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NUCLEAR REGULATORY COMMISSION

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

RESEARCH - A LOOK INTO THE FUTURE

PUBLIC MEETING

Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Room 1F-16, Building 1
Rockville, Maryland
Thursday, August 6, 1998

The Commission met in open session, pursuant to notice, at 10:13 a.m., the Honorable Shirley A. Jackson, Chairman, presiding.

COMMISSIONERS PRESENT:

SHIRLEY A. JACKSON, Chairman of the Commission
NILS J. DIAZ, Member of the Commission
EDWARD McGAFFIGAN, JR., Member of the Commission

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1 STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

2 JOHN C. HOYLE, Secretary

3 KAREN D. CYR, General Counsel

4 JOSEPH CALLAN, EDO

5 ASHOK THADANI, NRR

6 LAWRENCE SHAO, RES

7 JOHN CRAIG, RES

8 BRIAN SHERON, NRR

9 MARGARET FEDERLINE, RES

10 TOM KING, RES

11 DR. MALCOLM KNAPP, NMSS

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P R O C E E D I N G S

[10:13 a.m.]

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3 CHAIRMAN JACKSON: Good morning, ladies and
4 gentlemen. I am pleased to welcome members of the NRC Staff
5 to brief the Commission on current research activities, as
6 well as some of its perspectives and plans for the future.

7 The Staff also will discuss how it is positioning
8 itself to meet the many challenges that face the Office of
9 Research as well as the Agency.

10 The goal of the Research program is to provide the
11 independent expertise and technical information that is
12 needed to support our regulatory activities and to help
13 develop background for regulations and guidelines necessary
14 to implement Commission policy.

15 A necessary Research function is ensuring that we
16 have the adequate margin of safety so as to provide
17 protection of the public health and safety. Now with the
18 exception of Mr. Shao, Mr. Lawrence Shao, Research has a
19 relatively new management team in place, new either to the
20 Office of Research or new to their current position, so I
21 would especially like to welcome this new team to this
22 morning's briefing. It's always good to jump in when there
23 are many challenges.

24 Today's briefing will provide an overview of the
25 Research Program and its mission, will highlight the value

1 of Research results to the Agency, will discuss the need for
2 change as well as future program emphasis, and the results
3 of the recent core capabilities assessment.

4 The Commission recently has received an advance
5 copy of an IG report on core research capabilities which was
6 fairly critical, so I would also ask the Staff to provide
7 your preliminary views on the issues -- both the validity of
8 them and for those you feel are valid, you know, what your
9 initial thoughts are -- that have been raised. I understand
10 that copies of the viewgraphs are available at the entrances
11 to the meeting so unless my colleagues have any opening
12 comments they wish to make, Mr. Callan, please proceed.

13 MR. CALLAN: Thank you, Chairman. Good morning,
14 Chairman and Commissioners.

15 Chairman, as you noted, we did receive a copy of
16 the Inspector-General's audit of core capabilities. We
17 received that late yesterday afternoon.

18 CHAIRMAN JACKSON: Yes. Right -- so you spent all
19 night.

20 MR. CALLAN: Yes, we -- right, Chairman, and we
21 are prepared to provide our initial reaction to that audit.

22 As you noted, Chairman, we do have largely a new
23 management team in Research and that management team is led
24 by Ashok Thadani, and he will be introducing his new team,
25 but before I turn the discussion over to Ashok I would also

1 like to introduce the representatives from the two major
2 users or Research's products, two major customers if you
3 will, Dr. Mal Knapp, who is representing NMSS, and Dr. Brian
4 Sheron, representing NRR -- so it's a crowded table but I
5 think everybody has a purpose.

6 CHAIRMAN JACKSON: Not on our side.

7 [Laughter.]

8 MR. CALLAN: Okay. Ashok?

9 MR. THADANI: Thank you, Joe. Good morning.

10 CHAIRMAN JACKSON: Good morning.

11 MR. THADANI: I guess I am partially responsible
12 for this crowd at this end of the table because to me it is
13 very important that a number of us are new to the Office of
14 Research and as you, Chairman, noted that Dr. Shao is the
15 only one who's been Division Director in the Office of
16 Research in the past and continues in that position.

17 I thought it was very important -- Margaret
18 Federline and I have had only limited time with the Office
19 of Research, and I thought it was very important for you to
20 hear directly from people who have been involved and who
21 have some views and who would be crucial in terms of the new
22 direction that we have been talking about, and for them to
23 hear from you directly as well as for you to hear from them
24 directly rather than either from Margaret or from me.

25 May I have Viewgraph Number 2, please?

1 This viewgraphs lists the topics that we will be
2 covering. As we have already said, there have been
3 significant management changes in the Office of Research and
4 not only have their been changes in management but it is
5 clear to us that there are a number of other environmental
6 issues that we have to deal with in this office, and we do
7 have some short-term activities planned as well as thinking
8 in terms of where should we be going in the longer term
9 within the office, and we'll be talking about that.

10 I used to attend a number of meetings where
11 Research had the lead when I was in NRR, just as Brian
12 Sheron is doing now, representing NRR, and I can speak from
13 first-hand experience about the number of past
14 accomplishments by the Office of Research. I think it is
15 important for us to not dwell on them but to recognize these
16 accomplishments, so we will touch on them and I would like
17 for each Division Director then to sort of briefly go
18 through the responsibilities as we go on through this
19 presentation.

20 The Advisory Committee on Reactor Safeguards, as
21 you know, has been looking fairly closely at the Research
22 Program and they have prepared a draft NUREG document, and I
23 think it has some very good thoughts which we would
24 incorporate and I think it will give the Research programs a
25 sharper focus, a better focus, and I think we will be better

1 off with the suggestions that are provided by the Advisory
2 Committee.

3 The Commission recently has also given us
4 recommendations, direction in terms of where Research needs
5 to be more active, play a more active role. Our intention
6 is to do in fact that, and quite frankly I think this
7 Commission direction is going to be one aspect that would
8 lead to I'd say rejuvenating the Research Staff, because
9 there would be more involvement in day-to-day efforts and a
10 better understanding of what the future problems might be as
11 a result of that interaction, so I personally think that
12 that is a very positive change, but that means that we have
13 to work towards it. It requires a fair amount of planning
14 and so on that we'll be getting into.

15 As to the core capabilities, we will be talking
16 about our interaction with the ACRS and while the ACRS
17 letter was very critical, I thought, it appears to me that a
18 number of meetings have taken place since then and we seem
19 to be converging. It is not to say that there aren't
20 differences still, but that we seem to be converging.

21 We will address as part of our presentation our
22 initial reaction to the idea IG report, which I got
23 yesterday afternoon. I have read it and I understand the
24 criticisms, but we will be addressing them, at least our
25 initial reaction to that report.

1 May I have the next viewgraph, please.

2 This chart in my view sort of reflects the changes
3 that we're going through both in terms of -- I'm clearly not
4 going to dwell on the issue of budget and stuff like that,
5 but to say this is the facts of life. This is reality.
6 Looking at these reductions in budget we have to learn from
7 it, learn from our experience and get smarter in terms of
8 utilization of our resources.

9 Because they are so scarce. Not only --

10 COMMISSIONER MCGAFFIGAN: Can I ask a clarifying
11 question?

12 MR. THADANI: Yes.

13 COMMISSIONER MCGAFFIGAN: The dollars on this
14 chart are only for extramural or do they include the two --
15 the 173 FTEs?

16 MR. THADANI: No, the dollars do not include FTEs.
17 These are just program support funds.

18 COMMISSIONER MCGAFFIGAN: So 173 FTE to 100K is
19 another \$17 million?

20 MR. THADANI: That's correct. That's exactly
21 right. Yes. I didn't --

22 CHAIRMAN JACKSON: What percentage of the decrease
23 in the FTEs is attributable to the completion of large
24 experimental programs?

25 MR. THADANI: I am not sure I can answer the FTE

1 reduction, but, certainly, the dollars, if you look at the
2 big programs in the '80s, loft, semi-scale and so on, they
3 were pretty expensive. Those, probably 30-40 percent of the
4 budget was going to those major programs.

5 In the last few years, I'll look to my colleagues
6 to expand on this, but I'll give you my general
7 understanding. Some of the facilities have been closed, for
8 example, work at Sandia National Laboratories in the area of
9 severe accidents has been significantly cut down in terms of
10 experimental work. That's probably not a huge percentage, I
11 don't think.

12 But the big ticket items pretty much are in the
13 area of thermal-hydraulics and severe accidents, and big
14 cuts in 19 -- the activities were complete in the '80s and
15 some additional facilities have been closed down in the
16 '90s. That may be on the order of 10-15-20 percent, but I
17 don't have --

18 CHAIRMAN JACKSON: Well, I guess what I am saying
19 is you are showing this drop here.

20 MR. THADANI: Yes.

21 CHAIRMAN JACKSON: And the question is, what are
22 the activities that have gone with that drop?

23 MR. THADANI: A significant number of activities,
24 experimental program, as I said, in certain severe accident
25 --

1 CHAIRMAN JACKSON: Okay. Because you were
2 speaking of the '80s and this is the '90s.

3 MR. THADANI: No, I was saying severe accidents is
4 '90s.

5 CHAIRMAN JACKSON: Okay.

6 MR. THADANI: That's -- Tom can correct me, and I
7 hope he would, if he has better figures, or we can get the
8 figures for you, but that there have been some facilities
9 that have been closed down, at Sandia in particular in the
10 area of severe accidents. And there might be other
11 facilities, Tom, that you might --

12 MR. KING: I would say in my division alone,
13 probably \$10-\$15 million a year of this reduction was due to
14 terminating experimental programs in thermal-hydraulics and
15 severe accidents.

16 CHAIRMAN JACKSON: I see. And what about the
17 ratio of contractors to in-house staff?

18 MR. THADANI: Again, I would look to people who
19 have longer-term knowledge of research. But, as I
20 understand it, in the last few years, certainly, the
21 in-house work that is being conducted has increased and I
22 have been talking this issue within the office in the last
23 few weeks, as a matter of fact, and it appears to me to be a
24 variable in the three divisions that we have in the office.
25 I would say not a significant increase in terms of in-house

1 work in perhaps Dr. Shao's division, Engineering Technology,
2 to a fairly significant change in the Division of Systems
3 Technology, Tom King's division. I think something on the
4 order of 25 -- 20-25-30 percent, in that range, of the work
5 now is being done in-house in that division. So it is a
6 variable. We are moving in that direction, because it has
7 increased significantly in DSD, for example, the in-house
8 work.

9 CHAIRMAN JACKSON: Before you go further, because
10 I don't see any viewgraph attached -- related to that,
11 although you have it listed, I think it is appropriate for
12 you to introduce for the record the members of the team in
13 their current positions.

14 MR. THADANI: Yes, I will do that right now. Dr.
15 Larry Shao is the Director of Division of Engineering
16 Technology. John Craig, to his right, is Director of
17 Division of Regulatory Analysis. You know Margaret
18 Federline is the Deputy Office Director. And then Tom King
19 is the Director of Division of Systems Technology. My
20 apologies for not having done that initially.

21 COMMISSIONER McGAFFIGAN: Can I get --

22 CHAIRMAN JACKSON: And so, yes, he is Director of
23 the Division?

24 MR. THADANI: Yes.

25 CHAIRMAN JACKSON: Okay. Because the way it is

1 listed here is different. Okay. Please. And Mr. Craig is
2 the Director of the Division of Regulatory Applications.

3 MR. THADANI: I might note that both Tom King and
4 John Craig were previously Deputy Division Directors and
5 currently are Directors.

6 CHAIRMAN JACKSON: Okay.

7 COMMISSIONER MCGAFFIGAN: Can I again try to
8 clarify something?

9 CHAIRMAN JACKSON: Yes.

10 COMMISSIONER MCGAFFIGAN: The 240 in FY '93 FTE,
11 did that include rulemaking or has that been normalized?

12 MR. THADANI: I believe it includes rulemaking. I
13 think it is 26 FTE. So, it really --

14 COMMISSIONER MCGAFFIGAN: That really follows up
15 on the Chairman's question. If it is 26, you have gone from
16 214 to 173.

17 MR. THADANI: That's right.

18 COMMISSIONER MCGAFFIGAN: Down 41 people, which is
19 about 20 percent, and your budget for extramural research
20 has gone down 60 percent. And it raises the issue -- you
21 know, we are in the current budget cycle, which I won't go
22 into in detail, but there's a research buy-back list that
23 consists of two -- I think it's \$2.6 million and one FTE.

24 Last year we cut severe accident research to react
25 to the budget and we cut \$2.6 million, or approximately \$2.8

1 million, whatever, and zero FTE.

2 And a really fundamental question is, are we doing
3 this right? You know, are we preserving FTEs at all costs
4 rather than trying to preserve some capability outside and
5 using "core capabilities," quotation mark, which you are
6 getting criticized on, as a mechanism for justifying why we
7 maintain staff in-house. And so if you could address why
8 this bias towards preserving FTEs at all costs in research?

9 CHAIRMAN JACKSON: May I recast the question? The
10 question, is there a bias toward preserving FTEs at all
11 costs? And how does that play against the close-out of
12 large experimental programs?

13 MR. THADANI: Yeah. In fact, we made every
14 attempt to try and look at these cuts in a fairly objective
15 manner. Certainly, I can speak for the last cycle. And the
16 goal has been that the agency is involved in less and less
17 experimental work. Generally, when you have large
18 experimental programs, you do not end up needing a large
19 number of FTEs to follow experimental programs.

20 The bulk of the work that the agency -- the Office
21 of Research is now doing is really not
22 experimentally-oriented work. It is more issue-oriented
23 work. More and more, about 80-some percent of the work is
24 driven by what I would call user needs, by and large. And
25 many of these issues tend to require a lot of caring of

1 technical efforts.

