UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
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BRIEFING ON OFFICE OF RESEARCH (RES) PROGRAMS,
PERFORMANCE, AND PLANS,
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ROCKVILLE, MARYLAND
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TUESDAY, APRIL 5, 2005
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The Commission met in open session at 9:30 a.m., at the Nuclear Regulatory Commission, One White Flint North, Rockville, Maryland, the Honorable Nils Diaz, Chairman of the Commission, presiding.

COMMISSIONERS PRESENT:

NILS J. DIAZ	Chairman of the Commission.
EDWARD MCGAFFIGAN	Member of the Commission
JEFFREY S. MERRIFIELD	Member of the Commission
GREGORY B. JACZKO	Member of the Commission
PETER B. LYONS	Member of the Commission

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

STAFF AND PRESENTERS:
LUIS REYES, EDO
CARL PAPERIELLO, Director, RES
JOHN CRAIG, Deputy Director, RES
RICHARD BARRETT, Dir, Div of Engineering Technology, RES
MARTY VIRGILIO, DEDO for Materials, Research and State & Tribal Programs
FAROUK ELTAWILA, Dir, Div of System Analysis & Regulatory Effectiveness, RES
CHARLES ADER, Dir, Div of Risk Analysis & Applications, RES

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3 P R O C E E D I N G S
4 CHAIRMAN DIAZ: Good morning. It is a pleasure to be
5 here this morning. If I count the number of pounds in this document,
6 you guys have been working very hard.
7 MR. REYES: Very hard.
8 CHAIRMAN DIAZ: If that has nothing to do with it, you
9 are in deep trouble.
10 The Commission is pleased to welcome the staff to
11 discuss the NRC Research Program. Our Research Program, of
12 course, plays an important role in our regulatory decisionmaking, and
13 we look forward to hearing about the program, specs of it, that you
14 believe the Commission should be keenly aware of them, significant
15 issues that are either being resolved or need to be resolved. We have
16 seen progress in a series of areas.
17 I especially like the progress made on 50.46. We all have
18 our pet peeves. It is very clear that that is one of mine. But I think
19 pressurized thermal shock is an issue that we are doing very well with
20 it.
21 We intend to make improvements in five areas, although
22 I'm sure you will realize during the questioning, the Commission is
23 worried about five areas. So, the role of Research is in many cases to
24 make the right technical decisions that are so important to our
25 regulatory programs.
26 We talked about many issues last years. Some of those
27 issues are coming back. I think it is important that issues that we have
28 mastered we become learned about it and we when we are no longer
29 learning, we properly sunset them and give them the proper value.
30 Before turning the meeting to the staff, asking for my
31 fellow Commissioners' comments, I would like to take a moment to
32 recognize John Craig and his many, many years of service, 33 years of
33 Federal service. I remember John when I was a child and he had
34 started in the NRC.
35 (Laughter.)
36 COMMISSIONER MCGAFFIGAN: Were you born?

CHAIRMAN DIAZ: I was about two. I was very, very, well developed for a two-year-old.

John had a distinguished career in this agency. He has been in many offices and been a key contributor. I'm sure that many of you can talk to his contributions in different places, but I personally would like to thank him for the time that he had been Chief of Staff in my office and he helped me in a very short period of time. We came from, I guess in about 48 hours, we had the Office of the Chairman running.

And I want to wish you well. Don't get lost. Sometimes we do need the wisdom that you have acquired. And we want to really wish you well.

We also have John Wiggins, who is going to take over.

And, John, we are looking forward to working with you. By the time somebody comes from the regions, they say they have really practiced where the rubber meets the road.

Well, I'm not sure in here in Research, which is the rubber and which is the road. But I'm sure you will find out for us and put them in the proper perspective.

Before I turn the meeting over to Mr. Reyes, I would like to ask if my fellow Commissioners have any comments.

COMMISSIONER MCGAFFIGAN: Mr. Chairman, I certainly join you in your remarks on John Craig. This is going to be his last Commission meeting. And he has had a distinguished career here, including being the person who had to succeed Jim Blaha for a while in the EDO's office. And he did an excellent job trying to do that.

I do want to point out that my lobbying to get Cheryl Trottier to the table has once again failed. It is not just that she runs, I think, an important part of the Research's program and that she's the materials efforts, but I also think it helps, particularly in light of the recent controversy involving Mr. Summers, for us to have the women who are involved in Research here at the table.

But I feel it shows you how much influence a Commissioner has around here that I have been lobbying this for two years, and the male hierarchy has not quite managed to get there yet.

CHAIRMAN DIAZ: Thank you, sir.

COMMISSIONER MERRIFIELD: Mr. Chairman, I would like to make three remarks. First, I'd like to associate myself with the comments of both you and Commissioner McGaffigan in regard to John and what he has done; a terrific service for our agency. It will be lasting well beyond his years here. So again, I can't add anything more articularly than that of my fellow Commissioners. But, again, thank you.

In regard to the seating at the table, I am not going into the comment about Cheryl, although I love her as much as Commissioner McGaffigan does. I would make one note, however.

When you look at Research information about organizational dynamics and the importance of incorporating Research into the operations of the agency, and in the operations of any organization, one of the things, and it is quite clear, is the importance of moving people from other elements of the organization into the Research organization, and from the Research organization out into other parts of the organization.

I think the membership at this table certainly recognizes that we have made a lot of effort in that regard. I think that is for the better interest of the Office of Research, and I think it is better for the overall interest of this agency.

So I do appreciate those changes, Mr. Chairman. I know you have been a champion for that as we all have. I think that is going to continue to make this overall a stronger organization.

The last comment I would want to make is in regards to the book. And it's a positive comment.

Now, the Chairman made a comment about its weight, and it is true -- and sometimes one gets graded on the weight, not necessarily the content. But I want to focus on the content for a moment. This is really as much for the benefit of our two new Commissioners as everyone else.

The information that we have received from the Office of Research regarding a level of detail about the Research programs that we have underway has not always been of this nature. In fact, when I first came on board, some of that information that was provided to us was a mere fraction of what is contained in this book.

I think that this organization has made what I would call

tremendous strides in its ability to actually understand the Research work that it's undertaking. And to put it in a format, albeit quite lengthy, but in a way for the Commission to access that and better understand the work that we have underway.

My only regret was I did not have more time to spend with this book today, because it is really filled with a wealth of information. It represents a significant amount of effort on the part of the Research staff. And I also want to give great kudos to Carl, who I know was a champion for this effort.

It is certainly going to be on my bookshelf and will be a good reference material down the road as we move toward the budgetary process for me to better understand what is it we are actually doing in Research. And does it validate all the money that we are spending on it, which, I think, certainly helps to make more that case.

So, I think it is an excellent product and wanted to recognize the hard work that went into it.

Thank you, Mr. Chairman.

COMMISSIONER JACZKO: I just have one brief comment, and this is no disrespect to the Chairman.

John, I was, in fact, one when you started at the NRC, to put that in perspective.

(Laughter)

CHAIRMAN DIAZ: I do admit that I am older than Commissioner Jaczko, not by much.

(Laughter)

COMMISSIONER JACZKO: But again, I just want to echo some of the comments. I think this is a very good set of materials. And I do also regret that I didn't have more time to go through it in more detail. But it will be a really useful resource in the year ahead until the next briefing.

CHAIRMAN DIAZ: Commissioner Lyons.

MR. LYONS: I would just echo the comments from my fellow Commissioners. It is a well prepared book.

Congratulations to you, John, for long years of service.

CHAIRMAN DIAZ: Thank you. With that, Mr. Reyes.

MR. REYES: Chairman, Commissioners, the staff

welcomes the opportunity to brief the Commission on the programs we have in the Office of Research. Although the book is large in size, I hope you judge us by the contents of the material. I think the office has done a good job preparing for the presentation today.

I am just going to turn the presentation to Carl, who is going to make the bulk of the presentation. And then we will be available for questions.

Carl.

MR. PAPERIELLO: Yes. Thank you.

Good morning, Mr. Chairman, Commissioners, EDO and staff of the agency.

My staff and I are here today to brief you on the performance and plans of the Office of Research. And it has been 11 months since I became Deputy or, rather, Director of the Office of Nuclear Regulatory Research with John Craig as my Deputy.

I am going to join with the rest of you in thanking John for the job that he has done. He certainly has helped me greatly.

He is an engineer. I am a physicist. I'm impractical. He is practical. And so out of the many screwy ideas I come up with, he picks out the useful ones and implements them. And certainly, has been a major contributor to the successes we have had this year.

Could I have slide 2.

Obviously, there is limited time available. I can only give you a high level overview. You have referred to the material I have given you, my staff has given you.

I tell you what I will do. I will promise you next year it will be a better hierarchal order so you can bore down better than you could this year. But at least once you build it out, then you can structure it better.

We have given the Commission more detailed briefings on specific topics. I know we gave the Commission -- we were part of the briefing on decommissioning.

