgrim Station
Boston Edison Company
600 Rocky Hill Road
Plymouth, MA 02360

Dear Mr. Boulette:

Thank you for your November 30, 1995, report on the Nuclear Safety Research Review Committee (NSRRC) meeting of September 25 & 26, 1995. The NSRRC raised a number of issues of concern which will serve as a basis for further discussions at the forthcoming meeting of January 25 & 26, 1996. This letter, which addresses the major points in the report, may resolve some of the issues or at least clarify for the Committee some of the activities underway at the NRC which were brought into question.

At the end of September 1995, the President signed the Energy and Water Development Appropriations Bill which included the FY 1996 appropriation for the NRC. As expected, NRC's budget was reduced from \$523.9-million in FY 1995 to \$473.3-million in FY 1996. Through the use of prior year and newly appropriated funds, the funds available for contractor support to the Office of Nuclear Regulatory Research (RES) in FY 1996 will be \$65.3-million compared to the FY 1995 obligations of \$83.8-million, excluding high-level waste research funding. I recognize the Committee's concern with the large reduction in contractor funding, but I am convinced that the staff and I have made judicious choices through assessment of our priorities to retain the essential research activities without compromising the Agency's mission.

In its report, the Committee expressed concerns that priority and emphasis may not be properly placed on the major project plans for the future. The Committee recommended that opportunities be explored to reduce efforts in areas where it considers that a strong regulatory base exists, such as severe accidents, containment performance, and reactor aging. It also recommended that areas such as waste and decommissioning, digital I&C and human interaction, and risk-based regulation development, which the Committee considers to have a limited regulatory basis, be given higher priority and emphasis. While considerable time was devoted to the question of research funding at the September meeting, less time was spent addressing the nature of the research. Further discussion between the NSRRC and the RES staff of both the research content and funding level is warranted to determine if the priority and emphasis within the research program is proper. I have formed three Task Groups within RES to reexamine all of our research areas and our

preliminary findings will be reported at the January meeting. Since special emphasis also is to be given to prioritization at that meeting, I will reserve further detailed comments on the planning process within RES until then. The additional insights from the Committee on priorities and the priority setting process will be useful as we continue this phase of research program planning. The results of research program planning will be subject to further NRC senior management review.

In a parallel effort that is consistent with NRC's decision to meet the Office of Personnel Management's FY 2000 staff reduction targets through attrition rather than a reduction-in-force, I am continuing to address the skills and competency levels that the entire RES technical staff needs to possess in the near term, as well as what will be needed as we move into the 21st century. As a first step, we are examining the work we could bring in-house in FY 1996/1997 (as a result of the budget reduction) and are determining how it meshes with the current work assignments and capabilities of the RES existing staff. Since NRC has no in-house experimental facilities, we are focusing on analytical support efforts. I expect to complete this assessment in February or March 1996, and I may be able to make some preliminary observations at the January meeting.

The Committee commented on the R&D efforts by industry and the Department of Energy (DOE) in the areas of severe accidents, containment performance and reactor aging, where in its view there is a strong regulatory base. My staff has looked at this comment and concludes that while there is some work going on in these areas outside the NRC, the scope and extent of this work is limited and does not in the main fulfill our regulatory needs. For example, the DOE has presently an ongoing Advanced Reactor Severe Accident Program (about \$1.0 million) devoted to the resolution of severe accident issues for the US Advanced Light Water Reactor designs. This program is narrowly focused on the resolution of outstanding issues identified by the NRC in its review of severe accident requirements for evolutionary and passive reactor plants, but it does not address other issues for existing power plants that are of regulatory concern to the NRC.

RES devotes considerable effort to remain cognizant of industry, DOE, and international nuclear safety research and enters into collaborative agreements with various partners when these programs are consistent with our needs. The Meltdown Attack and Coolability Experiments (MACE) program that is being jointly funded by the Electric Power Research Institute, DOE, NRC, and a number of foreign countries is but one example of our collaborative research efforts in the area of severe accidents. An example of collaboration in aging research is NRC's participation in the reactor pressure vessel annealing project with DOE and industry. We are cooperating with NUPEC of Japan in containment performance tests at Sandia, and we are not aware of any other containment research initiative which would duplicate the present efforts.