2 Let me use an example, because it is a fairly
3 recent one.

4 The BWR sump blockage issue. That was a very
5 safety significant issue. You might recall it came out of
6 the Barsebek event in Sweden.

7 The Staff efforts, without getting into details --
8 at some time we can get into details if you so desire -- the
9 Staff effort to pursue that issue even though the contractor
10 support was really pretty minimal I would say -- I don't
11 remember the numbers but it was maybe on the order of a
12 couple hundred thousand dollars -- the Staff effort was very
13 extensive because one of the things the Office is trying to
14 do is to make sure that we are maintaining our technical
15 strength, in-house technical strength.

16 In this case, for example, it required significant
17 involvement of Research Staff members. I believe there were
18 two Staff members who were directly involved, conducting not
19 only some work in-house but also making sure that they were
20 interacting with the international community, which was
21 working on these issues, staying on top to make sure that
22 the regulatory decision that we ultimately make is a solid
23 one.

24 That is just an example. I don't mean to say that
25 each issue works that way but more and more the work that

1 the Office is doing is oriented that way.

2 It seems to me that there is one other piece. If
3 we want to take a budget cut of a certain magnitude, say
4 \$200,000, that means since we are not talking about
5 experimental work, if it is experimental we generally have
6 to go out -- we don't really have a flexibility there -- but
7 if it is a \$200,000 cut, we lose one FTE from outside but to
8 make up for that we have to give up to FTE from inside.

9 We believe that we are more effective as long as
10 we are technically able to do the work, that we are more
11 effective by saying let's look at the lowest priority work
12 we are doing outside and that is the one we'll cut and have
13 the Staff be the one continuing to work on these issues.

14 COMMISSIONER MCGAFFIGAN: But that -- I am used to
15 that argument in other parts of my life. You will always
16 find, you know, that the external cost is \$200 K from a lab
17 and \$100 K here and therefore, you know -- but are you sure
18 that your people are as effective? The same issues comes up
19 not just in Research, it comes up in NRR. You know, we are
20 going to potentially give up contractor resources for
21 improved standard tech spec conversions and there is no
22 evidence. I mean the past evidence is that when we do it
23 in-house we do it less productively than when we have the
24 contractor support, so there is a bias in the Agency, and do
25 you really look at whether giving up that contractor

1 support, if you have some unique contractors out there who
2 can do things more than twice as productively, do you have
3 any metrics on that?

4 MR. THADANI: Currently we do not have metrics but
5 we have to make a conscious decision when we are giving up
6 something to take a look, to see if in fact we have some
7 in-house capability or not.

8 CHAIRMAN JACKSON: In fact, though, I guess two
9 criticisms have come up in my experience. One has to do
10 with to what extent do you really avail yourselves of peer
11 review, which is the way to get at in the appropriate areas
12 the question of the quality of the work and whether it meets
13 certain standards, and that may be more appropriate for
14 longer term activities than ones that have issues specific,
15 and the other is that even with respect to when there are
16 external projects and participation in international
17 projects, they had then criticisms that NRC people over the
18 years have eroded their technical expertise and have become
19 contract monitors without being -- and that that in fact can
20 influence the interest or the willingness of those abroad to
21 have NRC participation other than whatever financial
22 contribution there may be.

23 I think Mr. King also could speak to it, because
24 he has been involved with a number of the international
25 projects.

1 MR. THADANI: I was just going to make one
2 comment -- but I think you're right. I have heard the same
3 criticisms about Research Staff and Tom can tell you about
4 some of the recent efforts to try and make our Staff much
5 more in tune with the technology today and able to provide
6 appropriate resolutions of issues with just in-house Staff.

7 I had a meeting, a get-together with all of the
8 Research Staff last week, and talked about a number of
9 issues that we as an Office have to deal with.

10 We are going to be going through changes and I did
11 talk about this issue as well, but we need to recognize that
12 we are going to have to do more and more technical
13 evaluations in-house. I think that is just the direction.
14 I don't think there are enough funds for us to not do that,
15 and a question was are there any things we can do to make
16 ourselves more capable and so on.

17 There were some suggestions including things like
18 if we want to be able to learn the details of certain codes,
19 for example, or run certain computer codes and so on. It
20 may be worthwhile to send a Staff member or two to the
21 contractor's place for six months to be part of that effort.

22 It's a cost but a cost that may be worth paying
23 upfront.

24 CHAIRMAN JACKSON: Well, let me hear from Mr. King
25 and then I think Commissioner Diaz has a comment.

1 MR. KING: I think five years ago there was not a
2 whole lot of technical work being done by the people in the
3 office. We recognized that was a problem for several
4 reasons.

5 One, to be able to effectively manage contracts
6 you want to have people technically up-to-date. Two, it is
7 more efficient if you really have the people on Staff to do
8 it, and I would like to use one example, the recent paper we
9 sent up on source term rebaselining.

10 That was done primary by people in the Office of
11 Research, the analysis, the interpretation, the results, the
12 writing of that paper. I don't think a contractor could
13 have done that as efficiently and as quickly as the Staff
14 and we recognized a couple of years ago that that is the
15 kind of thing we wanted to do, and we had people working on
16 being able to run the source term codes and be able to do
17 that kind of work and it paid off in that recent paper that
18 came up.

19 CHAIRMAN JACKSON: What about the issue of peer
20 review?

21 MR. KING: Peer review? We have done peer review
22 on some of our major Research projects like direct
23 containment hearing where we have gotten external peer
24 reviewers.

25 The peer review we do on something like source

1 term rebaselining is an internal peer review by people who
2 are familiar with the analysis and the issues and we try and
3 make sure the quality is developed by using our own Staff
4 and our own management review on those kinds of activities.

5 CHAIRMAN JACKSON: Commissioner.

6 COMMISSIONER DIAZ: It appears to me that of
7 course you have a very dynamic situation, I don't know
8 whether it is positive dynamics or negative dynamics, but it
9 is dynamic and I was thinking that what I would like to hear
10 is as you go through this presentation is how you are
11 establishing a balance between those activities that you
12 know have to be contracted out to those activities that are
13 really Research, to those activities that actually are
14 engineering consultants to the rest of NRC how then they
15 plug in, how are those things being planned to be
16 distributed, because that is the bottom line is how you are
17 going to be able to get this done and so there is a
18 distribution in there, and I don't think we got a hold of
19 that, but I will really look forward to hearing what the
20 balance that you are striving for is.

21 COMMISSIONER McGAFFIGAN: Could I also --

22 CHAIRMAN JACKSON: Yes.

23 COMMISSIONER McGAFFIGAN: -- lay something on the
24 table? The Generic Issues resolution -- that historically
25 has been in the hands of Research and ACRS has criticized us

1 for not resolving very many generic issues, high priority,
2 allegedly high priority generic issues that linger for
3 decades.

4 If we have this capability in-house to resolve
5 issues -- now I think the source term paper, Tom, is a good
6 example -- I think that was a good paper and people who
7 worked on it should be commended but I don't get a sense
8 that that is -- I think that that is the exception rather
9 than the rule at the moment, unless you can prove the
10 opposite.

11 MR. THADANI: Let me -- I think there are some
12 other examples but I don't want to suggest that I can prove
13 it, but I do want to talk -- to make sense of the issues.

14 CHAIRMAN JACKSON: Let's try to deal with
15 Commissioner Diaz's, because they are really somewhat
16 different. He has asked the question about how you arrive
17 at, you know, decisions about the appropriate balance,
18 in-house versus out-house, you know, large Research versus,
19 you know, consultant type activities.

20 COMMISSIONER McGAFFIGAN: Sorry.

21 CHAIRMAN JACKSON: And there is a separate one
22 having to do with Commissioner --

23 MR. THADANI: First of all, again I will give you
24 my thoughts and then ask my colleagues to add/subtract.

25 My thoughts on this, what is central to the Office

1 of Research is to step back and prioritize what it is that
2 we -- first, we need goals -- where are we trying to go --
3 and then step back and really prioritize the activities that
4 we're involved in and what are those attributes that we
5 would use to be able to prioritize clearly.

6 We have them on one of the charts, risk
7 significance is one and maybe it also means burden reduction
8 activities, need for certain infrastructure so that we can
9 respond to changes, requests, whatever have you that comes
10 from Offices and so on.

11 Using those attributes and looking at what work we
12 have, we would have to then make decisions on what is it
13 that we are going to do in-house, what we will outside the
14 Agency. It is going to be to a certain extent driven by two
15 pieces. One is going to be do we have the capability
16 in-house. I said earlier anything to do with experimentals
17 we are just not capable of doing that.

18 The second thing is if it is driven by short-term
19 schedules, I don't think we will go contractors, by and
20 large. We would have to be prepared to do those things
21 in-house. That raises then the sole issue of qualifications
22 capability and so on. That's the process that in this paper
23 we are saying we need to go through. I cannot give you an
24 answer today that, in my mind, addresses what I think are
25 pretty basic issues that we have to address. And that's the

1 prioritization effort that you will hear later on that we
2 are going to be going through ourselves.

3 In terms of generic safety issues, Commissioner
4 McGaffigan, I have been very unhappy myself with the way the
5 office has handled generic safety issues, activities. Some
6 of the issues languish -- have languished because in some
7 cases I think the technical work may have been largely
8 completed, but languished because of lack of decision
9 making. And I have asked to do two things.

10 No. 1, I have asked that the prioritization of
11 issues, we will do in-house. I think we have the capability
12 to do it in-house. We can do it quicker, I think equally
13 well, that's my personal view, and I think maybe simpler.
14 And it is costing us, has been costing us quite a bit just
15 to go through and prioritize some of these issues.

16 The second part is I have asked, and John Craig
17 can expand on this, I have got -- I got status on each of
18 the issues. I asked that a group be put together to say
19 what are the problems with generic safety issues program and
20 what can we do about those problems. I have had one
21 briefing on that already. And I can tell you, as a result
22 of that discussion, my goal -- and I hope I am not premature
23 -- keep me honest, John -- my goal is to resolve quite a
24 good number of these generic issues by -- I believe the date
25 I -- when I say resolve, technical resolution -- by next

1 summer. I think it's about five or six generic safety
2 issues, trends.

3 CHAIRMAN JACKSON: So you have a work plan with
4 milestones?

5 MR. THADANI: That's what we are pulling together.
6 And the plan -- what I have is not the detailed plan for
7 each resolution path, but I do have the estimated
8 completion.

9 CHAIRMAN JACKSON: Let me ask John.

10 MR. CRAIG: What we have done, the unhappiness
11 with the GSI program is not new, we discussed it some time
12 ago, even when Dr. Knapp was the Acting Office Director.
13 There are several aspects to the programs, different steps.
14 The identification, prioritization, resolution,
15 implementation, and verification. When we looked at the
16 process, it was clear that there weren't clear criteria to
17 enter the process, to move from the process. We focused on
18 the prioritization to see what it meant, what was entailed
19 and why couldn't we bring it in-house right away.

20 Tom Martin, who is the Branch Chief of that
21 Branch, the new Branch Chief, has initiated an assessment
22 with Arthur Andersen to look at the process and that effort
23 is going to be completed the end of this month, I believe.

24 We have identified a number of changes that need
25 to be made. We are working with NRR and with NMSS to make

1 sure that there is clear understanding of what we need to do
2 and what the problems are. Dr. Sheron has indicated, about
3 a month ago in discussions with him, that when we do a
4 prioritization, we assume a solution, so that the
5 prioritization -- the results come, are driven by this, the
6 fix that you assume up front, and there needs to be a better
7 way to do that, and so we are looking at that.

8 We go out every year and ask the Regional
9 Administrators in the offices the question -- this was an
10 issue that was previously prioritized as low or drop. Is
11 there new information? In the past, if somebody said, well,
12 I think there is new information, let's reprioritize, that
13 was put in the queue. There wasn't clear criteria to
14 evaluate the need for the reprioritization.

15 Similarly, if somebody said I think this is a
16 generic safety issue, cost beneficial enhancement, it
17 entered into the prioritization phase. Some of them didn't
18 need to be prioritized, to be honest. Some of them we have
19 eliminated from reprioritization. We have looked at some of
20 the suggestions from the last iteration. We have gone back
21 to the Regions and the program offices. This is the new
22 information, we think it is closed. We don't think we need
23 to reprioritize.

24 CHAIRMAN JACKSON: Well, have you laid out clear
25 criteria for doing that kind of prioritization?

1 MR. CRAIG: We are in the process of doing it. We
2 haven't --

3 CHAIRMAN JACKSON: Because it is hard. I mean,
4 otherwise, each one becomes an individual negotiation.

5 MR. CRAIG: And that's where we have been --

6 CHAIRMAN JACKSON: And then having prioritized, do
7 you then put it into your operating plan?

8 MR. CRAIG: Yes.

9 CHAIRMAN JACKSON: Do you have milestones? Do you
10 have deliverables associated with those milestones? And
11 then do you have responsible individuals who own it and that
12 you hold them accountable, and then those -- that individual
13 is appraised according to his ability to deliver, or to
14 explain why something, you know, is not going to meet the
15 time line? I mean is that how you are managing or is that
16 how you are planning to try to manage the process?

17 MR. CRAIG: All of the GSIs to be prioritized or
18 reprioritized, or resolved, are included in our operation --
19 in our op. plan, with clear dates, clear accountability has
20 been established, and we are meeting to track the progress
21 on each one.