We will participate in upcoming briefings on new reactor licensing tomorrow and on grid reliability issues later this month. So we are part of the briefings the Commission gets.

Slide 3.

The office is a very diverse technical organization and with a large number of different scientific and engineering specialties being represented. And it is a support office. Our job is to support the front-line offices of the agency.

Since we are a support office, one of my top priorities when I became Director was the improvement of communication with the other offices, particularly the ones we support.

I have monthly meetings, about monthly, with the Director of NRR and approximately quarterly meetings with the Directors of NMSS and NSIR. And our staffs are meeting on particular topics far more often. And, in fact, a growing number of research projects are being managed by technical advisory groups that are made up of representatives of Research as well as the technical offices that we are supporting.

I have received informal feedback from both contractors and a member of the ACRS that this cooperation is evident. I'm going to discuss this communication area a bit later.

Internal communications have been strengthened. I hold almost daily meetings with direct reports, weekly meetings with managers and supervisors, and periodic meetings with section chiefs, branches, and other cross sections of the Research staff. We have an expanding internal web site.

There have been considerable direct support of the Commission in the past couple of years, particularly in the area of security. In fact, the major portion of the reprogramming done in Research for the last year and a half, at least, has dealt with the security area.

Much of our research involves collaboration outside of the NRC. Some is overseas but much is domestic. We collaborate with the industry, chiefly through EPRI, DOE, and other Federal agencies.

And lastly, because of age distribution with about 37% of us being retirement eligible by the end of fiscal year 2007, human capital is a significant issue in the Office of Research.

May I have Slide 4?

This is a very brief summary of activities that we conduct, both in Slide 4, this one, and we go to Slide 5 afterwards, on what we

do to support NRR.

New reactors, you are going to hear about tomorrow.

We have provided the technical basis for a number of important rule revisions particularly 50.46, the large break LOCA, and 50.61, pressure thermal shock, having the largest resource commitments.

Fuel performance research has permitted the use of new fuels with newer cladding and higher fuel burnups, as well as the authorization of MOX fuels.

The steam generator action plan. Looking at flaw growth in steam generator tubes and performing extensive computational fluid dynamics calculation to understand the behavior of steam generators under transient conditions.

We support computer models, tools and databases used by the agency's PRAs. We have developed and trained staff in the use of SPAR models to use as part of the reactor inspection oversight program. And we have published a number of documents in support of the PRA quality action plan. We have issued two draft reports in support of the grid action plan.

Slide 5.

In coordination with NRR, the operating experience program has been improved as part of the Davis-Besse action plan.

We revised regulatory guides as requested by NRR and other stakeholders.

In support of the PRA action plan, the staff has published a NUREG dealing with good practices for implementing human reliability analysis, and the Research staff has supported the regions in inspections in which human performance was an issue.

We are going to discuss later -- we have spent a lot of time in developing and maintaining computer codes.

We have also had time to actually do licensing support for both NRR and NMSS by preparing some portions of SARs, particularly areas where we have the expertise that these offices need support in.

Actually, it has not been included on this list because of the timing of preparing the slides, is all the recent activity we referred to in fire safety and in resolution of Generic Issue 191.

May I have Slide 6.

In support of NMSS. I'm going to cover those in the next two slides briefly.

Decommissioning, as I mentioned earlier, has been discussed with the Commission at a meeting about six months ago on the subject.

We have developed a dry cask storage PRA which NMSS plans to use as a basis to risk informed the licensing project process. The ironic thing is I requested that PRA when I was Director of NMSS back in 1997. But actually, they didn't get started on it until 2001. It was done internally. It was not done through contractors. But anyway, that has been just about wrapped up.

And this slide really has a mistake on it. I talk about cask burn up credit, when obviously, we are not burning up casks. We are dealing with a fuel burnup for loading dry cask, effectively, to make more efficient use of dry cask by removing the conservatism of the fresh fuel assumption and loading cask.

The fresh fuel assumption for the basis of loading a cask is that the fuel has the same enrichment it had when it was fresh. Now, obviously, when fuel has been burnt, you will reduce the amount SNM. It's complicated because you have reduced SNM, you have grown in new types of SNM because you have grown in plutonium and other transuranic but you have also had fission products grow in which tends to poison a nuclear reaction.

Of course, the fission products decay. So you have a very dynamic changing of K_{eff} for these things. But anyway, we have done research to enable more and more of the conservatisms to be removed from the assumptions and to allow more fuel to be loaded in the cask.

And then cooperation with DOE. We are obtaining foreign criticality benchmark data. And it will be used by Research to develop the technical bases used by NMSS in criticality code used in fuel cycle licensing.

Slide 7.

I mentioned that we do provide licensing support. We will do portions of licensing review. And this has been done for NMSS for

both the MOX facility and the gas centrifuge facilities.

We are updating Division 8 Regulatory Guides. These are Regulatory Guides that deal with radiation protection.

We support NMSS by providing the technical bases for some rules. And the material disposition rule was a significant activity. That is about wrapped up now.

We are also being supported by NMSS. We are preparing a paper for the Commission on international radiation protection activities along with staff recommendations. And I think you have recently received the paper on the package performance study that you requested.

Slide 8.

I'm not going to go into the details of our support to NSIR. The Commission has been briefed in the past year on any number of activities that we have engaged in in the area of security research. And after discussions with the Director of NSIR, I am looking at what we can do in the incident response and emergency preparedness areas by updating reference materials with current severe accident risk insights.

Slide 9.

There are also a number of areas that have been assigned to the office that are not clearly Research as such but which are associated with other work that exist in Research. We prepare the agency abnormal occurrence report to Congress. We coordinate the generic issues program. We have the lead for some of these issues and support the agency in most of them.

We are the standards executive for the NRC responsibilities under the National Technology Transfer Act.

We manage and provide support to the committee that reviews generic issues. And we maintain the radiation exposure information reporting system and receive and file radiation exposure reports required by Part 20.

For a period of a few years, we were responsible for developing risk communication guidance. This work has been successfully completed and turned over to the agency's Director of Communications.

Slide 10.

Computer code development and maintenance constitute a significant portion of our budget, both FTE and budget. I am going to spend a little bit of time on this because it contributes to my human capital concerns. And why? For several reasons.

The most important is the use of these codes across the board in regulatory applications. They are used to support licensing decisions such as thermal hydraulic, fuel performance, PRA, criticality, structural decommissioning. They support the technical bases for rulemaking, PTS, 50.46, radioactive materials disposition.

They support the regulatory oversight programs, SPAR models, fire models and so forth. Generic safety issues, computational fluid dynamics was used for steam generators.

They support the incident response activities and are used in the security program.

In a number of disciplines, most of what we know is embodied in the computer codes. In many areas of applied science and engineering disciplines, simple handbook methods used 30 years ago to build the plants dealt with uncertainty using a fairly large margin. In my own field of health physics, I would characterize the calculational methods of the early '70's as bounding. Today's realistic calculations depend on the validity of our computer models.

Most of the models are semi empirical. We think we understand the phenomenon, and we understand the physical laws on which they are based, but the values of most of the coefficients and the constants are empirical.

Most engineers and scientists have learned as undergraduates the difference between interpolation and extrapolation. In the use of these codes we can't lose sight of it. You can't use a computer code as a black box. If you do, you can be in trouble.

Some of the codes are fairly simple while the majority are very long and complex to use. And 20 years ago, the predecessors of many of these codes were run on supercomputers at national laboratories and a cost for one reactor evaluation might equal the entire cost of our current program today.

The world has changed drastically in 20 years. We have

bilateral agreements for a number of these major code sets. And this actually vastly improves our capability to verify and validate these codes.

We do fire modeling and it involves collaboration with EPRI and other federal agencies and some international collaborations.

Slide 11.

Today, most of our codes can be run here on PCs, high-end work stations, or a Linux cluster.

There is no doubt in my mind that in the next decade we will run finite element and computational fluid dynamic codes on work stations with hundreds of CPUs on just a few chips and costing no more than today's top-of-the-line work stations. We have already had the major manufacturers indicate they are going to be putting out chips this year with more than one CPU on the chip.

I point out that a portion of our research code work is done in-house. And for most offices, we provide training in code use or perform the analysis to support agency activities.

And the technology is changing rapidly. There seems to be no end in sight for Moore's Law, which says that computational power doubles every two years. In fact, recently, Moore stated he was very surprised that his law has remained true for 40 years.

But computer language and operating systems change rapidly. And we have to spend resources just to maintain our ability to run our codes even with no improvement in the underlying model. You can't run when you replace Windows to Windows XP. Some codes that would run under Windows 98 or Windows NT just don't run. You have to modify them.

Furthermore, I can't find a good word, I use handcrafted. We have a lot of codes which are written in FORTRAN that we created, evolved over the years. However, we are making greater use of commercial software. Our computational fluid dynamics, finite element analysis, and spreadsheets, those three different areas, we are using general purpose software which we then adapt for the particular calculation we want to do.