The NRC conducts periodic meetings with EPRI's Nuclear Power Group to discuss research programs and has concluded that there is presently no duplication of efforts. Such a meeting was held on January 5, 1996, and several areas for

possible collaboration were identified. The next step is to define the conditions for collaboration that will preserve the necessary independence between NRC and industry.

Since the subject of the regulatory base for digital I&C was raised by the NSRRC, I would like to draw attention to NRC Generic Letter 95-02: Use of NUMARC/EPRI Report TR-102348, "Guideline On Licensing Digital Upgrades," In Determining Acceptability Of Performing Analog-To-Digital Replacements Under 10 CFR 50.59, dated April 26, 1995. Although not all technical issues with respect to digital I&C systems have been resolved, the generic letter does provide the basis for approval of digital modifications to operating plants and new advanced reactor digital system designs to meet current safety requirements.

The Committee has a valid concern that research of an exploratory nature could be perceived as being less important than research in response to specific regulatory requirements. Exploratory research has been and should continue to be an important element of the NRC's research program. About 20% of our FY 1995 and FY 1996 funding is for exploratory research. I believe the key to sustaining adequate levels of exploratory research is for RES to provide strong justification for individual programs based on their importance to the future regulatory needs of the agency. We can also justify some exploratory research when it is needed to maintain essential expertise or experimental facilities. In today's budget environment, I do not believe we can successfully defend a "formal and specific contribution of effort" to exploratory work. We can, however, continue to have a sufficient program of exploratory research, if it is well justified.

The Committee also emphasized the need to maintain a certain level of technical expertise on the NRC staff to support sound regulatory decision-making. There are a number of initiatives currently underway or planned that address minimum levels of expertise, which I refer to as "core competencies". The RES Task Groups are now examining core competencies from the perspective of (a) minimal expertise needed and (b) where that expertise should reside, i.e., on the NRC staff and/or in one or more contractor organizations. To obtain insights from some of our primary contractors, I have met with managers from each of the major DOE laboratories to obtain their perspective on their ability to maintain technical expertise in the face of laboratory downsizing. An outcome from these efforts will be a defined set of core competencies and a strategy for achieving and maintaining them. It will also highlight where RES staff members need to enhance their skills and expertise to meet tomorrow's job requirements. Recruiting needs, training, and developmental assignments will be identified and pursued to raise the levels of expertise and enrich jobs.

Mr. E. Thomas Boulette

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I am looking forward to the meeting with the NSRRC in January. The discussion which we had in September, your report and this letter, and the additional resource assessment and planning the we have done within RES collectively provide a rich basis of information for further deliberation at the meeting.

Sincerely,



David L. Morrison, Director
Office of Nuclear Regulatory Research

cc: James M. Taylor, EDO

REPORT ON THE NSRRC MEETING September 25 & 26, 1995

A meeting of the Nuclear Safety Research Review Committee (NSRRC) was held in Rockville, Maryland, on September 25 and 26, 1995. Present at the meeting were Chairman Boulette and Members Bankoff, Burstein, Golay, Mayo, Molz, Uhrig, Vogel, and Yukawa. Two new members yet to be confirmed were also present. They are Christine Mitchell and John Taylor. The meeting was also attended by the Director of RES, David Morrison, and members of his staff.

The meeting was opened with introductory remarks by the Committee Chairman and the Director of RES. The principal objectives of the meeting were to (a) review the Nuclear Regulatory Commission's (NRC) current safety research plans; (b) discuss the nature and the role of regulatory safety research in support of NRC regulatory responsibilities; and (c) discuss the role of NSRRC itself. Made available to the members was documentation on the history of and charter for the NSRRC and also a recent memo from David Morrison to NRC Chairman Jackson. Also available was a recent speech presented by Chairman Jackson to the NRC staff. Dr. Morrison made the first presentation to the Committee reviewing the current major issues facing the NRC. These include (a) the concept of risk-based regulations and its potential impact on the research program; (b) an initiative directed by Chairman Jackson to perform a strategic assessment and re-baselining of the NRC and the very high priority given to this initiative; and (c) the impact of external factors on the role of RES and the NRC, with special emphasis on industry restructuring and its implications for operating nuclear power plants.