22 CHAIRMAN JACKSON: Okay.

23 COMMISSIONER DIAZ: I just want to piggyback on
24 that. You know, it follows that maybe, you know, the
25 process that we use to have contracts outside might be a

1 good way to do things inside for anything that is, you know,
2 a real project. A statement of work, deliverables,
3 schedules, interfaces. Who do you interface with? You
4 know, how do you go across the interfaces? And that, you
5 know, work breakdown program, it is indispensable at the
6 present time. And I think that is what the Chairman saying.
7 I agree.

8 CHAIRMAN JACKSON: I think we are in complete
9 agreement. But somebody has to own it. You know, you got
10 bodies in the shop. The question is, who owns it? Okay.
11 Is he empowered to own it? Is he held accountable? And you
12 move on down the line. But you have got to plan and work
13 the plan. And you have got -- in thinking of your criteria,
14 maybe you have things on the generic issues list that don't
15 need to be on the list. Okay. And so, you know, a lot of
16 times people get into trouble with never closing things out,
17 because, you know, you are not very discriminating. And
18 that's, I guess, what you are trying to talk about in terms
19 of what needs to be on the list. Okay. And maybe you are
20 unrealistic about what is -- when you are going to reach a
21 resolution, and that affects how you schedule it.

22 But I mean these things have to be done. These
23 are baseline managerial kinds of things. Okay.
24 Particularly for those kinds of issues.

25 I'm sorry, Commissioner.

1 COMMISSIONER MCGAFFIGAN: I agree with everything
2 you have said. I think we need more of a closure
3 orientation, not just in --

4 CHAIRMAN JACKSON: A production-oriented mentality
5 is what I call it.

6 COMMISSIONER MCGAFFIGAN: Yeah. How do we get to
7 closure? But I also want to go back to one point you made
8 in response to Commissioner Diaz's question. You said on
9 short-term schedules, we wouldn't go to contractors. Again,
10 I think that reflects -- I can imagine a scheme where I
11 could -- especially with the contracting laws as they exist
12 at the moment, Mr. Holman could tell you how to do it. You
13 could have a bunch of contractors on-call.

14 I believe NRR does this sort of thing for when
15 they have somebody on-call to help on an inspection. And
16 you would call them in short-term to work on something. And
17 that model, you know, where you pay only for what you get,
18 you use task -- or you can even preserve competition in it
19 by having a couple of these task order contracts out there
20 and you bring them in for the task. That model can be very
21 productive because you are only paying for what you get.
22 You are not paying \$200K a year unless you actually spend
23 \$200K.

24 Now, the question for you is, you know, if you are
25 going to maintain the 170-odd FTE, having all those people

1 be productive 100 percent of the time and not 50 percent of
2 the time, and working. Otherwise, the contractor beats you.
3 And I can imagine a task order contracting scheme with an
4 array of contractors out there in university and beltway
5 bandit-land who could be pretty effective.

6 CHAIRMAN JACKSON: Right. But I think what you
7 don't want to bias it to -- I think we want to get back to
8 the fundamentals that Commissioner Diaz -- I mean I am not
9 taking issue with what he says. But the issue is neither to
10 say, well, we are just going to -- you know, this is the NRC
11 Full Employment Act, but is also not the Beltway Bandit Full
12 Employment Act. The issue has to do with being clear about
13 what needs to be done inside, what is best done outside,
14 including short-term, as well as longer-term. But you have
15 got to come to a rationalized approach.

16 And for those things that you take on, whether it
17 is through management of a contract or someone internally
18 doing it, you have to have a clear ownership. You have got
19 to have criteria for an issue becoming an issue. And you
20 have got to have a work plan and it is has got to be worked
21 off.

22 MR. THADANI: Yes.

23 CHAIRMAN JACKSON: And the accountability has to
24 be there. It doesn't matter whether you manage it, because
25 I don't think it's the Commission's job to sit here and tell

1 you exactly whether it -- what should be in-house and what
2 should be out-house. It is your job to tell us. Okay. But
3 you have got to do it.

4 MR. THADANI: And I quite agree. I just want to
5 be sure that, Commissioner McGaffigan, that you don't
6 misunderstand what I said or what I implied at least from
7 what I said. First of all, I am very familiar with task
8 order arrangements. And some of that -- some, I believe is
9 done in the Office of Research, perhaps more can be done.
10 My --

11 CHAIRMAN JACKSON: But I am saying the criteria
12 for how you do the work is the issue.

13 COMMISSIONER MCGAFFIGAN: Right.

14 MR. THADANI: Yes. Yes.

15 CHAIRMAN JACKSON: Not to bias it one way or the
16 other. The bias ought to come out of the criteria.

17 MR. THADANI: Yes, I agree.

18 CHAIRMAN JACKSON: Okay.

19 MR. THADANI: I agree.

20 CHAIRMAN JACKSON: And that's the point.

21 COMMISSIONER MCGAFFIGAN: And that's all -- all I
22 am trying to do is relax a boundary condition, if indeed
23 there is one. I have a perception there might be, and if
24 there isn't, that's fine, but I am trying to relax it.

25 MR. THADANI: Okay.

1 COMMISSIONER DIAZ: In other words, you have a
2 safety envelope. That safety envelope is your capability to
3 do the do the work.

4 CHAIRMAN JACKSON: Exactly.

5 COMMISSIONER DIAZ: And now you need to balance
6 everything, all of these things and the Commission is
7 looking forward to hearing about the balancing.

8 CHAIRMAN JACKSON: And don't forget, --

9 MR. THADANI: I fully agree.

10 CHAIRMAN JACKSON: -- look at the signals, you
11 decide.

12 MR. THADANI: Yes.

13 CHAIRMAN JACKSON: You decide.

14 MR. THADANI: Because I believe it is my job. It
15 is my responsibility. And I would --

16 CHAIRMAN JACKSON: And so what you are going to
17 get judged on is your ability to lay all of that out.

18 MR. THADANI: Yes.

19 CHAIRMAN JACKSON: Okay.

20 MR. THADANI: Yes, indeed. If you do not have any
21 objections, I would propose --

22 CHAIRMAN JACKSON: Being production-oriented, I
23 think the meeting is over. No.

24 MR. THADANI: What I would propose is to go on to
25 the next viewgraph, page 4. And I am going to quickly run

1 through two or three of these viewgraphs. And then I do
2 want each of the divisions to give you their sense of where
3 they are.

4 CHAIRMAN JACKSON: Talk fast.

5 MR. CALLAN: We are going to abbreviate that.

6 MR. THADANI: Yes, absolutely. Yes.

7 CHAIRMAN JACKSON: But it is good to hear from
8 them.

9 MR. CALLAN: Yes, absolutely.

10 CHAIRMAN JACKSON: Okay.

11 MR. THADANI: Yeah. Again, I think we have sort
12 of talked about it, and I won't dwell on some of these
13 issues, because all of us recognize that the environment is
14 really changing around us. One of the major --

15 CHAIRMAN JACKSON: I have been saying that for
16 three years.

17 MR. THADANI: And in some cases we have moved but
18 we clearly haven't moved fast enough. And all of what we
19 are hearing now is that we really haven't moved fast enough.
20 And at the top of this clearly is have we gone far enough
21 quickly enough in terms of the use of risk-informed
22 thinking. And I understand that we have to move, we have to
23 move faster, and we have to make sure we have the right
24 infrastructure in place.

25 And I appreciate in this case the responsibility

1 of the Office of Research to be an active player in some of
2 the process issues as well. And I am pleased because I
3 think this is another example of where I think it is good
4 for the office. I think it will make the office more
5 responsive for other activities that would be more
6 risk-informed as well.

7 Because of this involvement. I won't go into much
8 more on this chart except to note that we have been working
9 with the industry. In the last year, Dr. Knapp has had a
10 number of meetings. I have had meetings with EPRI as well
11 as the Department of Energy. We have some ongoing
12 cooperative programs with EPRI in particular, and some with
13 DOE as well. I think we just -- we have signed a Memorandum
14 of Agreement with the Department -- with EPRI, and we have a
15 meeting coming up with the Department of Energy in the next
16 two weeks, again, Bill Magwood, to see if there are other
17 areas we could combine our resources on.

18 We are just going to have to keep doing more and
19 more of this to be effective in terms of where we are. And
20 we have a number of examples that I won't go into now.

21 If I may go on to the next chart. What you will
22 hear from today is what is what I would call, in two parts,
23 some of the near-term things that I believe we need to do,
24 and then there are other areas that we are looking into and
25 will decide down the road as to how we should proceed.

1 And, quickly, near-term things, we do have to get
2 some management -- further management supervisory changes
3 are going to have to take place in the Office of Research.
4 We have to get to a ratio of 8 to 1. And that means that we
5 will have to revise our structure in the office. We will
6 probably be taking into account in this revised structure,
7 as to some of these new initiatives that we are involved in
8 and how they will be folded in in this new structure and so
9 on. And then, of course, we will be working with the
10 Labor-Management Partnership Committee, as well, as we move
11 in these upcoming changes that we have to make.

12 Prioritization of research activities,
13 Commissioner Diaz, you touched upon. I think that was a
14 criticism we got also from the Advisory Committee on Reactor
15 Safeguards. And I think we have to not only fold in this
16 concept of how risk significant something is, but also to
17 fold in the ideas of costs associated with those, because if
18 there are significant costs with areas of low safety
19 significant, I think in the past maybe it was getting not as
20 much attention as it deserves today, particularly looking at
21 the environment that we operate under.

22 CHAIRMAN JACKSON: What is Research's involvement
23 with the all-plant risk-informed pilot initiative?

24 MR. THADANI: The all-plant initiative has steps
25 starting from zero to 6.

1 CHAIRMAN JACKSON: Where are we at, half?

2 MR. THADANI: Step zero -- yes. Unfortunately,
3 quite frankly, the NEI folks said they want to see something
4 that we can do before they invest significant resources.

5 CHAIRMAN JACKSON: Yes, we know that. I want to
6 know what you are doing.

7 MR. THADANI: We are working with NEI. Steve
8 Floyd is the leader for NEI on this project. And, in fact,
9 we have a meeting coming up with NEI to get schedules. We
10 don't have specific schedules for each of the six steps to
11 get to these plants in the four categories of cores that we
12 are looking for.

13 What we have told NEI is we, the Office of
14 Research, will participate in the efforts with NEI and the
15 industry to avoid the time that it might take down the road
16 otherwise for reviews and questions and so on. So we are
17 going to be -- Office of Research is going to participate in
18 these activities. But we cannot -- this is NEI, under their
19 leadership. We can't get started until they get started.
20 And we have urged NEI, I have urged NEI --

21 CHAIRMAN JACKSON: Well, have you worked out a
22 joint plan?

23 MR. THADANI: We have some draft plan that has
24 gone -- in fact, that has not been followed. Let me ask Tom
25 to touch upon -- I mean the NEI plan.

1 MR. KING: What we have received from NEI last
2 December was a draft plan. It did not have a lot of the
3 details filled in terms of the approach, the criteria they
4 were going to use for doing these whole plant studies and
5 coming up with some generic recommendations on regulations
6 and so forth.

7 What we need to do is try and pin that down and
8 work with them on the criteria, the approach, the ground
9 rules of the study, so that when they do the detailed work
10 and put it into this process, that we are in agreement in
11 terms of how the information is interpreted and what the
12 results are going to be.

13 CHAIRMAN JACKSON: Okay. Well, you need to go
14 ahead and sit down with them, and if there is an NEI
15 representative in the audience -- I know there is media, so
16 you can propagate it that way. Is that the folks, you know,
17 on both sides need to come together and work it out.

18 MR. KING: Yes.

19 CHAIRMAN JACKSON: And decide, you know, how one
20 is going to proceed. And we have to a clear idea of what
21 our cornerstones are in this and then move ahead.

22 MR. KING: Yes. Our ideas have been evolving over
23 time.

24 CHAIRMAN JACKSON: Right.

25 MR. KING: And we need to settle on something and

1 get started.

2 CHAIRMAN JACKSON: Get started. Yes,
3 Commissioner.

4 COMMISSIONER MCGAFFIGAN: My concern would be --
5 Research is in the lead on this, as I understand it, but NRR
6 is where the rubber hits the road for licensees. How
7 connected are the two offices on this?

8 MR. KING: Very connected.

9 COMMISSIONER MCGAFFIGAN: Okay.

10 MR. KING: On both task zero and the follow-on, 1
11 through 6, which is the generic studies.

12 CHAIRMAN JACKSON: Do you have people assigned?

13 MR. KING: Yes.

14 CHAIRMAN JACKSON: Do you have people assigned?

15 MR. THADANI: Yes.

16 CHAIRMAN JACKSON: Okay. Let me ask you one other
17 question. I mean does Research, you know, following in this
18 vein, have a role to play in a number of the other important
19 ongoing agency activities, risk-informed inspection,
20 risk-informed 50.59, as much as, you know, we can. Plan
21 assessment, you know. What is your role?

22 MR. THADANI: Research clearly has a role to play.
23 In a recent memorandum to you we have laid out our ideas on
24 how Research can participate in these activities in a
25 coordinated way with NRR and others where it is appropriate.

1 And, yes, Research has a role for direct involvement in
2 these efforts. To a certain extent, I personally think that
3 it helps for Research involvement, beyond what I said
4 earlier. I was at NRR and I know how day-to-day challenges
5 occur there. I think the Office of Research can really help
6 the agency provide somewhat of what I would call
7 evaluations, ideas, concepts, which are not necessarily
8 driven by certain factors. Research can bring some fresh
9 ideas and concepts that I think in the end would add value
10 to the agency's efforts in this area, in these areas.

11 MR. CALLAN: I agree with what Ashok has said,
12 Chairman. But in order for those inputs to be useful, to
13 add value, they have to occur at the precise right moments.
14 And we understand that, and Research is working with NRR to
15 ensure that the Research input is useful, because it is --

16 CHAIRMAN JACKSON: Well, there are two pieces to
17 it. I agree with exactly what you say, and I didn't mean to
18 cut you off, and so I will hold that thought.