For example, we have fire codes now that run on Excel spreadsheets. We used a commercial product as the computational

fluid dynamics code for the steam generator work.

Now, you need to understand, these things are actually very high level programming. We never really think about them being programming languages.

I mean, Word or WordPerfect is a programming language. We don't think about it as such. But if you hit the wrong key, give it the wrong instruction, it does not work.

So these higher level codes make it easier for you to write instructions -- you limit the number of instructions you write but you still have the same problems. You have to have data. They are just not magic. And you have to know how to use them.

This is going to grow. Along with other mathematical packages like Math Lab and Mathematica, we are using them now, I think this is going to grow.

What does this mean in terms of human capital? That means in addition to a firm foundation in science and engineering, the future staff are going to need, not to say staff does not have it now, but we will certainly have to focus on mathematical skills including partial differential equations, numerical analysis and probability and statistics.

And it is going to mean computer skills, including basic programming knowledge and demonstrated ability to use complex computer codes including one or more mathematics packages. These are the things that I am looking for in people as we now look over resumes.

Our codes are widely distributed. They are used by other government agencies, foreign countries, universities and businesses. And I don't have a good number. I did have the staff dig the numbers out for me. But it is safe to say that if the university has a nuclear engineering program in this country, they are using codes that we developed. Why? They are free. And if you had to use a commercial product, you would have to pay licensing fees.

They are also used in 20 -- at least I know the codes for thermal hydraulics and severe accidents are used in 25 to 30 countries around the world.

May I have Slide 12.

In the international arena, we support the Office of

International Programs and take on assignments they give us. Of equal importance is collaborative international research. As I mentioned earlier, foreign partners make major contributions to validation, verification and extension of our major computer codes.

Some facilities needed for research are not available in the United States or in other cases, it is far more cost effective to do research collaboratively in a foreign facility. And in fact, most of the research we do in Europe is generally supported by a significant number of countries from the European Union.

We contribute, this is ballpark, about $4 million to research in foreign facilities. And foreign partners contribute about $1.2 million to research in the United States. This is where we are collaborating.

Slide 13.

I talked a bit about what I feel we have accomplished in the managerial area.

I initiated a number of activities to improve office processes. We have had one retreat to focus on improving communications. And I believe it has yielded results.

Today the office is far better integrated into the activities of the offices we support than ever before. I mentioned the technical advisory groups and the excellent work they have done in coordinating projects.

We have actively sought to ensure that all levels of the offices supported get research results in a form they can use. That is a major problem with research. For the inspector in the field, supplying them with a long set of partial differential equations is not all that useful.

What does it mean for me? What do I have to look for? I have focused what we do in getting the information to people in a form they can use.

We include plain English forewords in our publications. We have essentially focused on communicating with you by trying to be present in as many briefings as possible where some aspect of Research is going to be discussed.

We are doing more outreach to the labs and the universities. And we are going to be reviewing our efforts in a

management retreat at the end of next week.

The operating plan is a road map for resources and products for the fiscal year. We have created a tier operating plan for all Research activities along with performance metrics that have never been tried before. Now, the problem is you start out with new metrics and some of them we're not meeting. So we have to work at it.

We are coordinating with the operating plans of other offices. The budget and work processes are integrated with the supporting office. And this year in preparation for the '07 budget, Research fully is integrated in the budget review. We are using a common prioritization. And as the various offices we support change their priorities, we have been changing our work.

Actually, as a result of preparing for this briefing, I have identified a number of items to add to our operating plan. There are some things that I found out that I would have liked to have told you that I don't know. And I have sketchy information. So we are going to change that.

Our office procedures need to be upgraded and augmented. What exist is far less than what exists in other comparable NRC offices.

We have created a program to revise and create a set of office procedures. The programs will be done by the end of this calendar year. And to the extent possible, we are going to adopt procedures developed by other offices. And as a first step, John here has worked with the staff to create an effective correspondence tracking system.

Slide 14.

I would like to talk about some of our major office challenges.

Expanding the sources of information available to staff is a challenge that I'm continuing to respond to.

Research is developing procedures and systems to capture foreign data in ADAMS. And we have recently created an internal web site that either has all of the foreign research data on it or links to where it is available, because some of the research we support is on web sites that are overseas and just the volume of material as

1 such that it's easier to get access through a link.
2 We need to do more to learn as much as possible from
3 research that is relevant to the NRC yet done outside of the NRC or
4 even outside of the nuclear community. And more needs to be done to
5 ensure that Research products are electronically accessible to the
6 entire Research staff and the rest of the NRC.
7 One of the things I found out is we have published
8 probably almost 200 papers in the past year. And if I tried to give you
9 the list of them, I don't have it all in one place. And I don't know how
10 much is available to the staff. This isn't just internal agency
11 documents. these are conference proceedings and papers.
12 We are working to improve our work processes and
13 streamline our budget processes and procedures. In doing this year's
14 budget, I told the staff come June, we are going to rebuild the whole
15 thing. Now it is too complicated.
16 Incidentally, I had the CFO meet me in an elevator and
17 make a remark about the budgeting process being too complicated. So
18 I think I'm just a cross section of the rest of the agency, but anyway.
19 We have to be timely in the delivery of our products since
20 we are a support office. However, the nature of scientific research, the
21 need in many cases to work through contractors and the need to
22 coordinate with numerous other offices frequently causes delays.
23 We need to be more accurate in establishing product
24 delivery dates. I think in some cases, we would just make people
25 happy and agree to a date they want without ever really looking at
26 whether this is realistic if you consider the steps that have to be taken.
27 So we need to be more realistic based on the operating
28 plan or missed delivery dates for central and important deliverables.
29 In every case, I instituted a process about a month ago
30 where a date is missed, the responsible managers have to conduct
31 lessons learned on the cause of the failure and the office will take
32 corrective action to prevent recurrence.
33 We are a major contributor to agency efforts to improve
34 the regulatory programs by ensuring that the technical bases for rules
35 and requirements are scientifically accurate and as realistic as
36 possible. It is the major task of this office to either conduct or find

the research information that is more scientifically accurate than perhaps the more conservative bounding estimate previously used. Some of this comes about because of the growth of computational power. We can now do in three dimensions calculations that in the past were only done in one dimensional. Computational fluid dynamics is one example.

But the problem is these codes are still phenomenological. And so, yes, we now have the computer power and software to do the calculations but we don't always have the data.

One interesting point in computational fluid dynamics, and I ran into this both in a presentation my staff made and I heard about it in reading a paper from NEA, two-phase flow. Computational fluid dynamics right now is quite reliable in the reactors we regulate when you are dealing with one-phase flow, water with no steam or with air, gas. We would use computational fluid dynamic codes that we were licensing, a high temperature gas cool reactor, for example.

With two-phase flow, we are not there yet. And I have been told by our staff as we have the equations, we don't have the data.

But I think this is going to change. I have seen papers in Nuclear Engineering. The people are working on them. My guess is in about five years we will be there.

And I'm going to talk about human capital.

Why don't we go to Slide 15.

I see three important areas of human capital in Research. The first is management succession. In fact this is, Chairman, your remark to me when you asked me to take over Research.

This area is received considerable attention in the NRC from the EDO and from the Executive Resources Board. There are SES succession plans in place and are being developed for most SES positions, a strong SES candidate program and a leadership development program.

To promote SES development by broadening work experiences in Research -- Rich is an example -- one Research director has been swapped out with NRR. Three SES branch chiefs have exchanged positions within Research. One SES branch chief

position has been used by us for candidate development. A deputy division director has been temporarily reassigned to a different division. And in the past year, two new SES branch chiefs were selected from the SES candidate development program. Both individuals had previous NRC work experiences outside of Research. Seven new section chiefs were selected, many of whom are graduates of the leadership development program.

And we are going to conduct the retreat, as I mentioned, at the end of next week on staff succession. Managers are going to review the work done by each SLS and GG-15 position in Research.

We are going to also look at new skill areas that may be needed based on the planned activities through fiscal 2007.

We are going to be looking at the tasks done, the knowledge, skills and abilities needed to do these tasks, and identify understudies and backups for critical positions.

Assignments are going to be made for managers and supervisors to develop staff where needed, and if necessary, recruit, train, develop and redeploy. This goal is to ensure that the office has the skilled staff it needs to conduct future activities.

I expect a meeting like this will probably have to be held on an annual basis for the next several years.

Slide 16.

I would like to talk a little bit about knowledge management. You have heard of it. What is knowledge management?

I will tell you what it is not. It is not information technology.

I have read a number of books, and some of the books started from an information technology start. It is not information technology.

What it is, is an extension of existing knowledge acquisition. Learning, training, and educational activities of the type that the NRC has been engaged in ever since I joined the agency in 1975.

We have the technical training center, the library, the computer training center on the third floor of the second building, an internal web site, agency and office procedures and even this

Commission briefing are all parts of knowledge management.

What it is, it starts with the systematic analysis of the knowledge needs that an organization must have to accomplish its mission.