Morrison then continued with a briefing on NRC budget issues, with emphasis on the RES budget. He emphasized the major budget reductions (about 30% in FY 96 and about 10% in FY 97) in contractor support for RES. This discussion was supplemented with much details in the major research areas and generated many comments from the Committee members. The Committee expressed serious concern with the approach for budget reductions. Specifically, the Committee is troubled by the large cuts being suggested for contractor support, apparently to avoid a significant reduction-in-force of the NRC Headquarters staff. Such an approach requires significant retraining of individuals and could result in inadequate expertise. The Committee recommends that this budget reduction initiative be re-examined with a reduction-in-force being considered seriously. We believe that such an approach is more compatible with congressional intentions and will help to preserve the research capability and expertise needed to support the NRC in its changing mission.

The Committee also reviewed the major project plans proposed by RES for the near future. The Committee expressed concerns that priority and emphasis may not be properly placed. Specifically, some areas have ongoing substantial R&D efforts by the industry and the DOE and have strong regulatory bases. Examples are severe accidents, containment performance, reactor aging, etc. The Committee recommends that opportunities to reduce efforts

in these areas be further seriously explored. More cooperative efforts with the industry and DOE should be implemented, thereby allowing RES access to significant R&D while minimizing costs. On the other hand, several technical areas have limited regulatory bases; for example, waste and decommissioning, Digital I&C and human interaction and regulation development. The Committee recommends that these are the areas that require the higher priority and emphasis. Much discussion followed on the goals and objectives of the NRC R&D program. It was suggested and agreed to that a meeting in early 1996 be devoted to a comprehensive review of the overall R&D program, with specific emphasis on area prioritization. The key areas to be focused upon include risk-based regulation, Digital I&C, and high-level waste disposition.

The question of driving force for research was discussed at some length. User needs request certainly constituted the principal motivation for the efforts; however, the Committee recommends a more formal and specific contribution of effort be devoted to "exploratory" research. An example given was in the area of steam generator tube cracking. Might not the Commission be more able to respond to the current concerns had more exploratory research been done in this area. In this line, the Committee was also concerned that during severe budget-cutting periods, exploratory research may be the leading victim. The Committee believes that the mission of the NRC would be better served with a hard commitment to some resource dedication to exploratory research.

To summarize the Committee's recommendation regarding the role of research in the NRC's mission, we would emphasize the need to maintain some research capability within the NRC. This ensures the preservation of technical expertise in key areas affecting regulation development and should help answer important questions posed by the staff for which unsatisfactory answers exist.

The other principal objective of the meeting was to discuss the role and usefulness of the NSRRC. The Committee was quite unanimous in the view that independent oversight of the RES program by a group of very experienced and highly-selected individuals was of benefit to the NRC and it should continue. Some concern was expressed regarding the Committee's impact on RES' direction. However, we believe the Committee's role is first and foremost to review the program and offer critical suggestions. It remains for the Director and his staff to review these suggestions and apply them as appropriate. The Committee will continue to function by subcommittee format, with the subcommittee membership to be defined by the Chairman.

The Committee also heard a presentation on a Digital instrumentation and control study performed by a committee of the National Academy of Science. The presentation was given by Christine Mitchell, a new member of the NSRRC. The presentation reviewed the Phase I report of the NAS Committee. The NSRRC expressed concern that more emphasis should be placed upon the timeliness of issue resolution, noting that the need is now. Operating plants are currently retrofitting systems and the regulatory process is hard-pressed to support the changes.

The NSRRC was also given a brief presentation of ethics and conflict of interest.