19 MR. CALLAN: I'm finished.

20 CHAIRMAN JACKSON: But NRR also needs to ensure
21 that it solicits, has people informed. It is hard to
22 contribute if you don't, you know, if something -- the train
23 leaves the station --

24 MR. CALLAN: That's right.

25 CHAIRMAN JACKSON: -- and you don't know it is

1 pulling out.

2 MR. CALLAN: Exactly.

3 CHAIRMAN JACKSON: At the same time, Research has
4 to be more proactive. But I mean that's a problem even
5 within NRR.

6 MR. CALLAN: Precisely.

7 CHAIRMAN JACKSON: That there are pieces here that
8 could use expertise from here, and they don't do it. And so
9 that is a generic issue, but it is exacerbated when you have
10 different organizations. So I didn't mean to cut you off.
11 Go on.

12 MR. CALLAN: No, I agree with that. That's
13 exactly right.

14 MS. FEDERLINE: Chairman, if I could just add on
15 each of these tasks, what we have just done is sat down with
16 the key NRR managers and defined distinct pieces of the work
17 that Research can do and identified the time frame, when our
18 product will be delivered to NRR. So we each understand
19 what we are accountable for in the effort.

20 CHAIRMAN JACKSON: Very good.

21 COMMISSIONER McGAFFIGAN: I just want to go back
22 to a point that Mr. Thadani made a few minutes ago, and that
23 was taking cost into effect. I think that is -- in trying
24 to define risk-informed, I oftentimes think you all focus
25 too much on embedding PRAs everywhere and not enough about

1 looking at the framework that exists and asking are we
2 diverting resources in a less than risk-informed way onto
3 things that aren't very important, and how we can get rid of
4 some of that stuff. And I think the letter that we got from
5 ACRS, you all got from ACRS, trying to give us a definition
6 of effectively, included in it timely response incidents and
7 controlling excessive burden on the industry. But
8 risk-informed, in my mind, has this cost component.

9 CHAIRMAN JACKSON: It's more than just PRA.

10 COMMISSIONER McGAFFIGAN: It's more than just PRA,
11 and I am glad you recognize that, because sometimes it isn't
12 always clear.

13 MR. THADANI: I went through it quickly, but that
14 was one of the points I had intended to make, that perhaps
15 in the past we have paid less attention in that area and we
16 are going to be paying more attention to make sure that is
17 captured.

18 CHAIRMAN JACKSON: We are not being timely, we are
19 only on viewgraph 5.

20 MR. THADANI: Let me go on to the next viewgraph.
21 I am not going to -- the next three viewgraphs, I am clearly
22 not going to go through them, except to note that these are
23 just a few examples where Research has really made an
24 important contribution.

25 That's not to imply that Research alone was

1 responsible for achieving these improvements and
2 efficiencies. Clearly NRR was a part of this. I was part
3 of NRR involved in some of these issues. These are more
4 from Agency point of view where the Office of Research
5 played a very important part --

6 CHAIRMAN JACKSON: Can you just not go through all
7 of it? Can you, you know, pick the one of your choosing and
8 talk about or characterize the extent of burden reduction
9 and safety improvements in terms of some requirements that
10 may have turned out not to be necessary but where the focus
11 was improved as a result of your efforts?

12 MR. THADANI: Let me just pick the one at the top
13 because I think it maybe illustrates the point quite well is
14 the issue of embrittlement effects on reactor pressure
15 vessel.

16 As you might recall, we did not have any specific
17 requirements in terms of response of pressure vessel to low
18 temperature and high pressure conditions and we did have
19 pressure temperature limits from Appendix G for requirements
20 but nothing in terms of thermal shock the vessel might see.

21 The Agency conducted some studies and came to a
22 conclusion that for things like small break loss of coolant
23 accidents, which are not that unlikely, on the order of 10
24 to the minus 3 or so per reactor year -- at some time in
25 life these vessels actually might fail. When I say high

1 pressure I don't mean 2000 pounds. You are only talking
2 about 200 pounds pressure.

3 This is the understanding that the Agency came to
4 as a result of its studies and so on, and that led to a
5 regulation called 5061, I think it is, on the pressurized
6 thermal shock regulation. It was a regulation that was
7 based on adequate protection. It was not one of these other
8 regulations that we have promulgated lately which are more
9 cost beneficial regulations. This was an adequate
10 protection regulation.

11 Having said that, that led to a significant
12 improvement in safety. Industry went to some unique ways to
13 minimize fluence levels for the vessels and so on, different
14 types of core designs as a matter of fact, but there is
15 another component where we worked with the Department of
16 Energy. We in this case was NRR and Research worked very
17 closely with Department of Energy to see how one can extend
18 life of vessels. This is the concept of the annealing
19 program.

20 So on one hand we said we were concerned about the
21 vessel response, establish some criteria, and that, by the
22 way I believe led to some very significant improvement in
23 safety. I said there were estimates on the order of 10 to
24 the minus 3 per reactor year -- some serious challenges --
25 and with the annealing portion there's not only you extend

1 the life of the vessel but that there's cost saving because
2 annealing is a lot less expensive than replacing a vessel,
3 and the difference in price could be anywhere from, as I
4 understand, one hundred to three hundred million dollars
5 saving if one were to anneal rather than replace.

6 This is sort of an example of where some of the
7 work that has been done has not only led to a significant
8 improvement in safety but I think potentially significant
9 reduction in burden, particularly if licensees got an
10 additional 20 years and its vessel becomes a critical issue.

11 Chairman, that is an example of the kind of issues
12 on these three charts. I will not go through any of these
13 charts any further, but move quickly to Tom King, who will
14 briefly go over it. Tom?

15 MR. KING: Yes, I just wanted to take a couple of
16 minutes and talk about the Division of Systems Technology.
17 There's some backup viewgraphs at the end of your package,
18 starting with Slide B-1, which just on one page summarizes
19 the technical areas for which the Division is responsible
20 and then I just wanted to talk about a couple of examples.

21 We do a combination of work that responds to user
22 needs as well as anticipatory research. The technical areas
23 are listed on the slide.

24 We develop and maintain analytical tools that are
25 used by the Agency. We develop guidance that is used by the

1 Agency in the form of Reg Guides or other documents.

2 We do technical studies and we do a lot of support
3 for risk-informed regulation.

4 The example that is shown there is direct
5 containment heating. That is an area where we as an office
6 took the initiative to look at that issue that came out of
7 the NUREG 1150 risk studies from several years ago. There
8 was a lot of uncertainty in terms of does that phenomenon
9 cause early containment failure, which is a high risk issue.

10 We did an experimental program and an analytical
11 program that dug into things on a plant-specific basis and
12 have convinced ourselves that that is an issue that has low
13 risk consequence and therefore does not need any additional
14 regulatory action, and we have resolved it for the
15 Westinghouse large dries, the B&W plants, the CE plants. We
16 are working on ice condensers now and ultimately we are
17 going to take a brief look at BWRs so that is a Research
18 initiative that we think has brought value to the Agency in
19 the sense that we are not spending time and attention on an
20 issue that we can show is of low risk significance.

21 I just wanted to follow up on a comment
22 Commissioner McGaffigan had made earlier when we were
23 talking about the source term rebaselining study is a good
24 example of in-house work that you see, but you don't see
25 many of those.

1 Well, that's true. You don't see many of those
2 because a lot of those don't come up to your level. We have
3 done a lot of in-house work in support of NRR that is
4 documented in the forms of reports that they have used in a
5 number of areas, but the Commission -- those things don't
6 make their way up to the Commission level and there have
7 been in steam generator tube integrity analysis a number of
8 support activities on AP600, looking at in vessel retention,
9 steam explosions, thermohydraulic aspects.

10 The IPEs are an example of a lot of that is done
11 in-house that's provided to NRR but you don't see the
12 products of those.

13 CHAIRMAN JACKSON: Well, in fact, in a recent ACRS
14 letter, the work on the confirmatory and analytical program
15 in support of the AP600 final design approval was viewed as
16 being of great value --

17 MR. KING: Yes, yes.

18 CHAIRMAN JACKSON: -- to the committee in
19 reviewing the Westinghouse test and analysis programs.

20 MR. KING: Yes, so I just wanted to amplify on
21 that that there is a lot we do in-house and sometimes with
22 contractor support that is of value to the program offices.

23 With that I will let Larry talk.

24 MR. SHAO: Page B-2, please. My name is Larry
25 Shao. I am the Director of the Division Engineering

1 Technology. As the Chairman has just said, I have been
2 around for awhile. Actually, I started my career in NRC,
3 NRR. I worked there for six years, then I came to Research,
4 and in the 1980s I went back to NRR for two years and then I
5 came back to Research again, so I quite familiar with some
6 of the issues that NRR has faced.

7 The Division of Engineering knows how to deal with
8 the actual hardware problems in the plants. Our division is
9 responsible for research on integrity of major structures
10 and components when subject to operating and external loads
11 including the aging effects and severe accident events such
12 as seismic, hurricane, tornado, et cetera.

13 The major structure and components -- they are
14 covered in our program as reactor vessels, piping, steam
15 generators, reactor internals, pumps and valves, electrical
16 cables, containments and structures.

17 Since our research program covers aging effects,
18 our research is applicable to operating reactor safety,
19 license renewal, as well as advanced reactors.

20 I should just -- I want to use the reactor vessel
21 integrity.

22 MR. THADANI: I'm sorry -- do you want to talk
23 about piping?

24 MR. SHAO: Okay. First of all, let me show you
25 page 6 here.

1 Page 6.

2 CHAIRMAN JACKSON: Page 6 or B-6?

3 MR. SHAO: Page 6 -- Slide 6. All of these five
4 bullets, except bullet 2, are the four other bullets coming
5 from my division. Reactor vessel integrity. I should just
6 mention in the piping integrity, our piping research enabled
7 us to develop so-called leak before break theory for certain
8 quality piping. And for these piping, we eliminated the
9 large pipe break loads, because the control regulation we
10 have designed also supports adjacent components against full
11 skeleton breakload. If we can prove the pipe will leak
12 before break, we eliminate these loads. So the licensee was
13 able to eliminate many, many jet impingement baffles and
14 pipe weight restraints. It saved them a lot of money.

15 And on the pipe crack research, we identified the
16 causes, the significance of cracking, the repair methods and
17 the methods for mitigating the cracking. For the open MOVs,
18 our research shows that some of the MOVs will not close
19 under LOCA conditions. They require thrust to close the MOV
20 with higher than estimated value given by the vendors,
21 mainly because the vendor used too low a coefficient of
22 expansion -- coefficient of friction. They used .3, it
23 should be .5, and the industry agreed with our results and
24 they changed their design.

25 Okay. Back to B-2. Let me talk a little bit more

1 about our reactor vessel integrity research. Actually, the
2 research discovered the so-called PTS event. It first
3 happened in Rancho Seco many years ago. Luckily, at that
4 Rancho Seco was quite new, the vessel had only a few years
5 of operation, it didn't have a lot of embrittlement. And we
6 did an analysis and it survived, and there will be no damage
7 to the vessel.

8 What is PTS? PTS is a so-called event or training
9 that causes the PWR vessels to be subject to a very, very
10 overcoating concurrent with or followed by significant
11 pressure. So the vessels see large similar load as well as
12 large pressure load. So research identified the
13 significance of PTS and performed research to develop
14 screening criteria. And the screening criteria is in our
15 regulation 10 CFR 5061.

16 We also developed criteria for a plant operating
17 the vessel beyond the screening criteria. In case the
18 vessel goes beyond the screening criteria, what is the
19 criteria for operation? And the criteria --

20 MR. THADANI: If we can sort of move on because --

21 MR. SHAO: Okay. It was defining Reg. Guide
22 1.154. So it also has -- I should say we also work on
23 annealing not only on the engineering evaluation, also
24 material recovery. So I think here is another example that
25 our division has worked on.

1 CHAIRMAN JACKSON: Okay. Thank you.

2 MR. THADANI: John.

3 MR. CRAIG: Slide B-3, please. The Division of
4 Regulatory Application is the division that was most
5 affected by the Commission's decision on DSI to move
6 rulemaking out of Research into the program offices. And
7 one of the things that we are doing there is we are
8 undergoing a reinvention study with Dr. Stan Ridley with the
9 Radiation Health Effects Branch, and working closely with
10 the program offices, and that is having a positive effect in
11 a number of ways.

12 The division responsibilities also include
13 transport of radionuclides. For those two functions, we
14 work closely with NMSS. We have initiated a Decommissioning
15 Board that meets weekly at the division level and involves
16 NRR, other offices, as appropriate, with NMSS, to go over
17 issues they are working on, our research programs, near-term
18 results, and how we can best meet their needs. So that
19 activity has been closely coordinated and continues to be.

20 I talked earlier about GSIs and so I won't replot
21 any of that ground. The other activity that is in the
22 division is consensus codes and standards and we are
23 managing that program. I attended a meeting yesterday with
24 other federal agencies. As you know, we just sent an annual
25 report to OMB with some statistics. They note two things,

1 that there has been a decrease in federal government
2 participation in codes and standards. Some agencies
3 decreased rather significantly. The NRC did not, our
4 participation is the same, about 170 staff.

5 The other activity that they noted with respect to
6 codes and standards are the government unique standards,
7 that OMB feels that the federal agencies need to play a
8 little closer attention to promulgating their own standards
9 as opposed to using consensus standards, and that is
10 discussed in OMB Circular --

11 CHAIRMAN JACKSON: Say that again.

12 MR. CRAIG: OMB believes that we should pay closer
13 attention when we generate our own standards, our own
14 criteria in lieu of adopting or endorsing a consensus
15 standard. The statistics that are in the report that is
16 being distributed now show that they are very low numbers,
17 where federal agencies are owning up to promulgating their
18 own standards, their own criteria, as opposed to adopting a
19 consensus standard.