We use IT as needed. It is not the driver. We use IT just like any business process. Define your business process and if IT can make it work better, faster, cheaper, then employ IT.

We have undertaken a number of knowledge management initiatives. And many of these initiatives have been coordinated with the Office of Human Resources, NRR and NMSS.

We have a knowledge management plan in the Office of Research. Working with HR, we have created a pilot knowledge center, this is on the computer, this is web-based, which is a study guide, references and expert assistance all linked together on a web site.

Data is being entered right now relating to fuels research, and ground water monitoring.

And I just could not help thinking when I am looking at this thing, for those of us who at least years ago when I used to subscribe to the American Journal of Physics, they would have resource letters in the Journal periodically. And what it was for, for generally college professors of either senior level or graduate school. And if I wanted to teach something like, say, x-ray energy spectroscopy, which was a, for a while a big field -- I still think it's around but it was a cutting-edge research field. We don't have a textbook for it.

And it would list maybe 40 papers that were important in the area. And there would be some on theory, some on experimental practice and some on applications. And it would sort of lay out how you might create a course around it.

The problem is you didn't have -- if we do it here, you can hyperlink all of the references. So rather than, what you would have to do is search through all these journals and xerox then 30 years ago, you have all these hyperlinks. And rather than calling up experts, you have agency experts available on line. So really, this is only an extension of what we have done with paper for years.

We have created an on line database in support of our

international research. This is going to provide a searchable database for the reports, trip reports, agreements and resources.

Working with HR, we have trained a small group of our staff in interviewing skills to better capture experts, relevant knowledge. And we have been conducting monthly Research seminars. I'm sure as you have walked around, you have seen the notices down in the lobby. These seminars have been well received. We have had good regional participation by teleconferencing. Videotapes of these seminars are available and slides are on our internal web site.

In addition, I consider our efforts to update our business processes and capture and ensure the availability of research reports also part of knowledge management.

Slide 17.

I have given you an overview of Research at a very high level. I believe we have strengthened our integration into the agency. I think that other offices see us a as a reliable supporting office.

I have found most of the technical work to be of high quality with the greatest need to be more focused on regulatory use and the need to ensure information is clearly communicated to the users of the information in a form they can use.

Business processes are being significantly improved.

Human capital needs are a challenge but are being addressed.

I will be pleased to answer questions.

MR. REYES: Chairman, that concludes the staff presentation, and John Craig is available to answer any questions you may have.

(Laughter)

CHAIRMAN DIAZ: Well, that certainly presents me with an opportunity.

I want to thank Carl. And I know all of you have worked hard on this. I concur with Commissioner Merrifield that the background is very good, that it provides a very good foundation and that we will be using it during the budget process. So if there is something in there that you don't want to be held against you, you might as well take it out soon because it is going to come back and

help us early in the process.

I appreciate many of the things that have been happening. I think this is a very good time for all of the offices, and I think everyone is going to take some succession planning, both management succession planning and staff succession planning, very seriously, because we do realize that unless we take it very seriously, the agency will have some problems in the future.

And this agency has enough problems every day coming in and out that we don't need any more. We need to be ready to face whatever this Nation asks us. And we have been and I'm sure we will continue to be.

So I congratulate you on your efforts in making sure we are ready. I know that when many of these changes have been made across the agency, people sometimes wonder whether we are taking resources and putting them in the wrong place.

The reality is that those who know and those who care use their talents in any place and in a good manner. And then it propagates. And then other people learn to use those talents. And we needed to be able to do that in this agency.

And so, again, thank you. And now, I'm going to get tough.

Let me see, the simple issues first. We continue to try to leverage our international resources and also we have tried to leverage our national resources. And we do this in a very careful manner just to make sure that we still maintain the decision-making and results and we provide quality assurance.

Are we doing all we should do in this area? Are there areas where we really should move forward and create pockets or areas of excellence, regulatory excellence in Research where we can do better?

Including -- I want to make sure because I think this is an important area -- this area of low dose radiation research or consequence analysis, in particular those two?

MR. PAPERIELLO: One, I hate the word "leverage." We collaborate.

CHAIRMAN DIAZ: Let me take the word "leverage" out.

MR. PAPERIELLO: We collaborate. I know it has been used in the past. I like "collaboration," because, in fact, that's what we are doing. And it's very fruitful. Everybody collaborates. Nobody has the resources to pay for a lot of experiments by themselves. So we collaborate.

We do it domestically with other Federal agencies, with EPRI. So therefore, we are collaborating with the industry. When we do that, just so everybody understands what we are doing, we jointly pay for experiments. We jointly design the experiments. But we independently analyze the data. So we preserve our independence.

I just want to make that clear.

We do essentially the same thing with our foreign partners.

In the case with Federal partners, it varies. There are some cases where we are jointly funding work together. There are some cases where we have developed a computer code, DOE has taken it and said, I want to use it for a new application, which they do. Some time later, we take it back, build on what they have done.

So there are two different ways of where this works.

Now, to take a look at are we doing all that we can? The answer is no. That's why I raised the issue of obtaining information.

Let's start with the way scientists do research, reading journals. I'm not sure we get everything we ought to be getting. That's not to say I have identified a deficiency, except I picked up a book I read over the weekend on European research. There is a number of things in there that were not tapped into.

The European Union has a program. We have tapped into NEA and some of it we are into. Other things we are not.

You raised the issue of low dose research. We are watching what DOE does. We do nothing ourselves primarily because we are looking at the size of this animal. If I could figure out a place to put a half million dollars where it would do some good, I would recommend it to the Commission. But I can't find a place. It just isn't there.

And, in fact, I can look at it and look at the data. And what struck me is, although I don't believe in LNT, and I have told

1 people that for years, I don't know what the equation is. I don't have a
2 replacement. And for all the critics of LNT, I have not really seen
3 anybody publish an equation. And I do a lot of reading in this area.
4 So if I could find a place where it would do some good, I
5 would recommend something. But I don't have a place.
6 CHAIRMAN DIAZ: But maybe we don't have to have a
7 program. All we have to do is put the mechanisms to make sure that
8 we are tied into that program and learn from it.
9 MR. PAPERIELLO: And I think we really are in that case.
10 We have a member that is on the U.S. delegation, UNSCEAR, and the
11 like.
12 Consequence analysis. I think we may wind up leading in
13 that area. However, having said that, I became aware that there is a
14 European program on consequence analysis. And there is a European
15 program that has been running for five years on how to respond to a
16 major contamination event in the environment. I kind of knew about it
17 six months ago. In getting ready for this meeting, I wound up going on
18 the Internet and found the web site.
19 I have downloaded a ton of stuff, but I have not had the
20 chance to read it yet.
21 This has been going on for about five years and I don't
22 know whether there is anything there we could avail ourselves yet. We
23 have not tapped into that. These are the things we need to do.
24 CHAIRMAN DIAZ: Let me go back to the answer. The
25 answer is no. Therefore, I would sense that there is a need to take a
26 look at what key areas, because we cannot cover everything, what key
27 areas we are not doing enough that will be very appropriate for
28 Research to identify and then bring them to the Commission for areas
29 in which there is a real need to resolve the issue and where there are
30 areas in which we can actually collaborate, and therefore give it even
31 better credibility because it comes from many different places with high
32 standards, we will add our own standards to it.
33 So maybe that's one area that we need to do.
34 Let me go back to one other issue.
35 Again, you mention the analysis. You mention how things
36 have changed.

Have we made enough progress in Research in really focusing in and providing the approach to do realistically conservative analysis? Has that permeated the organization so people realize the tremendous value of what I call reduction of the potential relevant consequences by becoming realistically conservative from the very beginning but still maintaining conservatism that the decision-making fits into our programs?

MR. PAPERIELLO: Yes.

CHAIRMAN DIAZ: All right.

MR. PAPERIELLO: But it has to be piecemeal, because again, you don't open up a textbook and find an answer. You are writing the book.

I have somebody right now looking at given what we know with all of the work we have done on severe accidents, how many things do we have out there that ought to be reexamined? I have somebody doing that right now.

CHAIRMAN DIAZ: So that becomes a real issue, because that would allow us to decrease or eliminate many of these issues that are out there that have been alluded that they come from the NRC or they have a history, and we needed to keep defending them when we know that really, we don't want to defend them. What we want to do is provide the right answer that says we have looked at this. We have done the right analysis. These are the real consequences for protection of public health and safety.

So we are looking at a program that must continue and cover all of those areas. So in essence, you would end up with very good cross sections of your programs that have already been projected. MR. PAPERIELLO: I don't want to mislead you. We are doing it on a case by case basis. But we don't have a systematic program to -- what we are doing just on spent fuel and cask is just that. It is a reduction in traditional, very conservative assumption dealing with criticality.

But let me tell you, that has been an incredibly long and difficult process to do, because of just the availability of data and trying to get reliable data, some of it that we are getting from overseas is considered proprietary so DOE has had to pay for it.