20 One of the things that we are doing --

21 CHAIRMAN JACKSON: So what is the message from
22 OMB?

23 MR. CRAIG: That we need to increase our controls
24 to make sure, if we do promulgate a standard, a criteria,
25 that we have checked to see if there is a consensus standard

1 that we should have considered before.

2 One of the things that we are doing along those
3 lines is to try and incorporate in the CRGR process some
4 clear decisions and questions associated with the
5 development of new rules, Reg. Guides, that kind of thing.

6 The example that I was going to cover --

7 COMMISSIONER MCGAFFIGAN: Can I stop on that point
8 as well?

9 CHAIRMAN JACKSON: Yes.

10 COMMISSIONER MCGAFFIGAN: The responsibility, I am
11 looking at Mr. Sheron, because the last time I heard the
12 words codes and standards, I think he was at the table. But
13 how does the responsibility of your organization break down
14 vis-a-vis NRR in this codes and standards area? Because my
15 recollection is most of the bodies that go to these Codes
16 and Standards Committees come out of NRR, or maybe NMSS in
17 some cases. Am I wrong? How does that integration work?

18 MR. CRAIG: I'll try to cover it quickly. When
19 there was an Office of Standards Development in the NRC,
20 they had the lead and the bulk of that staff participated in
21 Codes and Standards. That function was merged into the
22 Office of Research, and so Research has the lead
23 responsibility to coordinates Codes and Standards
24 participation.

25 So that if an NRR, an NMSS staff member wanted to

1 participate on a consensus organization, the letter would be
2 signed by Ashok, and it comes up through one of Brian's
3 staff, up through Brian's chain. We coordinate it. I am
4 the standards executive for the agency responsible for
5 coordinating our A-119 activities and the actions to meet
6 Public Law 104-113. And so we try to work closely with the
7 program offices.

8 As you know, DSI-13 asked a number of questions
9 about endorsing, utilizing codes and standards more
10 efficiently. There are also a number of questions related
11 to A-119 about how we are going to do it more efficiently,
12 more effectively, and we are working with NRR and NMSS. The
13 group that is working on that, there are representatives
14 from both offices participating. The product, the result of
15 that effort ultimately will be probably a management
16 directive that lays out responsibilities in the process.

17 COMMISSIONER MCGAFFIGAN: Again, my recollection
18 is this is one of the areas where we are criticized on the
19 timeliness of our products or whatever. And I am, again,
20 trying to sort out -- going back to a different area,
21 generic safety issues, how are you going to sort out the
22 timeliness issue? Are people going to be responsible for
23 using --

24 CHAIRMAN JACKSON: The same principles?

25 COMMISSIONER MCGAFFIGAN: Yes, the same principles

1 as the Chairman outlined earlier. But have you thought that
2 through, or is that what you are going to discuss at this
3 meeting next month in Chicago, how that is all going to
4 work?

5 MR. CRAIG: As I am sure you are aware, the
6 Commission's SRM on DSI-13, that was, if you will, if there
7 was a key message in it, that was it. And we are working
8 to, in fact, discuss options. We have invited a range of
9 consensus organizations to talk about the process for
10 endorsement. There are some ideas that are kicking around.
11 We have options that we will present to the paper -- to to
12 that Commission in a SECY that is due in December with some
13 of the pros and cons.

14 As in the past, the key issue for timeliness has
15 to do with the procedures that we follow using the
16 Administrative Procedures Act, where we go out for comment
17 after a consensus standard has been endorsed. So there is
18 -- it is understandable, but it is a lengthy process.

19 CHAIRMAN JACKSON: Okay.

20 MR. THADANI: Margaret?

21 MS. FEDERLINE: Yes. My next four slides
22 beginning -- may I have Slide 9, please. Could I just ask
23 how much time I should aim for?

24 CHAIRMAN JACKSON: You are always rather
25 efficient, Margaret, so --

1 MS. FEDERLINE: Good.

2 COMMISSIONER MCGAFFIGAN: We'll be here till 3
3 o'clock.

4 [Laughter.]

5 MS. FEDERLINE: The next four slides address our
6 plan for changing our process in the Office of Research.
7 The Commission provided us some good guidance, guiding
8 principles, to look at how to organize our future program in
9 DSI-22 and in the principles of good regulation. Even though
10 we have only been together for a few weeks, we have sat down
11 and arrived at some general goals and strategies as to how
12 we could make this change process work.

13 I have listed a few of the goals here on this page
14 and just wanted to point to a couple -- develop reasonable
15 thresholds for decision-making. We feel that this is a very
16 important principle. This is knowing when enough is enough.

17 We need to look at how to impose reasonable
18 thresholds and to decide when our work has satisfied those
19 outcomes.

20 We also need to provide the tools and knowledge
21 for risk informed improvements in the regulatory process.
22 One area where we have been working with NRR is recent
23 publication of the Reg Guide 1.174, which is how to make
24 plant-specific changes using PRA as a good example there.

25 Another area where we really feel a need to

1 improve is to better synchronize our research programs with
2 the Agency needs. We feel that shared organizational goals
3 must be developed between the user offices and the Office of
4 Research so that outcomes can be decided for each party.

5 Let me turn to the next slide and talk about our
6 approach to achieving change --

7 CHAIRMAN JACKSON: I want you to talk about your
8 first bullet and your last bullet.

9 MS. FEDERLINE: On Slide --

10 CHAIRMAN JACKSON: 9.

11 MS. FEDERLINE: 9, yes. A key priority is
12 maintaining our emphasis on safety by assuring that risk
13 significant vulnerabilities are identified early. It is
14 very important that we can prioritize our work such that we
15 can bring our information to bear early in the process.
16 That involves using prioritization criteria and defining
17 outcomes with the user offices to make sure that we have
18 just in time information.

19 Now that is quite difficult in a research program
20 because having conducted research yourselves you know that
21 the results are unpredictable, but we believe that we can do
22 some phasing of our work, such that interim results can be
23 useful to the program offices.

24 The last bullet is sunset activities when
25 sufficient information is available for regulatory purposes.

1 This again is an issue there has been some
2 differences on the definition of sunseting activities.
3 What do we actually mean by sunseting activities? We had
4 advanced a definition in our core capabilities paper that I
5 think talked about closure of programs. We are now feeling
6 that the best way to approach this issue is to sit down at
7 the beginning of programs and try to define program outcomes
8 with the user offices -- where are we headed on these
9 programs?

10 These will identify measurable criteria that we
11 can use to determine when the outcomes have been achieved.
12 We feel that the perfect answer is always not necessary for
13 some of these questions. In other words, there might be a
14 bounding or adequate answer for some of these questions, and
15 that is what we have to scope with the user offices early in
16 the process, so it is going to involve more planning
17 upfront, more discussions with the user offices in planning
18 our programs, but we would envision sunseting activities
19 based on that basis.

20 CHAIRMAN JACKSON: My colleague has a question.

21 COMMISSIONER DIAZ: Since you have been drilling
22 too, let me drill you on another one, the synchronization of
23 Research programs with Agency needs.

24 I think this involves again the idea of balance
25 and what the role of Research is, and I think we not very

1 long ago talked about the use in Research as an expert
2 advice on away from point of views, meaning that when there
3 are problems in the Agency that requires an expert advice
4 that Research be used as a resource that can quickly be
5 brought to bear on the issue, and I concede that that is an
6 important aspect of the synchronization.

7 MS. FEDERLINE: Yes.

8 COMMISSIONER DIAZ: Is that --

9 MS. FEDERLINE: Yes. We agree. We think there
10 are certain key issues where Research has done some longer
11 term issues and I think one example is perhaps improving the
12 regulatory process. Well, we don't do research in how to
13 improve the regulatory process, but maybe we should step
14 back and take that long-term look at how we can improve our
15 regulatory process.

16 That is sort an away from point of view strive --
17 or taking a longer term look.

18 CHAIRMAN JACKSON: Or even on specific technical
19 issues.

20 COMMISSIONER DIAZ: On the specific technical
21 issues -- that's very important.

22 MS. FEDERLINE: Right, we agree.

23 CHAIRMAN JACKSON: Yes, Commissioner.

24 COMMISSIONER McGAFFIGAN: i want to go back to the
25 sunseting point that the Chairman was on, because it came

1 up the last time we core capabilities or we looked at the
2 paper last year.

3 One of the problems, I think it comes across in
4 the ACRS critique as well, is it looks like expertise-driven
5 core capability as opposed to workload driven core
6 capability might be kept around even if there isn't any user
7 need for it on the grounds that there might be some day.

8 We ended up rejecting that I think in the case of
9 the hydrogen area last year, one of the first areas that was
10 looked at, but you then potentially -- it sounds like you
11 have an unproductive asset sitting there -- so is sunseting
12 really sunseting in that case? Maybe that is a core
13 capability if there is not a user need or a prospective user
14 need for some period of years. We say okay, we can live
15 without it.

16 Are you thinking sunseting in terms of
17 expertise-driven core capabilities?

18 MS. FEDERLINE: Well, I think this gets back to
19 the balance that Commissioner Diaz was talking about.

20 In the expertise-driven capabilities, the
21 Commission asked us to look at current needs as well as
22 foreseeable needs and we believe that there is an element in
23 the capabilities where we have to define skills which would
24 put us in a position to look at those foreseeable activities
25 that we see coming down the road.

1 I think there are clearly areas, for instance in
2 the severe accident area, hydrogen combustion is an example
3 where that particular activity will be sunset. That
4 individual's expertise will be preserved because he will be
5 usefully employed on other topics in very related areas, so
6 we will still preserve the core capability to be able to
7 answer future questions.

8 Now there may be a few specific areas, and I think
9 core degradation, materials issues related to core
10 degradation is one where it is a very specific issue and it
11 is difficult to find a closely-aligned area where those
12 individuals can retain their expertise. You need to have
13 real useful work going on to retain the expert.

14 CHAIRMAN JACKSON: Well, in fact, that kind of
15 thing is a factor -- a factor, not necessarily the -- that
16 has to go into this issue about laying out your criteria for
17 what can be done in-house --

18 MS. FEDERLINE: Right.

19 CHAIRMAN JACKSON: -- versus out of house.

20 MS. FEDERLINE: That's correct.

21 CHAIRMAN JACKSON: If something becomes that
22 specific, then it also suggests something about the way the
23 work can usefully be done because my general comment was
24 that I think relates to both of the Commissioners' comments
25 is that this issue of redeployment of individuals and the

1 fungibility of individuals comes into play and can that be
2 done in a way to preserve a capability that you think you
3 need or might call upon --

4 MS. FEDERLINE: Right, .

5 CHAIRMAN JACKSON: -- in the consultative role if
6 not for some long-term -- what might occur is very
7 important, these things, and that is why I think it is not
8 appropriate and not easy just to sit here and say, well, do
9 this, do that, but you have to really fold all these things
10 in and come back.

11 So my basic question was these are noble goals in
12 terms of the future program emphasis, but I assume that plan
13 are being put into place --

14 MS. FEDERLINE: Yes.

15 CHAIRMAN JACKSON: -- and developed to accomplish
16 these goals.

17 MS. FEDERLINE: Yes. Let's turn to the next
18 slide.

19 The next slide just talks about some strategies.
20 How do we go about achieving our objective?

21 One of the areas we feel we need improvement in is
22 encouraging a management team concept within and between
23 offices. The IG's climate survey recognized Research's view
24 that good interoffice communication -- we had a less
25 favorable view in our office than other offices did. We

1 need to improve that.

2 It is important that we all have a common
3 understanding of our organizational goals in order to
4 identify accountable pieces, and so that is one of our
5 strategies.

6 We also want to have an office-wide mindset that
7 places greater reliance on proactive. We need to get to the
8 user offices. We need to get into their heads and
9 understand what the issues are and have a dialogue early in
10 the process.

11 We also need to focus on measurable outcomes. I
12 think that is one of the key things that we need to do in
13 Research is be outcome-oriented in terms of our work.

14 We also need to give more attention to cost
15 effectiveness. I think we can do that fairly -- as Ashok
16 pointed out in some of our near-term activities with looking
17 at ways to achieve efficiencies in contract management and
18 contract consolidation.

19 Another one of our strategies is to use risk
20 informed thinking throughout the agency and we think we have
21 a real heads-up on this. In the climate survey it showed
22 that the Research Staff viewed this as an important
23 priority. This was something that was very high on their
24 value scale so we think this is an area where we can provide
25 service to the Agency.

1 Last but not least, we want to build on our
2 current strengths. Research, as ACRS acknowledged, has made
3 a lot of contributions to the Agency over 25 years, so we
4 don't want to throw the baby out with the bath water. We
5 want to make sure that we keep the things that we do well.

6 CHAIRMAN JACKSON: Commissioner Diaz?

7 COMMISSIONER DIAZ: Just a quick thing in here. I
8 don't know whether office-wide mindset are consistent
9 things. Mindsets are dangerous, I think. You want to think
10 about that.

11 CHAIRMAN JACKSON: Office-wide thinking.

12 MS. FEDERLINE: Thinking.

13 [Laughter.]

14 MS. FEDERLINE: Yes.

15 CHAIRMAN JACKSON: But other than that, I can
16 plagiarize -- this is totally my point of view about how we
17 need to be managing our business. Besides, you have heard
18 some of this from me, but I would like -- this is very nice.

19 [Laughter.]

20 MS. FEDERLINE: The next slide -- on Slide 11,
21 please.

22 It really outlines our plan for achieving change.
23 And, really, what we want to do is design and conduct a
24 self-assessment. We view this as the ideal time for
25 research because NRR, which is one of our best customers, is

1 doing their own self-assessment now, and there is an
2 opportunity to optimize some of our joint processes. So we
3 would like to move forward with that.

4 Of course, the staff ideas and involvement are
5 going to be key to making this a successful effort. We
6 would also like to consider some contractor assistance
7 because we are not the world's experts in self-assessment.
8 They can give us an independent perspective in that regard.

9 And then we want to pin these down so we can be
10 accountable. We want to develop an improvement plan. It
11 will have a phased approach. We want to move aggressively,
12 but we want to make sure we move aggressively on the
13 important issues and we are not looking at the exponent
14 instead of the main integer.

15 CHAIRMAN JACKSON: Let me just say something in
16 terms of getting some outside help, which I think is always
17 good to let some fresh air in. Two comments I would make to
18 you on that. One is that when that occurs, you really
19 should try to build off of what is going on --

20 MS. FEDERLINE: Yes.

21 CHAIRMAN JACKSON: -- for the other program
22 offices like NRR, so we don't have, you know, this
23 contractor tells, you know, NRR to do X.

24 MS. FEDERLINE: Right Yes.

25 CHAIRMAN JACKSON: And then you have, you know, a

1 separate guy comes along and tells Research to do Y. This
2 is has to be -- if you are going to have an agency-wide
3 thinking, --

4 MS. FEDERLINE: Yes.

5 CHAIRMAN JACKSON: -- then we have to have a
6 coherent agency-wide approach. And I think there is
7 something built in even to the self-assessment that is going
8 on under the EC that can allow for that.

9 MS. FEDERLINE: Yes. We have met with the CFO on
10 that and that is the direction we are pursuing.

11 CHAIRMAN JACKSON: And the second piece is
12 benchmarking, that I think you can have contractors come in
13 and help you do things, but there are things to be learned,
14 both from the private sector, as well as other agencies that
15 have had to change either in response to external pressure
16 or through some reinvention process. And I think too often
17 we are too insular, and we can make use of that, let some
18 outside air in.

19 MS. FEDERLINE: One thing that Ashok and I have
20 done is, sort of coming into our jobs, is we have tried to
21 go out and look at what other agencies are doing in their
22 research programs to support regulation. And it is
23 interesting how closely EPA and NASA supporting the FAA are
24 looking at a partnership with industry. You know, in
25 previous times, that -- the sort of independence, but there

1 seems to be a large emphasis on trying to work out
2 appropriate partnerships with industry.

3 CHAIRMAN JACKSON: And the research area is one
4 that may lend itself --

5 MS. FEDERLINE: Right.

6 CHAIRMAN JACKSON: -- more easily to that than
7 some others.

8 MS. FEDERLINE: Right.

9 MR. THADANI: If I may just note that the Advisory
10 Committee also made the same recommendation to us.

11 CHAIRMAN JACKSON: Okay.

12 MS. FEDERLINE: On Slide 12, we have identified
13 some desired outcomes of our self-assessment. We want to
14 improve the integration of Research and user office
15 priorities and schedules. We clearly want to improve
16 efficiencies and we think we can do that through some
17 contract management efficiencies and consolidation of
18 projects.

19 Leadership buy-in is a very, very important
20 aspect. You can't achieve the outcomes without having the
21 buy-in of leadership at all levels in the office, and that's
22 one thing we are going to be working very hard on, as well
23 as improving our linkage to agency performance measures.

24 COMMISSIONER McGAFFIGAN: Could I stop her on
25 this?

1 CHAIRMAN JACKSON: Yes, please.

2 COMMISSIONER McGAFFIGAN: The original DSI-22 SRM,
3 I think said -- it asked you to consider establishing a
4 Research Effectiveness Review Board that would have the user
5 offices. There was an attempt to try to do this better
6 integration, or at least give you a mechanism for it. Did
7 that ever happen, and is it working?

8 MS. FEDERLINE: Yes, it has. Let me ask -- John
9 Craig chairs that group.

10 MR. CRAIG: We got it off the ground a little over
11 a month and a half ago, I guess, with the first meeting with
12 representatives from all the offices in Region 1. We went
13 over the SRM and some of the purposes and the activities we
14 would like the RARB to perform. And we are in the process
15 of setting up the next meeting.

16 One of the topics that we discussed was the
17 variation of user needs and what they look like, and how
18 that might contribute to confusion, poor definition of scope
19 of initial projects. And one of the thoughts, suggestions,
20 was that we ought to have perhaps some more defined format
21 for user needs with specific issues addressed so we could
22 have a better dialogue up front to clearly understand the
23 request, the product, the schedule, those kind of things.

24 COMMISSIONER McGAFFIGAN: It sounds like what
25 Commissioner Diaz was suggesting earlier, a sort of internal

1 contract with deliverables and schedules.

2 CHAIRMAN JACKSON: Yes.

3 MS. FEDERLINE: Slide 13, please.

4 COMMISSIONER McGAFFIGAN: And the Chairman. I'm
5 sorry.

6 CHAIRMAN JACKSON: Thank you very much. It's a
7 dual thing.

8 MS. FEDERLINE: Slide 13 provides some examples of
9 issues that we are considering for our self-assessment. I
10 won't go into detail. I will just highlight the first one.
11 The IG climate survey indicated that we got a less favorable
12 response in research than the agency as a whole about the
13 belief that NRC communicates well with the public. That is
14 an area where we know we have some work to do. We think the
15 Commission led the way in the recent stakeholders meeting.
16 But we want to see how we can better consider stakeholder
17 perspectives early in program planning. Look at alternative
18 solutions to technical problems. And that's one thing that
19 we are going to tackle in that area.

20 I would just highlight the optimizing the
21 effectiveness and efficiency of human resources. The
22 climate survey showed that the research staff are more
23 favorable than the overall agency on the opportunities for
24 training, and that they had a high favorable response on the
25 fact that their jobs are worthwhile. So I think there is a

1 real synergy there. I think there is an opportunity for
2 increased reliance on in-house staff and to improve the
3 human resource aspect.

4 If it is agreeable, I'll turn to Slide 14 just
5 because of the time. I wanted to mention another input to
6 our self-assessment is going to be the ACRS recommendations.
7 The Commission asked the ACRS to review the research program
8 in terms of scope, and balance, and need, and whether we
9 were preparing for the changing environment, and how well we
10 were anticipating research needs.

11 And we felt overall that the ACRS report was
12 extremely useful for us. It had a number of overall
13 recommendations which I have summarized on this slide. But
14 it also got into detailed comments in the technical areas.
15 And, of course, we plan to respond to the ACRS review, you
16 know, in more detail, but we want to take these
17 recommendations into consideration as part of our
18 self-assessment. And as I walk through these, you'll see
19 that we define some of these issues in our own thinking
20 process on what we need to do. So I think there is a lot of
21 commonality of thinking.

22 I would just highlight the first bullet. Define a
23 process for identifying and prioritizing research that
24 considers long-term benefits and short-term needs. ACRS
25 really observed that Research doesn't have well-developed

1 process for identifying future research needs, and they
2 remarked that the line organization often doesn't submit
3 research needs when the budget is believed to be fully
4 subscribed in that area. So they recommended revising the
5 user need process to get all the user needs in the basket
6 and then sit down and prioritize the user needs among the
7 two offices. So I think that was a very positive
8 suggestion.

9 They also observed that Research relies on assumed
10 solutions to complex technical issues. And I think John
11 brought that up in his discussion of generic issues. There
12 is a feeling that we peer review the work too near the end
13 of the product, that we need to get more peer review into
14 the solution-developing phase of our projects. That was a
15 very good suggestion and we plant to follow up on that.

16 I would just highlight the last. Validate and
17 improve PRA methods and results through support from AEOD
18 activities. Ashok and I couldn't agree more on this. We
19 see a great synergy between Research activities and AEOD
20 activities. And as a part of the memo that comes back to
21 you on improving our posture in risk-informed, we have
22 identified several ways that we can work more closely with
23 AEOD and take advantage of the work that they have already
24 done.

25 So, overall, we feel that ACRS has identified some

1 of the same issues that are close to our heart, and we plant
2 to incorporate these in our self-assessment and respond to
3 ACRS.

4 Turning to Slide 15, I wanted to touch for a few
5 minutes on core research capabilities. The first slide,
6 actually, I won't spend a lot of time on this. This goes
7 through the process of the Commission directing the staff to
8 evaluate, and core capabilities, develop criteria for
9 evaluating these.

10 I think it is important to focus a minute on the
11 definition. In the definition in DSI-22, the Commission
12 indicates that core means a maintenance program consisting
13 of the most critical expertise, including experimental
14 facilities, that NRC needs to have available to support
15 licensing and regulatory functions.

16 One of the things that we have found in discussing
17 this core capability area is that, in terms of definitions,
18 you always have one more opinion than the number of people
19 in the room. It is remarkable, you know, how many opinions
20 there are on the definitions in core capabilities.

21 And what we have tried to do in our interactions
22 with ACRS is sort of step back and get clear agreement on
23 the definitions. I think that is the only way that we are
24 going to sort of get through this core capability. You are
25 aware that we did provide a paper identifying expertise

1 driven core capabilities, and the Commission approved the
2 criteria. We have since come back with another paper which
3 evaluates the core capabilities.

4 Turning to Slide 16, I would just note that the
5 April paper that we provided you on the results of expertise
6 driven core capabilities was a very intensive, year-long
7 effort in the Office of Research. Thanks to Mal Knapp and
8 his role as Acting Office Director, there was a very
9 dedicated effort to look at this in a thorough way and come
10 out with a systematic process which was really workable.
11 And I think Ashok and I really believe that it is a good
12 start.

13 It is a difficult topic to address, and something
14 of this nature can always be improved, you know, it is
15 possible to make improvements. But we think that there was
16 a pretty good start and what we would like to do is sort of
17 build on this, have some more interactions with ACRS in this
18 regard, try to narrow the issues with ACRS, and then
19 incorporate what the new ideas are in the overall agency
20 planning on core capabilities.

21 Just a couple of points that I would make on Slide
22 16, we have defined -- we have sort of narrowed the
23 definition in our use of expertise driven core capabilities.
24 These are the minimum skills and facilities to effectively
25 support current and foreseeable future regulatory

1 activities. The words that are often in question in this
2 definition are "minimum" and "effectively." What we are
3 trying to design is not a Cadillac. We are trying to get to
4 the minimum types and numbers of skills that would allow us
5 to support a full range of activities. So that's what we
6 mean by that definition.

7 COMMISSIONER MCGAFFIGAN: I would think you would
8 also stop on the word "foreseeable."

9 MS. FEDERLINE: Yes.

10 COMMISSIONER MCGAFFIGAN: When you are having
11 arguments about that definition.

12 MS. FEDERLINE: Yes.

13 COMMISSIONER MCGAFFIGAN: How far do you try to
14 foresee?

15 MS. FEDERLINE: That's right. Everybody's
16 perception of foreseeable, it's in the mind of the beholder.
17 And that's why we need to have some additional discussions
18 with ACRS on this concept of ascentiality. Is it 29, is it
19 27, is it 26? You know, that is going to take a lot more
20 effort to sort of narrow in on that.

21 There was extensive external and internal
22 stakeholder involvement in developing these core criteria.
23 There was a meeting held with industry in March of '97. We
24 have had ongoing interactions with EPRI and others. We
25 talked to the Deans of the Nuclear Engineering Departments

1 of six different universities, and to the NRC Program
2 Managers at the National Labs. And there was overall
3 agreement on the approach that we used and on the areas of
4 core competence, so we felt pretty good going into this
5 effort, that we had at least targeted, in the views of these
6 independent parties, the right capabilities to look at.

7 The last point that I just wanted to clarify is
8 there is often sort of differences on how core capabilities
9 and the budget are intertwined. And I guess it is our view
10 that core capabilities inform the budget process but are not
11 driven by it. The way we see it is that core capabilities
12 are an effort to take an independent look at what are the
13 minimum set of skills that we need to have. We would then
14 use this as a gauge. As the Commission goes through the
15 budget process, it would be something to bounce the
16 decisions off, to say, Are we making reasonable decisions in
17 this area? And we would also use them to guide our staffing
18 requirements. As we recruit and hire, we would sort of look
19 at the balance of these skills and just sort of use it as a
20 calibration factor.

21 CHAIRMAN JACKSON: Let me ask you this question.
22 How does your methodology for establishing core capabilities
23 compare with or dovetail with what is being done by the rest
24 of the agency?

25 MS. FEDERLINE: I really can't speak in --

1 MR. CALLAN: We anticipated that question, so --

2 CHAIRMAN JACKSON: Good.

3 MR. CALLAN: Jim McDermott here, who can --

4 CHAIRMAN JACKSON: That's why he is sitting here.

5 Okay, Jim. Do you care to speak into the microphone?

6 MR. McDERMOTT: I guess for the reporter I am
7 supposed to say I am Jim McDermott from the Office of Human
8 Resources.

9 My thinking -- my ideas were permanently formed,
10 or warped, in the strategic planning process a couple of
11 years ago. We talked about staffing and core capabilities.
12 That was in the Human Resources context. And Margaret is
13 right, we have a had a little trouble with definitions. In
14 the latest papers we have written on it, from our point of
15 view, we want to talk about core competencies, to make the
16 point that we are talking about staff skills, which is a
17 smaller set of issues than core capability to perform
18 research.

19 That said, we found much that Research had done
20 very useful in helping us develop a process for capturing
21 core competency information for the agency. Two sides to
22 one coin. What we need and what we have.