1 CHAIRMAN DIAZ: But it does deserve to take a
2 systematic look and try to, with time, resolve each one of these issues
3 and in a manner that actually gives you confidence that the majority of
4 the key programs have --
5 MR. PAPERIELLO: From the things that we are working
6 on -- one of the discussions I have had with Jim Dyer is -- the
7 regulatory requirements that have a lot of conservatives built into them
8 are not always in the regulations. They can be in Standard Review
9 Plans. And they can be in Regulatory Guides.
10 And I know he is reexamining the NRR -- and I'm getting
11 ahead of myself, because I know he will tell you this -- reexamining the
12 Standard Review Plan, which is also part of knowledge management.
13 You understand, you do a lot of these things, and
14 touching a whole lot of bases when you do this.
15 And both of us are talking about -- because we normally
16 do the Regulatory Guide, but looking at what Regulatory Guides ought
17 to be revised in the same thing.
18 I mentioned the earlier, I think at a briefing on
19 decommissioning we are working on Reg Guide 1.109 because so
20 much data that we have done for decommissioning is relevant to us.
21 CHAIRMAN DIAZ: Commissioner McGaffigan had to
22 leave to an appointment. So I am going to use a couple of minutes of
23 his time to talk about one of his favorite topics, risk-informed and
24 performance-based regulation.
25 So, it will serve him well. He will never leave another
26 Commission meeting.
27 COMMISSIONER MERRIFIELD: Are you splitting up that
28 time, by the way, because I might be able to use some of that as well,
29 to ask some of his favorite questions, too?
30 (Laughter.)
31 CHAIRMAN DIAZ: Don't call him. He might come back.
32 Let me just take a minute in here. I was doing some
33 reading last night. And I went back to 98-300. That was gosh -- that
34 was just when Commissioner Merrifield was just getting here, had been
35 here a year, 98-300 was that main document where we say we are
36 going to change the regulations. We are going to change Part 50. We

are going to have Option 1, which we did; Option 2; and then, Option 3, that was going to be continuing.

And Option 3, as we quote from it says, "the staff should pursue the study", the study of converting Part 50, "on an aggressive timetable and provide for Commission approval as scheduled for this activity, which the staff periodically does."

"The staff should periodically inform the Commission on progress made in this study. And the study should determine how best to proceed with risk-informing the remaining sections of Part 50."

That's what 98-300 said.

I look at this and say, what is the problem with it? Then, of course, this little tiny part of me that is a little bit devilish looks at the way that the staff has designated this program, risk-informed regulation implementation plan. And the last two years, the RIPIP -- well, it depends to where you read this.

But the first three letters of these programs read, "rest in peace."

(Laughter)

MR. REYES: That's really aggressive.

CHAIRMAN DIAZ: I think the problem is in that time we really needed to study how these things fit together and where are the series of difficulties?

I think we have gone beyond that point. I think what we really need is a plan on how we are going to do this, a program, not just a study.

We know enough. If Sam Collins were here, I would say, Sam, we are a learn organization, not we are a learned organization.

So, I think it was okay at the time. You might remember the discussion I said we could do this in three years. And staff came and said, absolutely no way, it will take us five years to complete this. And that was seven years ago.

So, I think the word "study" and the way it is presently being done needs to be changed. It needs to become a program, a program of implementation of what we have done and how we should proceed.

And since my time is over, and I used a minute and 26

seconds of Commissioner McGaffigan's time, and I will tell him I used it to talk about this issue. I now yield the floor to Commissioner Merrifield. MR. MERRIFIELD: Thank you, Mr. Chairman.

During the years I've been here, there have been a number of meetings we have had, not merely centered around the Office of Research, but we have been reviewing work done by agencies or organizations we contracted with.

We have a task we want to do. We go out. We get some research information. We get some work done.

And lo and behold, we get a work product back that we are not entirely satisfied with, whether it's off the track of what we wanted, whether it's for lack of a better word, "shoddy", whether it's not useful, whether we got a draft and told the organization this is not what we expected. And notwithstanding our instructions, they came back with basically the same thing in the final. There has been a number of instances of this.

Part of what we need to do as an organization, and clearly, Research as much as anyone else in the agency has an important function in a project management role of setting out clear guidance for the agencies or departments or organizations that we are contracting with what we expect out of a work product. What is the product that we expect to get.

Putting in an appropriate time line for that to be accomplished, setting appropriate milestones for the review of that, having a draft that we would have an opportunity to review and ensure that it is meeting our expectations. And ultimately, coming up with a work product that is useful for the agency and based on sound science.

Obviously, we had some gaps in the past in our effectuating that goal.

What are we doing in the training of our project managers in the Office of Research to realign our programs and processes to avoid the problems we have had in the past and to make sure the projects that we have going forward meet the expectation of the Commission?

MR. PAPERIELLO: We are doing a number of things. Project manager is part of it. This is more than project managing. This

is technical managing.

Traditional project managing deals with did you get the I's dotted and T's crossed in all the paperwork. For one thing, this is one of the reasons I want to work on the budgeting process because with the number of -- we have, I think, almost 150 job codes. Not all of the projects are being worked.

But the paperwork is just drowning. Obviously, we need time. We need some consolidation to get fewer of these things so that we have time to take -- instead of dealing with paperwork -- I mean, all the things you have got to do to legally do that, we got more time for people.

Secondly, we have to look at the budgeting process. I have had people come to me with projects, and I say you cannot possibly technically manage this contract for the FTE you have allocated. I mean, you have barely enough -- so if you turn around and just throw a project over the fence to the contractor and get it back, there are problems.

I still have problems where basically reports have come in that have not been -- they are few, but the things that were -- they are jarring. And in cases where I have been told, at least in one case, and I believe it and I'm getting a briefing we have something in and we gave it to the office that we are supporting and we had not reviewed the package ourselves. It has happened in the last six months.

I an going to find out, get to the bottom of it and understand why. I'm afraid I am going to have to fix them one at a time. If it was an easy one shop, one hour training program, it would be fairly easy. You have to create expectations. We have added more section chief. The reason why we have added more section chiefs because we didn't have enough oversight in the past.

So we are working on it, Commissioner. I understand the issue.

That's one of the reasons I'm so concerned with human capital, because as more experienced people leave and we have less experienced people deal with the labs -- you know, you are talking about somebody running up with a bunch of National Lab Ph.Ds who say this is the way it is. And so I recognize some of the professional

push. I can understand the importance --

COMMISSIONER MERRIFIELD: Let me add one additional layer to that, without naming the organization involved.

I reflect on a discussion I had with a senior manager in this agency. And we were talking about an organization and work product that they had produced which did not meet our expectations.

And the senior manager said, you know, it's funny, I have been here for X number of years, almost as long as John and he said, every time we have contracted with this organization, we have had problems.

And it struck me that in a holistic way, not just within the Office of Research, that perhaps there is a need in a special team sort of way across the agency to, perhaps, keep book on some of the people that we contract with to make sure that they are meeting our expectations.

And there may be no answer to this today. But I would like for us to think about keeping better track on the people that we contract with to make sure that they are meeting our expectations for work product.

If those organizations are not, then I think the staff needs to think about a program and instruction to notify the Commission, and where appropriate have the Chairman or the Commission as a whole take action. If we are spending money and we are not getting good work product out of some of the organizations we are contracting with, we should stop. We should stop. If we are getting garbage -- the American taxpayers expect us to spend money smartly. And if we are not getting good product, we should not be spending it on those organizations.

You don't need to comment on that.

MR. PAPERIELLO: No. I think it is excellent, because, in fact, I know how to do it, because I did it when I was Director of NMSS. I put an attachment to my operating plan to track every contract, whether or not the work was done or completed on time and with the right quality, because there was one particular laboratory in one particular area that proved to be a real nightmare. And eventually, I reorganized NMSS to help deal with the issue and focus all our activity

in the area in one section.

So there are ways to deal with it and I have done it before. So I know how to do that.

COMMISSIONER MERRIFIELD: There are. And again, without naming any organization or group, I think that there are some out there who have come to depend on a reliable output of money from this agency to continue programs and are not looking at the bottom line, which is our expectation that we get a high quality work product based on sound science. And I think we ought to turn off the tap.

CHAIRMAN DIAZ: You know, this is an issue that we keep working with every year. We put it in budget space. I think like with everything, I think we know enough and we have the organization in place to take care of this issue.

We don't vote in open Commission meetings but I am totally in agreement with Commissioner Merrifield that it is time to look at how we actually use our funds and we use them effectively and we hold our contractors accountable.

And that means it starts with the staff and technical contract management. And we need to bring this issue to a point that we said we are confident that the majority -- there is always going to be something -- is being managed in this fashion.

MR. PAPERIELLO: I want to make it clear. This is only my view in Research because I read -- I won't say I read everything, but I read most things. It is rare and frankly, in most areas, we have an excellent staff who is quite capable of pushing and knowledgeable. But, on occasion, it happens.

MR. MERRIFIELD: The problem is that on occasion when that happens, we get really bad products.

MR. PAPERIELLO: I understand.