23 CHAIRMAN JACKSON: So you are saying the core
24 competency part is a subset of core capability?

25 MR. McDERMOTT: Yes, ma'am.

1 CHAIRMAN JACKSON: And you all agree on that?

2 MR. McDERMOTT: I believe so. I am looking at
3 heads to see which way they are going. They are going --

4 COMMISSIONER DIAZ: Let me go to Mr. Callan. He
5 is sitting too comfortable there, and I think he needs to be
6 squirming.

7 CHAIRMAN JACKSON: That's about to change.

8 COMMISSIONER DIAZ: As we look at all of the
9 things that we are learning, has any recent attempt been
10 made to put a road map of the technical issues that the
11 agency facing by office, by order of difficulty, you know,
12 how they, you know, sequencing time, something that could
13 guide Research, NRR and NMSS as far as establishing
14 priorities that then can actually be put together into the
15 budget process? This is a multi-dimensional road map. You
16 know, you might start with the things that have very little
17 technical difficulty to the ones that have the largest one;
18 to the ones that have less investment to the largest
19 investment; to the ones that involve a single office or a
20 multiple office.

21 But it seems like we are coming to the point that
22 a road map will be invaluable to guide Commission decisions
23 and yourself, in your day-to-day work. Mr. Callan, day
24 after tomorrow?

25 [Laughter.]

1 CHAIRMAN JACKSON: No, yesterday.

2 MR. CALLAN: We don't have a mature road map like
3 you describe, Commissioner. We understand that that is
4 where we need to go with our planning framework. The two
5 customers, and Dr. Knapp and Dr. Sheron can also give their
6 views on this, but both NMSS and NRR have rapidly maturing
7 planning frameworks. NMSS pioneered the notion of operating
8 plans here in headquarters, and NRR has made dramatic gains
9 in the past year, to do internally, to do the sorts of
10 things you talk about. And then, of course, both NMSS and
11 NRR and under the same Deputy, so Hugh Thompson, the Deputy
12 who oversees both program offices is then -- can integrate
13 NMSS and NRR priorities.

14 Now, the next level, the next plateau of
15 performance is then to take the outputs of that effort and
16 match them with Research's operating plan priorities and --
17 and it's under a different Deputy, and that's our next
18 challenge, and we are not fully mature in that area.

19 COMMISSIONER DIAZ: Okay. Because I get the
20 concern that we hired external people to look at how we
21 function, but they can't tell the difficulty of a task, that
22 has to come from inside. So those results are only going to
23 be as good as the input that we give them. And eventually
24 this road map would actually help to --

25 MR. CALLAN: On specific -- specific high priority

1 actions, such as our efforts to improve our assessment, plan
2 assessment process, our efforts to move more rapidly towards
3 a risk-informed regulatory regime, we are doing that.

4 COMMISSIONER DIAZ: Okay.

5 MR. CALLAN: We are integrating Research
6 priorities with Program Office priorities case by case. I
7 would to institutionalize that across the board so it just
8 happens naturally. We don't have to set up a special task
9 force, a special effort, steering committees and that sort
10 of thing. And we can get you that.

11 CHAIRMAN JACKSON: That is part of the planning
12 framework, it is not as comprehensive yet.

13 MR. CALLAN: That's right.

14 CHAIRMAN JACKSON: Being as comprehensively done
15 as it should be. But --

16 MR. CALLAN: Right. Right. But we are doing it
17 successfully. You know, I think the integration along the
18 lines you are describing, of Research priorities with -- I
19 mean particularly NRR priorities in the area of providing
20 objective indicators to support the Senior Management
21 Meeting and our assessment process has been dramatic. It
22 was reflected, if you recall, in our briefing of the
23 Commission last week on the results at the Senior Management
24 Meeting. The results were dramatic in Chicago when we met,
25 and I give a lot of credit to Research in providing that.

1 That input was pivotal in the case of one plant that we
2 discussed, if you recall.

3 So that's -- we just need to do more of that.

4 COMMISSIONER DIAZ: Okay. Thank you.

5 CHAIRMAN JACKSON: Let's try, in terms of this
6 meeting, let's try to bring things to closure here.

7 Commissioner McGaffigan.

8 COMMISSIONER MCGAFFIGAN: One of the tasks that
9 this paper, or this core capability effort was supposed to
10 look at, according to the SRM, and I guess it has been
11 postponed, was to see whether core capabilities had to
12 reside in Research or elsewhere, and that goes to this issue
13 that Mr. McDermott has talked about.

14 But is the presumption in this paper, this was an
15 internal only Research effort that looked only at --

16 MS. FEDERLINE: Yes.

17 COMMISSIONER MCGAFFIGAN: -- preserving things in
18 Research?

19 MS. FEDERLINE: Yes.

20 COMMISSIONER MCGAFFIGAN: And it didn't consider
21 the cross-cutting?

22 MS. FEDERLINE: Right.

23 COMMISSIONER MCGAFFIGAN: Okay. The other point,
24 has this paper -- the IG has criticized it, the ACRS has
25 criticized it. Is it a public paper at this point, this

1 paper that has been sitting on our desk since April 9th, or
2 is it still --

3 MR. HOYLE: We don't know where it is.

4 COMMISSIONER McGAFFIGAN: Well, we may want to
5 consider --

6 CHAIRMAN JACKSON: In the sense of peer review.

7 COMMISSIONER McGAFFIGAN: Yes, we might as well
8 send it out of here.

9 CHAIRMAN JACKSON: Since you have discussed it
10 with ACRS.

11 COMMISSIONER McGAFFIGAN: Right.

12 CHAIRMAN JACKSON: But, you know, it is fine. I
13 mean, but we can do that. Okay. Why don't you go on?

14 MS. FEDERLINE: Just my final slide, Slide 17. I
15 just wanted to touch for a few minutes on the ACRS comments
16 on core capabilities and on the IG's Special Evaluation
17 Report on Core Capabilities. Staff has met with ACRS on at
18 least three occasions on core capabilities. They provided
19 us a letter in June in which they discussed some concerns
20 that they had. They felt that there was a need to better
21 define core capabilities and incorporate the concept of
22 ascentiality.

23 They were also asking us to consider the use of a
24 top-down process to ID capabilities. As you will recall,
25 and this is one of the differences that we had with the IG,

1 our approach, which the Commission approved, said that we
2 would identify some core capabilities and then we would
3 evaluate them using the criteria. So, you know, a top-down
4 process would be another way of doing this, it is just not
5 the one that we identified in our methodology and came
6 forward to the Commission with.

7 Also, a key issue with the ACRS is that they
8 believe core capability should focus only on those
9 capabilities that are unique to nuclear technology, or for
10 which independent assessment is essential. They also
11 recommend, as does the IG, a process which discriminates in
12 terms of priorities. Now, that is certainly do-able. It is
13 not something that was outlined in the original request to
14 staff or did we propose it, but it is certainly do-able.

15 So in terms of the ACRS, I met with them in July
16 and we had -- I felt it was a very constructive meeting. We
17 discussed, we clarified some terminology and we clarified
18 actually where our differences are, and we agreed to come
19 back after the Commission meeting and have additional
20 discussions. And we really welcome their help on this. We
21 are not the experts in core capability. So, you know, we
22 are willing to take all the help we can get.

23 The IG, yesterday afternoon we got a copy, as you
24 said, of the advance report, the IG Special Evaluation
25 Report on Core Research Capabilities, and we will be

1 reviewing it thoroughly. We have only had a chance to look
2 at it preliminary. But we did have just a few thoughts in
3 looking at it initially.

4 One of their first points was that they believe
5 that we had preselected core research areas and did not use
6 the Commission approved criteria as intended. I think this
7 is an area where we would differ with the IG. We believe
8 that we did follow the process that we identified in the
9 paper, and that process was to identify the core
10 capabilities, which we did in conjunction with industry and
11 university heads and program managers at the lab. And then
12 we would essentially validate those capabilities using the
13 criteria. So I think we just have a difference of view in
14 that area.

15 They also talked about that our selection was so
16 broad that it included all research areas. And, you know,
17 we generally agree with that view, but we feel that because
18 of the broad population of people that we talk to in coming
19 up with these areas, not only external -- including external
20 parties, but also the user officers, that we believe there
21 was general agreement that these were the correct areas to
22 evaluate.

23 The IG indicated that there was limited value to
24 core capability if not weighted, and that is something that
25 we can certainly do. One thing we need some guidance from

1 the Commission on is -- this is a very resource-intensive
2 effort, and we have got to decide what more we want to do on
3 this and, you know, consider the impacts of the resources
4 before we move forward on this.

5 The IG also indicated that staff does not know how
6 organizational core capability will be used. And, again,
7 this has to -- we have to have an organizational agreement
8 across the agency on how this capability would be used. But
9 I think our view is that it would be used to inform the
10 budget process, not drive the process, and that it would
11 provide a way for us to monitor staffing requirements and
12 staff recruiting and whatnot. So, again, I think we agree
13 that it would be good to establish an organizational view of
14 how the core capabilities are going to be used.

15 But, essentially, our plan on moving forward is we
16 want to have additional discussions with the ACRS. We want
17 to have time to look at our office-wide prioritization of
18 research using a more risk-informed approach, because we
19 think that will inform core capabilities. And then we would
20 see our -- the outputs of our efforts being merged with the
21 Human Resource process that is being put in place for the
22 agency.

23 COMMISSIONER McGAFFIGAN: So could I try to say --

24 MS. FEDERLINE: Sure.

25 COMMISSIONER McGAFFIGAN: The difference between

1 you and the IG on this weighting issue is that, and I am
2 looking back at the paper, you laid out the criteria, these
3 various areas, and you evaluated the 29 core capability,
4 expertise driven core capabilities in these various areas,
5 and at one point in the paper you say you didn't mean for
6 this -- didn't intend to use this framework quantitatively,
7 so you didn't assign weightings. But in the budget process
8 you can, and the one place where you say in the paper,
9 Research agrees that if areas five and six were the only
10 areas where core capability could make a contribution, then
11 it probably wouldn't survive, words to that effect. So you
12 agree that some areas should be weighted less in a process
13 and some weighted more. But you were leaving the weighting,
14 as I understand it, to the budget process. And the IG, I
15 guess, was -- is suggesting that you might have done it up
16 front.

17 MS. FEDERLINE: Well, it's possible --

18 COMMISSIONER MCGAFFIGAN: Decide which areas are
19 more important.

20 MS. FEDERLINE: Well, it's possible to do it a
21 number of ways.

22 MR. THADANI: I just, if I may. Just, I think --
23 I think the difficulty, as I understand, the IG had, and I
24 believe the ACRS also had the same difficulty, which was you
25 have got high, medium, lows and so on, but at the end of the

1 day you have got to say what is the most important.

2 COMMISSIONER McGAFFIGAN: How do you integrate it?

3 MR. THADANI: The least important. So the issue
4 really was, Can we rank order these? And I think that is a
5 good thought, and we are going to take a look to see if we
6 can actually do that, and how best to assign weighting
7 factors and go forward.

8 COMMISSIONER McGAFFIGAN: Right.

9 CHAIRMAN JACKSON: Okay. Commissioner.

10 MR. THADANI: Summary section.

11 MS. FEDERLINE: Yes, I just had a summary slide.
12 I think our view is that Research continues to be an
13 essential component of the regulatory program. We will
14 continue to provide the expertise, tools and information
15 that is needed. We want to work closely with the user
16 officers. But we feel that constant attention is needed to
17 the prioritization, to the timeliness and to the cost
18 effectiveness of our work, and we are going to give some
19 management attention to that over the next term.

20 CHAIRMAN JACKSON: Okay.

21 MR. CALLAN: That's all we have, Chairman.

22 CHAIRMAN JACKSON: Okay. Commissioner?

23 Commissioner?

24 [No response.]

25 CHAIRMAN JACKSON: All right. Well, let me just

1 thank you for a very comprehensive, and I believe
2 informative briefing on the agency's Research Office and its
3 programs.

4 Let me just say for the record that the Commission
5 appreciates the contributions that the research programs
6 have made to the agency's regulatory programs over the years
7 and will continue to make in the years to come. And I
8 believe that -- I'll mention one specifically, your
9 noteworthy contributions in support of the final design
10 approval of the AP600 design. We have given it a lot of
11 focus in recent months. And it is just one of the many
12 examples of how, and you have mentioned your own, of how
13 this agency has contributed.

14 But having said that, many challenges remain for
15 the agency and with it, for the Office of Research as part
16 of that. And so we have to then not only position ourselves
17 for future challenges, but I think this office has a
18 significant role to play in addressing many of the current
19 challenges before us. And so I encourage you to perform the
20 necessary work to support our regulations and issues of
21 importance and to provide timely support in finding
22 solutions to current challenges.

23 And I spoke earlier, that I think the -- and it is
24 hard for a research organization, and I came out of one.
25 Okay. That to have -- when I say a production-oriented

1 mentality, that is not to say not do your research, but to
2 do the kind of planning, to lay out the kinds of -- you
3 know, understand the outcomes and the goals to plan the work
4 and to work the plan. To do the resource loading, you know,
5 to follow through, to get things done.

6 And so I actually think that the slide that
7 Margaret talked to, Slide 10, covers it very well, you know,
8 in terms of a management team concept and that you are part
9 of an overall agency mission to have a thinking that places
10 greater value on being proactive. Okay. And you know that
11 is my mantra, to be outcomes-oriented and to be cost
12 effective, to use risk-informed thinking and to build on
13 what you already have. Okay. But that doesn't mean
14 preserving what is not needed anymore. Okay.

15 And so I think you ought to take that Slide 10 and
16 use it internally, because I think it summarizes. And then
17 Slide 9 in terms of how you go about doing it. And then
18 just for the record, I would -- because I am asking each
19 office, whenever there is an audit type or a management
20 assessment type IG report, to document your response to that
21 report within a specified period, and saying what you agree
22 with, what you don't. You know, what is resource-intensive,
23 what is not, so that we are all clear on where we are. And
24 if there are things with which you agree and, you know, the
25 resource expenditure, it is worth that, then that you lay

1 out time lines, or saying how you are going to get them done
2 and when, and how you are going to fold that into what you
3 are already doing.

4 And so with that, we are adjourned.

5 [Whereupon, at 12:14 p.m., the briefing was
6 concluded.]

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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: BRIEFING ON RECENT RESEARCH PROGRAM
RESULTS AND CORE CAPABILITIES
PUBLIC MEETING

PLACE OF MEETING: Rockville, Maryland

DATE OF MEETING: Thursday, August 6, 1998

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: Matthe Brazil

Reporter: Mark Mahoney



RESEARCH -- A LOOK TO THE FUTURE

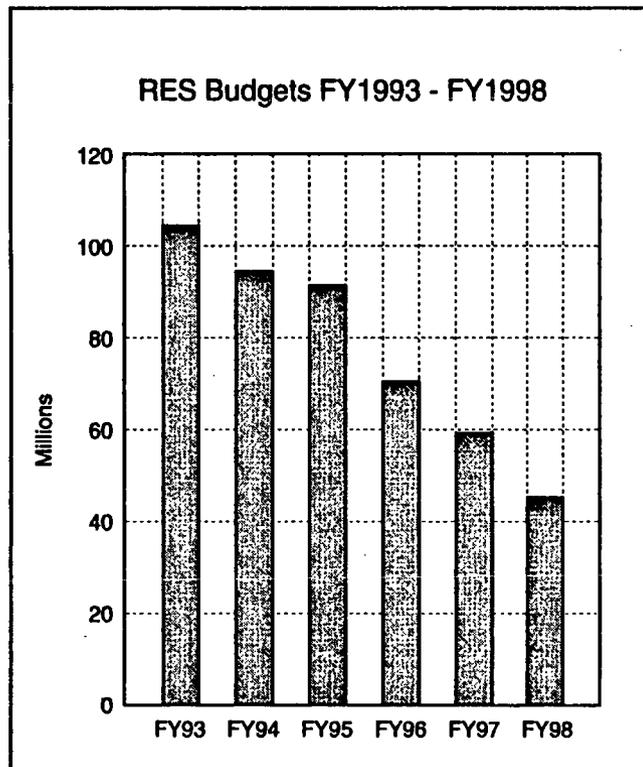
Presented by
Ashok Thadani, Director
Margaret Federline
Lawrence Shao
John Craig
Tom King
Office of Nuclear Regulatory Research

AUGUST 6, 1998

BRIEFING OBJECTIVES

- **Provide an overview of RES and its mission**
- **Introduce RES management team**
- **Highlight value of research results to agency**
- **Discuss the need for change and future program emphasis**
- **Describe an approach to achieve change**
- **Discuss RES core capabilities assessment**
- **Summary**

OVERVIEW



- RES budget peaked at over \$200M in FY82 and has declined from \$104M in FY93 to \$45M in FY98
- FTEs peaked at 292 in FY81 and have declined from 240 in FY93 to 173 in FY98
- A changing and maturing industry plus new technologies and new information will pose new issues
- Under DSI-22 the Commission examined the future role of Research in achieving the NRC's mission
- Research is needed to provide the necessary information to support safety and burden reduction decisions

RESEARCH NEEDS TO BE RESPONSIVE TO A CHANGING ENVIRONMENT

- **Transition to risk-informed regulatory process**
- **Nuclear industry undergoing economic deregulation and restructuring which will increase pressures to use risk insights to gain efficiencies**
- **Identification of new safety issues associated with operation, aging, new technology and research results**
- **Increased stakeholder interest in research programs**
- **Resource constraints and focus on outcome measures emphasize the need for efficiency and effectiveness**
- **Commission guidance such as the decision on DSI-22**

NEAR TERM PRIORITIES

- **Reorganize to position office for future and meet staffing constraints (FTE, Supv., SES)**
- **Initiate efforts to prioritize RES activities on a more risk-informed basis**
- **Take specific actions to improve the effectiveness of interactions with internal and external stakeholders**
- **Achieve contracting efficiencies**

BUILDING ON A FOUNDATION

Examples of Accomplishments	Safety Improvement	Burden Reduction
● RPV integrity-PTS, Annealing	x	x
● Performance assessment methodology for waste disposal		x
● Piping integrity-LBB, cracking, repairs	x	x
● Seismic criteria - hazard curves, higher damping values, siting criteria	x	x
● Motor operated valve failures	x	

BUILDING ON A FOUNDATION (Con't)

Examples of Accomplishments	Safety Improvement	Burden Reduction
● Hydrogen combustion/direct containment heating	x	x
● Steam explosion/basemat penetration	x	x
● BWR strainer blockage	x	
● Environmentally assisted cracking	x	x
● AP-600	x	

BUILDING ON A FOUNDATION (Con't)

Examples of Current Issues	Safety Improvement	Burden Reduction
● Risk-informed changes to licensing basis	x	x
● Source term rebaselining	x	x
● Improved regulatory process for decommissioning		x
● Digital I&C	x	x
● High burnup fuel	x	x
● Underwater weld repair	x	x

FUTURE PROGRAM EMPHASIS

- **Maintain emphasis on safety by assuring that risk significant vulnerabilities are identified early**
- **Develop reasonable thresholds for decision-making in areas of potential high risk, safety or regulatory significance**
- **Provide the tools and knowledge for risk-informed improvements in the regulatory process**
- **Better synchronize research programs with agency needs**
- **Sunset activities when sufficient information is available for regulatory purposes**

APPROACH TO ACHIEVING CHANGE

RES Objective:

Improve RES contribution to agency-wide performance goals while achieving efficiencies

Value/Strategies:

- **Encourage management team concept within and between offices**
- **Encourage an office-wide mind-set that places greater value on being:**
 - **Pro-active**
 - **Outcome oriented**
 - **Cost-effective**
- **Use risk-informed thinking throughout agency programs**
- **Build on current strengths, i.e., programs/processes where appropriate**

APPROACH TO ACHIEVING CHANGE

- **Evaluate options for designing and conducting a self-assessment**
 - **Consider contractor assistance for independent perspective**
- **Develop improvement plan using phased approach**
 - **Prioritize to ensure that important issues are addressed first**

EXAMPLES OF DESIRED OUTCOMES OF SELF-ASSESSMENT

- **Improved integration of RES and user office priorities and schedules**
- **Improved efficiency**
- **Leadership buy-in of assessment outcomes**
- **Improved linkage to agency performance measures**

EXAMPLES OF ISSUES BEING CONSIDERED FOR ASSESSMENT

- **Interactions with internal and external stakeholders**
- **Risk-informed prioritization of RES activities**
- **RES products -- timeliness and value-added**
- **Criteria for sunseting RES activities**
- **Optimize the effectiveness and efficiency
of human resources**
- **Effective communication of RES results**

ACRS/ACNW RESEARCH REVIEW

- **Major ACRS recommendations from NUREG-1635**
 - **Define process for identifying and prioritizing research that considers long term benefits vs. short term needs; revise user need process to better represent full range of research needs**
 - **Forge close ties between research activities and agency needs**
 - **Consider alternatives for addressing technical issues in areas that require innovation**
 - **Develop in-house risk assessment capability for use throughout agency and for planning research**
 - **Validate and improve PRA methods and results through support from AEOD activities**

CORE RESEARCH CAPABILITIES COMMISSION GUIDANCE

- **“Core means a maintenance program consisting of the most critical expertise, including some experimental facilities, that the NRC needs to have available to support licensing and regulatory functions” (DSI-22)**
- **“Identify core capability to support current and foreseeable future regulatory activities” (COMSECY-97-075)**
- **“Analyze core capabilities in NRR, AEOD, and NMSS; integrate results”**

CORE RESEARCH CAPABILITIES ARE WORK IN PROGRESS

- **Expertise driven capabilities defined as minimum skills and facilities to effectively support current and foreseeable future regulatory activities; identified 29**
- **Developed based on criteria and methodology approved by Commission**
- **External and internal stakeholder involvement**
- **Core capabilities inform the budget process but are not driven by it**

CORE RESEARCH CAPABILITIES (Con't)

- **Next steps:**
 - **Continue discussions with ACRS Subcommittee on Safety Research**
 - **Integrate with office-wide prioritization of research activities**
 - **Coordinate with ongoing program assessments and agency-wide core capability assessment**

SUMMARY

- **Research continues to be an essential component in the regulation of nuclear technology as indicated by emerging safety issues, introduction of new technology and changes in plant operation.**
- **RES will continue to provide the expertise, tools, and information to meet NRC's strategic objectives leveraging scarce resources with cooperative research when possible.**
- **Research expertise and products provide a foundation for credible agency decision making but constant attention is needed to the prioritization, timeliness and cost effectiveness of our work.**

DIVISION OF SYSTEMS TECHNOLOGY

Responsibilities:

- **Probabilistic risk assessment methods & analysis**
- **Thermal-hydraulics tools and analysis**
- **Fuel behavior**
- **Human-factors**
- **Digital I&C**
- **Severe accident tools and analysis**

Example:

Direct Containment Heating:

- **Addressed issue for large dry containments to show adequacy of existing designs**
- **Avoided additional requirements and costs to industry**

DIVISION OF ENGINEERING TECHNOLOGY

Responsibility:

- **Integrity of major structures and components (reactor vessels, piping, steam generators, reactor internals, pumps and valves, electrical cables, containments and structures) including effects of aging and severe external events.**

Example:

Reactor Vessel Integrity - Pressurized Thermal Shock (PTS), Thermal Annealing

- **NRR User Need**
- **Identified the significance of PTS, developed screening criteria (10 CFR 50.61), and criteria for plant operation beyond screening criteria (R.G. 1.154)**
- **Because of the PTS rule, many licensees adopted flux reduction programs which reduce the vessel failure probability.**
- **Material test data and engineering evaluation were bases for thermal annealing rule and R.G. (10 CFR 50.66 & R.G. 1.162)**
- **Thermal Annealing averts the costs of vessel repair or early closure.**

DIVISION OF REGULATORY APPLICATIONS

Responsibilities:

- **Radiation dosimetry and health effects dose assessment methods and tools**
- **Studies on radionuclide transport in the environment to develop methods and tools for Performance Assessment (PA)**
- **Generic Safety Issue Program**
- **Consensus Codes and Standards**

Example:

Performance Assessment Methodology for Waste Disposal

- **NMSS User Need**
- **Completed PA Methodology for HLW; extended later to LLW; currently being adapted to decommissioning**
- **Defined criteria, identification and resolution of technical issues**

PAST RESEARCH RESULTS

● Motor-Operated Valve (MOV) Issues

- Testing conducted by RES identified potential for certain safety-related MOV's to fail under design basis loadings**
- Generic letter required licensees to ensure operability of MOV's under design basis conditions**
- Significant averted core damage frequency, particularly for PWRs as well as net averted cost**

PAST RESEARCH RESULTS (CON'T)

- **BWR Strainer Blockage**
 - **RES conducted tests and analyses to evaluate the safety impact of debris blockage of BWR suction strainers on ECCS operation following a LOCA**
 - **RES work was instrumental in verifying that ECCS in BWR's would not have performed as required**

CURRENT AND FUTURE RESEARCH RESULTS

● Source-Term Rebaselining Study

- Licensees have proposed use of the NUREG-1465 revised source term to allow modifications to plant systems using risk insights to achieve costs savings**
- RES performed a detailed technical study (Rebaselining) to examine the impacts of the revised source term and provided technical basis for regulatory guidance.**
- Results indicated potential for substantial benefits to be realized by industry from use of the revised source term, while retaining adequate safety margin.**

CURRENT AND FUTURE RESEARCH RESULTS (Con't)

● High Burnup Fuel Behavior

- Fuel damage limits (e.g. LOCAs and reactivity accidents) were based on early data (1960s-70's) with fresh or low-burnup fuel; some of those limits are not adequate for high-burnup fuel**
- RES will provide data and recommended fuel damage limits for high-burnup fuel for postulated accidents of risk significance**
- Needed to confirm NRC approvals up to 62 GWd/t and to provide the basis for review of industry requests above that burnup**
- Approval of higher burnups could result in significant industry savings**

CURRENT AND FUTURE RESEARCH RESULTS (Con't)

● Transition to Risk-Informed Regulation

- PRA Policy Statement calls for increased use of PRA to complement traditional engineering approaches to regulation, and to better focus agency and licensee resources on the most safety significant issues**
- RES has developed regulatory guides for using PRA in plant-specific decision-making, inservice testing, graded QA, and inservice inspection**
- Application of guidance expected to produce both safety improvements and cost savings for licensees and staff**

CURRENT AND FUTURE RESEARCH RESULTS (Con't)

- **Cost-Effective Implementation of License Termination Rule**
 - **RES is developing a screening method which will allow many licensees to complete decommissioning in a more timely, cost effective manner**
 - **For other licensees, risk-informed, performance based guidance provides greater flexibility and eliminates unnecessary remediation**
 - **Using MARSSIM, a new survey methodology developed by an interagency effort, up to a 10-fold savings for reactor licensees can be realized over previous method**

CURRENT AND FUTURE RESEARCH RESULTS (Con't)

- **Underwater Weld Repairs of Irradiated Core Internals**
 - **RES has evaluated the general feasibility of weld repairs of highly irradiated stainless steel components underwater in BWR in-vessel environments**
 - **Ongoing work will develop the technical bases for approving weld repairs of specific irradiated reactor internal components**
 - **If the weld repair option is not available, it could lead to early plant closures in some cases**