COMMISSIONER MERRIFIELD: And it is product that we have to live with as an agency for a long time. And I am sure we can all come up with examples, and I know some off the top of my head. It is better to make sure we get good quality products to begin with.

Enough said. Without dipping into my McGaffigan's time quite yet, I am going to ask one question. And then perhaps, there

may be --

CHAIRMAN DIAZ: We gave you the full amount.

MR. MERRIFIELD: Okay. Well, I'm going to ask one question and beg the Chairman's indulgence that we have a second round because I have some other things I want to ask. But a quick one on this one.

We have been spending an awful lot of time on the issue of embrittlement of reactor vessels due to pressurized thermal shock, in part to determine whether the current temperature limits in 10 CFR on 10.61 are overly conservative.

And I'm wondering when is all of this going to be completed so that we can move forward with the proposed rule and where do we think we are going?

MR. REYES: I know the answer.

The schedule for the PPS rule has Research completing the technical work by '06. And then, after that, we move with the rule. I have been tracking it very closely.

MR. MERRIFIELD: Do we have any preliminary results that you're aware of?

MR. REYES: Not that I'm aware of.

MR. BARRETT: Let me speak to that because it's in my division.

This work is actually very far along. We sent preliminary results to NRR over a year ago. They have reviewed it and they find the quality to be quite high, quite high quality.

Since then, we put it through a peer review process, including outside peer review as well as the ACRS.

We are currently in the process of resolving the last issues with the ACRS primarily with regard to the documentation.

In the past few weeks, we have been talking to our counterparts at NRR on how do we transition this information to NRR so that they can begin the process of internalizing this information and evaluating it for suitability for rulemaking.

When I talked to Mike Mayfield, who is my counterpart in NRR -- and two months ago, I was in his job and he was in mine -- we are talking about how the two offices can cooperate so that the learning

that's gone on in Research, in the Office of Research as we have managed this project -- and it is a very complex project -- can be tapped into to support the rulemaking so that this can be done cooperatively.

I can't give you a schedule, but I believe that we can start that transfer process very soon.

CHAIRMAN DIAZ: Commissioner Jaczko.

COMMISSIONER JACZKO: I have a couple of different questions.

First one, we received, I guess it was a notice recently about a reprogramming of, I think it was one FTE from ACR 700 to -- I guess it was an FTE that was going to be taken off of that effort and put into pre-application activities associated with the Pebble Bed reactor.

My question on that, and this, in some sense, goes back to following up on some of the Chairman's comments about making sure we are focusing on important areas. Here was perhaps an opportunity where we had freed up an FTE that could have perhaps better been utilized in an area other than another advanced or exotic reactor design that is not necessarily on the slate for potential licensing activities in the near future.

So in short, I actually wanted a brief answer, what is the status of that movement of FTE? Is that happening? Has it happened?

MR. PAPERIELLO: Yes. I guess my view on this is that the applicant asked to engage. Came in here, they had a meeting with us in November. I told them there was a formal process. They followed the formal process.

We are reining in the effort on the ACR 700, because, again, that was one we were actively working on when it looked like there might be -- and the applicant had serious meetings with us, with NRR, public meetings. They are deferring and delaying.

I have somebody else in the wings. I didn't think that an FTE -- I agree, an FTE is an FTE, but it's a relatively small exposure. If they wanted much larger resources, I would have maybe hesitated.

I think we can probably learn some things that might be

applicable to the future reactors.

I don't know where we are going to go on non-light water reactors over the next couple of years. I mean, obviously, I read what I read in the trade press about DOE and a very high temperature gas cooled reactor in Idaho.

If I learn some things which are useful, I figure some of the resources are invested. But I discussed it with the EDO and so we made the decision to go that route and inform the Commission.

MR. REYES: Commissioner, we view it as a modest investment on something that -- it looks like the applicant wants to pursue, and we would not put a lot more resources into it. But we thought because of the long term involvement on the issues, we needed to start.

Anyway, that was the rational and we made the transfer.

COMMISSIONER JACZKO: Changing topics a little bit. One of the areas you talked about was computer codes and that's a big part of what you do. One of the areas that I was kind of going through and there was a lot information. One of the things that I don't really see a lot on, and perhaps it is not an area that Research has been active in the past, or maybe it's a difficult area to be active in, and that's issues with human behavior, human factors, in particular in the materials area.

If you look at the abnormal occurrence report that your office produces every year, the doses that we are seeing are in materials area often and I don't want to generalize too much, but there are often situations in which it's misapplication of sources, misuse of sources, misreading of vials somewhere, or picking up the wrong vial. These are very fundamental, simple things that perhaps could be corrected and eliminated in a lot of occurrences.

What kinds of activities are going on in that area, if anything at all?

MR. PAPERIELLO: I am going to have to ask one of my division directors for that, because I don't think we are doing a lot. I don't know.

MR. ADER: We have had a small effort to support NMSS with the human factors, human reliability folks in my division. We've been working with them very recently.

1 We did a feasibility report, which we delivered within the
2 last year on where you could use human reliability, human factors to
3 improve some of these areas.
4 They reviewed that, and we are in discussions almost
5 realtime now on where the next steps would be to pursue some specific
6 areas. So that is evolving but it is a small level of effort.
7 COMMISSIONER JACZKO: John, did you something you
8 wanted to add? I think we have a tendency here sometimes to want to
9 chase after -- well, not chase -- I don't mean it in that sense, but go
10 after the research that is in the areas that I think are, in some sense,
11 probably most technically challenging and most interesting from that
12 perspective which is often dealing with the reactor side of things.
13 If we really look on a yearly basis in the places where we
14 are causing harm to people, it's in that materials area, and it is often in
15 those human capital areas. And I think that it is important that we not
16 lose sight of that. It is really a crucial issue.
17 If I have a little more time, I want to ask one more
18 question.
19 I just want to say I think you have done a very good job on
20 identifying some issues recently with the fire protection with Heymc.
21 And I just note going through the materials and you did -- one of the
22 items you identified in the status -- maybe I'll just read it-- was to
23 identify areas in which fire modeling knowledge needs to be advanced
24 to support regulatory decision-making.
25 I think that is a very important area and I would
26 encourage you to focus on that. And I wonder if you could just briefly
27 touch on what kinds of things you may see happening in that area?
28 MR. PAPERIELLO: We are entering into collaboration --
29 this is an area of collaboration with other Federal agencies. As you can
30 imagine, there are a lot of Federal agencies that are interested in the
31 propagation of fires.
32 We use computer codes which NIST developed, but
33 again, you have to benchmark them against experiments. And we are
34 doing that with other Federal agencies. We are working on that with
35 other Federal agencies. And in fact, with the latest fire rule, probably
36 much more interaction with utilities who want to do the same thing. I

1 don't know -- I can't say more.
2 MR. ADER: If I could add, Carl.
3 We are supporting NRR right now in the implementation
4 of 50.48. We have a joint effort with EPRI to validate and verify some
5 of the fire models and fire codes. There's two from NIST that we
6 actively use. And industry has two. And then there is a spreadsheet.
7 That's our current effort now, is to validate and verify those.
8 We are having some preliminary discussions with DOE
9 and NIST on what would be the next steps in improving some of the
10 models we are exploring. We are doing a PIRT process, a
11 phenomenon importance ranking process to see where are some of the
12 gaps. We are using information coming out of the current V&V to help
13 inform that process.
14 But right now the folks are pretty much focused on trying
15 to get the codes verified to support the rule.
16 COMMISSIONER JACZKO: Thanks.
17 Thank you.
18 COMMISSIONER DIAZ: Commissioner Lyons.
19 COMMISSIONER LYONS: Carl, there are any number of
20 areas I would like to discuss further on this but just for a few questions,
21 and I very much appreciated both the book and your presentation.
22 I was interested in your comments on codes in general
23 where you talked about, in many cases, their dependence on empirical
24 values, and then talked a little bit about extrapolation versus
25 interpolation in the codes.
26 Several of your staff as well as folks from other offices are
27 helping us put together a series of briefings just within my office and for
28 some of the technical assistance on that very subject. And I very much
29 appreciate that support in the general area of the underpinnings of our
30 various codes and how we are validating them.
31 I wanted to comment also on your knowledge
32 management work. That looks especially interesting and very well
33 thought through.
34 I was wondering if that approach that you are using is
35 being shared with or used by any of the other offices?
36 MR. PAPERIELLO: The other offices, yes. I think Jim

Dyer from what -- I'm getting ahead of myself. He will tell you what he is doing. But I gave him a briefing about six months ago, and he seemed to have progressed better than me.

MR. REYES: Commissioner, it is the subject of my upcoming senior managers meeting, because it is an issue that we are going to take agency-wide because there is a variation in each office on each profile, et cetera, et cetera. This succession planning issue is valid throughout the agency. And this knowledge transfer is a much needed effort.

So, it's already in the senior manager's meeting agenda that I'm planning to have in May.

COMMISSIONER LYONS: I think that is truly vital. And I appreciate that you are doing it.

MR. CRAIG: Commissioner, we are also sharing it with other federal agencies. At least one other agency has adopted it in large part.

COMMISSIONER LYONS: Good. I also wanted to comment on the reprogramming of the FTE to the Pebble Bed, but perhaps from a slightly different perspective, because I wanted to compliment you doing it.

(Laughter.)

CHAIRMAN DIAZ: Welcome to the Commission.

(Laughter.)

COMMISSIONER LYONS: I recognize that it is a small effort, and I recognize that there is no Pebble Bed licensing activity as far as I know in this country in the foreseeable future. But I think there is substantial activity around the world in this, certainly South Africa and China. And I think, as the premier regulatory agency in the world, it behooves to us be able to comment effectively as issues arise on these other types of reactors, whether they are in this country or not. And they may come here at some point.

But in any case, I was very pleased to see you do that at that relatively modest level. It struck me as important in maintaining that database within the agency.

Then, if I may comment on one more thing.

CHAIRMAN DIAZ: You have plenty of time. Everybody

has 10 minutes.

COMMISSIONER LYONS: One more area that the Chairman mentioned in his question about additional areas for Research. He mentioned the low dose radiation effects.

I guess I had two thoughts on that. One is a question, and one may be a comment. With BEIR VII coming up, presumably, reporting out -- I hear various times, but perhaps June, perhaps later this year. I just wonder if you are anticipating that BEIR VII, do you have enough feedback now on BEIR VII to know if it is going to result in a need to re-evaluate any of our current approaches and standards? Or is it just too early to ask?

MR. PAPERIELLO: I'm not sure I know that. There may be people here. Cheryl?

MS. TROTTIER: Well, I don't know because we have not seen the report, exactly what it's going to say.

My prediction is it's not going to make major changes, minor changes. And I might as well state now that there's been further delay, not that this is a surprise. This project has been delayed over and over again, this time due to money. They are completely out of money.

Vince, has that changed? No.

So they have stopped all work. So, we have a prediction in the paper that's coming up to you as early as June we will have the report. But it could be as late as September, October, who knows at this point. But don't expect a major change here. I mean, I think there will be minor changes.

MR. ELTAWILA: It's not NRC that's -- it is another government agency that has not sent their share.

COMMISSIONER LYONS: I also wanted to follow up on a question by the Chairman about possibly other areas for Research and ask a question which may have already been thoroughly considered.

Given that we have a large population of workers at reactors for whom doses have been carefully measured over a long period of years, has there been a study -- I'm thinking of something similar to the so-called naval shipyard worker study that was done

some years ago -- has there ever been a study of an epidemiological nature looking at workers in reactors, related areas who have well documented dose histories over a period of years?

And I realize you have all kinds of confounding factors if you do that. And maybe it's not practical. But has it been done?

MR. PAPERIELLO: I don't know. And part of the reason is I'm aware of some mega studies that have been done where people consolidated others. But I don't know --

MR. REYES: There's somebody on the staff. You have got an expert.

MR. HOLAHAN: Yes, good morning, Vince Holahan. I am with Research.

Jeffrey Howell last year put out a paper, it's part of the IARC study that's being done. It's a 17-nation study. And late last year in Radiation Research he published a report on 53,000 U.S. workers where they took data from the RERS database, which is our database, the REMS database, which is a DOE database, and actually went to the utilities themselves.

And the report basically came out that there is a predominant healthy worker effect. The problem is as many workers are still relatively young that are being followed up, mean age is about 47, 48. When we start talking about solid cancers, there has not been sufficient follow-up time with these individuals. It has only been 10, 15 years.

In all of those cases, there has not been any increases in either leukemia or the solid cancers. The one notable exception was a possible small increase in non-cancer, arterial vascular disease.

That is something that we are also following with the Radiation Effects Research Foundation in Japan, looking at the life span study of workers there, about what long term effects might be on cardiovascular disease.

Here, we're talking about small, very small but statistically significant changes in those types of diseases. So we are following this up.

And in the following month, we also had a report that came out on the Canadian workers, same type of thing.

1 So we can provide through SECY copies of both those
2 papers if you would like to see those.
3 COMMISSIONER LYONS: I would be interested. Thank
4 you. If we have another round I will add a couple more questions.
5 CHAIRMAN DIAZ: You still have a couple of minutes.
6 COMMISSIONER LYONS. Well, let's see. On the grid
7 performance study, this NUREG-1784 that you published or that was
8 published, I'm just curious as to whether that has been found to be
9 useful by other offices, by NRR, or how that study is being used in this
10 overall issue of grid reliability?
11 MR. ELTAWILA: The report is being used as part of the
12 agency action plan for the grid reliability. So we have different action.
13 As the result of that NUREG, I believe NRR issued an
14 information notice to the utility about the potential degradation of the
15 grid during summer months and make them be ready for not to have
16 any outage for the diesel generator or something like that during the
17 summer months.
18 So it is being used by the agency. It is being used by
19 other agencies. NERC and FERC are interested in the report, and they
20 are using it in their study. And they will make the report available to
21 INPO and to the utilities who are using it.
22 But the main use here in the agency is the agency action
23 plan on the grid, and you will be briefed on that. And the I believe the
24 information -- related to the grid degradation during summer months.
25 MR. REYES: If I could add. We shared that with INPO
26 an insight of that document among other things, was using an industry
27 workshop that we participated on. And I have talked both with industry
28 and the staff. And they feel that a lot of good information was shared in
29 that workshop. Part of it came out of the document you were just
30 referring to.
31 COMMISSIONER LYONS: Thank you.
32 CHAIRMAN DIAZ: Okay. Quick second round in here,
33 thermal hydraulic codes. Are we finished with a five-year plan? We
34 started with a new plan. I understand we finished with the originally
35 planned architecture with it. Where are we? What are we doing now?
36 We are confirming the codes, making more use? Where are we in

thermal hydraulics?

MR. ELTAWILA: Mr. Chairman, as you indicated, we completed the consolidation activity and we have a single code called the TRAC code that embodied all the information from the other codes. Where we are right now in our plan is trying to bring the code, the new code to the same level of assessment as the other codes. So we have an extensive assessment program.

As far as the code architectural changes and things like that, that has been completed. What's being changed right now is the direction that the agency is taking, for example, about risk-informed regulation. And so we want the models in the code to be more accurate than the model that existed in the code before.

So we have conducted thermal hydraulic experiments, and we are developing improved model to be incorporated into the codes. So the phase that we are in right now is assessment and physical model improvement.

CHAIRMAN DIAZ: Is that like fine tuning?

MR. ELTAWILA: No, it's not -- it is really -- there were a lot of conservatism in the code. So, it is not fine tuning. If you want to take credit for all the science or the existing margin that exist in plans, you want to have a better model to be able to calculate that margin. So it is not in the fine tuning area.

CHAIRMAN DIAZ: When is that going to be completed so we can say this is a product that then we can do fine tuning to?

MR. ELTAWILA: I believe we are planning to issue another version of the code in 2006.

But again, as Carl indicated, we will continue to update the codes. But we will be able to use the code in regulatory activities full fledged and move from the other codes into that code by fiscal year 2006.

CHAIRMAN DIAZ: 2006, all right.

Commissioner Merrifield?

COMMISSIONER MERRIFIELD: Two quick questions. The first one is, you mentioned very briefly the fact we have been conducting extensive work regarding credit for fuel burnup for transportation casks and storage casks.

Are we on schedule on these issues and do we foresee any delays in coming to a resolution on our research? It has been underway for a long time and I'm trying to get some sense of when the end of the tunnel is.

MR. ELTAWILA: NMSS has issued interim self guidance number 11, which is being used by utilities right to you for partial burnup credit.

What we are working on is the refinement to be able to give them additional credit for the fission product. And that will allow them to move more of the high burnup fuel.

They can still load the cask with that fuel but there will be a penalty associated with it. But in order to encompass all the fuel that exists in the spent fuel pool, we need the fission product credit.

We are on target at NRC, but you know, as Carl indicated, the information is going to be coming from DOE.

DOE is negotiating with COGEMA . The minute that this information is bought by DOE and made available to NRC, will be within a year to be able to provide this update for NMSS for their consideration.

But the stumbling block is the negotiation between DOE and COGEMA.

COMMISSIONER MERRIFIELD: So we need to get DOE to help us here?

MR. ELTAWILA: It's COGEMA, actually that --

COMMISSIONER MERRIFIELD: Okay. Yes.

The second one is sort of a two-part question but I want to make it sort of succinct. I had an opportunity recently to review a variety of training materials regarding management of technical engineering staff. There were two interesting data points I found in it.

One is that for workers who are coming out of college, people who you bring into the agency, that the first assignment that you give them is quite critical in the development of their career.

If you give them something that has been languishing for a while, to sort of stick them off and don't give them the appropriate training, mentoring and worthwhile work, it can have a negative impact on their development in an organization such as ourselves.

The second data point is that for workers who are over the age of 55, sort of a curve, the interest of workers in following a management track, following a technical track, where they are in that area depends on their age. And it varies during the course of each individual's career.

After individuals who are not in management get to the age of about 55, there is a much greater degree of interest in being involved with projects of their interest. That's the real motivator between that age of retirement. High job satisfaction is associated with being involved in projects that are new, meaningful and interesting.

My two-part question is: What are we doing here relative to training opportunities for folks who are coming in the door? And what are we doing for folks who are in that 55 to 65-year-old time period in involving them in areas of technical expertise?

MR. PAPERIELLO: Well, we have the professional development program for entry-level people. And our program more or less models what the rest of the agency is doing. We are part of that program.

I can't say that we have any particular program or focus for individuals that are over 55. And, in fact, I don't always know the age of my staff. I say in some cases I do know the age of the staff. I certainly may know when people are maybe well over 55.

But no, we don't have any particular -- but by and large, the office is oriented around projects. And we don't have -- perhaps maybe in a PRA and some of the risk areas, you generally have more people with a similar sort of occupation. But in many of our areas, you only have a couple of people.

People are ultimately working on a project. And I think a lot of them -- in fact, if you look at the number of years people stay beyond retirement eligibility, I think they must be liking what they do.

COMMISSIONER MERRIFIELD: You gave an excellent presentation today in terms of management of human capital and knowledge management. And I think we just need to make sure that we are thinking about as we go and bring great people into the agency -- which I think we're doing right now -- that when they get here, that they are put into positions that are meaningful and are going to

allow for their development and motivate them to stay here.

I think we need to think about for individuals -- and a lot of human capital management, obviously, goes with succession planning. Do you have the right people in your management chain?

But I think we need to be mindful of folks who are not on that management chain, particularly in the technical track. Are we providing opportunities for people who are not there to continue to contribute in a productive way through the course of the remainder of their career here at the agency? And I think we need to think about that.

MR. PAPERIELLO: I understand that. But don't misunderstand me. I think from some previous meetings some things like, people don't want to go into Research because it's career deadening. The data does not support that.

The fact of the matter is that if you take -- I took a look at a one-year period, most of the period when I was in Research. Thirty people left Research. Half of them went to other parts of the NRC. For the 30 people who left, half of the replacements came from other parts of the NRC. Of the 15 -- about 15 who left the agency, all but two retired.

So out of those 30, there were only two quits. So I don't really see that kind of turnover that would indicate that people are unhappy. So I think we are giving them meaningful work.

We have worked very hard this past year to rotate people to other parts of our staff to the NRC. And a lot of people, SES candidates and others, have sought rotations in Research.

So I think we are giving people an opportunity to grow and find where they want to serve in the agency. And on top of the whole thing, I really think -- I am in sympathy with the fact that I think people need to work in various places, and not only that the issue of interesting work isn't confined just to include managers.

CHAIRMAN DIAZ: Right. But I do believe Commissioner Merrifield is making a broad statement that in reality, we have a wealth of knowledge and skills in people that are 55 -- I'm still not there -- but, Karen, you can't laugh -- let me finish.

I think that sometimes we need to realize that you being

at a job, you have been doing it -- a little bit of stimulus, a little bit of training, a little bit of making them out. And you have received that. I mean, you are practically a spokesman for having changed jobs and getting to a new way of doing things. And so I think a little bit of that is important.

We can't forget all the tremendous talents that we have of people that are already mature, myself included, even if you want to.

MR. VIRGILIO: Chairman, I just wanted to go back to Commissioner Merrifield's first point. With regard to the nuclear safety professional development program staff, I think we suffered a lot of inefficiencies early on in that program. But we recognized it, and we put a really good project manager in place, Donald Lamb from the Office of Human Resources.

In each of program offices, we put somebody like Donald Lamb. I know at NMSS, we have Eileen Miller who is doing this work.

They are watching to make sure and engaging with these professional staff to know whether they are getting meaningful assignments.

I know as an office director, I spend a lot of time with that group. I know Carl does meet periodically -- and Carl just recently reported back to me he had a meeting and what he got was the feedback is they are feeling engaged, they are getting meaningful assignments.

So we fully agree with you of the importance of ensuring that that first assignment or first series of assignments are viewed as meaningful, that the people feel like they have an opportunity to contribute.

On the other end of the spectrum, both Luis and I, when Luis was in Region II and I was in NMSS, had a contractor come in and do an organization assessment. And they really impressed upon us your second point of making sure that people feel, at the mid point or toward the end of their career, they have an opportunity to do what they feel is a contribution to the agency and do what they do best.

And based on that, I know we actually did move people to allow them an opportunity to work in areas where they had a talent, they had an interest and they actually could make a better contribution

than they were in the jobs that they were formally considered.

CHAIRMAN DIAZ: Thank you.

Commissioner Jaczko?

COMMISSIONER JACZKO: I just want to ask one question: There was a December 2003, the reactor operating experience task force report. In that, they identified some problems with the GSI process, and in particular they said there was reluctance to initiate the process because it is so protracted.

Are you familiar with that report? And are there efforts underway to address that?

MR. CRAIG: I'm familiar with the report. We had major revisions to the generic issues program and it was recently -- I think it's Management Directive 6.4. And indeed, it was unwieldy. It was bureaucratic. And it took a great deal of time in the past.

It's been revised where the specific stages are clearly defined. There is an interoffice group to make sure the issue is clearly articulated and understood before it actually gets considered to go into the process.

If you look at some of the notable examples in the past, it took a long time. It was because the issue was more fog than substance, and yet the decision-makers launched, put the generic safety issues title on it, even though they had not determined it was a real safety issue because they had not defined what the safety issue was.

So the new management directive has made a significant improvement in that process.

It also gives it more discipline and rigor. There are some time milestones set for each stage. And the hand-off to the applicable program office is more clearly defined. So I think it's working more smoothly.

MR. REYES: From my point of view, the resolution of the issues is probably the best marketing for the system, because then people will be willing to come forward and raise the question whether this is a potential generic issue or not.

I think John is right on. Once you define it, then you have to have a process where you can measure progress and tell people

what you are doing about it.

CHAIRMAN DIAZ: Thank you.

Commissioner Lyons.

COMMISSIONER LYONS: I wanted to comment on the very impressive figures that you showed on your human capital experience, where you have gone from looking at the over 60 to under 30 ratio. Just very, very impressive performance from a ratio like 15 down to a ratio of like 2 in a few years. I don't know how many staff -- I don't know what the number of staff is that had to change to make that, but that is very impressive.

MR. PAPERIELLO: As I said, in a year, we had a turnover of roughly, 30 people. As I said, half only them went to other parts of the NRC and half came from other parts of the NRC. And then we have hired a lot of people off the street. And a lot of the people we hired as new employees were in the professional development program.

So that had a lot to do with it.

MR. REYES: Let me just give you an agency perspective. Five years ago, we had a ratio of about 6-1, in that same category. Today we are closer to 2-1. And there was an initiative from the Commission, actually, to the staff to take action.

We have some goals of our new employees. How many are entry level and trying to do such things as knowledge transfer, et cetera, et cetera. So it is part of the succession plan.

But there's been -- every office director has put a lot of energy in this same area.

COMMISSIONER LYONS: That is really impressive and most commendable. I guess from the comments being made among the Commissioners, I'm not sure what the ratio would be from the Commission. Maybe below zero.

MR. REYES: We're not asking. We are not asking.

COMMISSIONER JACZKO: I think it's 4-1.

(Laughter.)

CHAIRMAN DIAZ: That's going to cost you.

COMMISSIONER MERRIFIELD: Just to inform one of our new Commissioners, and this is only something I have learned in

1 the last year, under federal law, it is -- the age point for discrimination,
2 age discrimination is 40. So let's be very careful about what you say.
3 (Laughter.)
4 COMMISSIONER LYONS: The only other comment I
5 wanted to make, when the ACNW folks were here, we had a very good
6 discussion with them, and also there were some discussions off line.
7 They had mentioned a strong interest in the package performance
8 study as that moves ahead.
9 Carl, you mentioned that paper is actually in our office. I
10 have not seen it yet.
11 But I will be curious to know if ACNW has had a chance
12 to look at that or comment on it. They, at least expressed a strong
13 interest in doing so. I think that would be a very useful set of inputs.
14 MR. PAPERIELLO: We have had a lot of briefing with
15 them. But when you ask me this specific paper, I don't think --
16 CHAIRMAN DIAZ: They have not commented on it yet.
17 They have commented on the previous one.
18 All right. Very good. Thank you so very much. We really
19 appreciate sitting here with you and not only hearing from you, but
20 provide you some of those little things that concern the Commission.
21 I look forward to a wonderful SRM, there are so many
22 good things in there that the Commission brought up that I believe will
23 provide guidance and stimulus to the staff. Good luck to you all in the
24 budget process. We look forward to keep working with you.
25 We are adjourned.
26 (Whereupon, the hearing was adjourned.)
27