OFFICIAL TRANSCRIPT OF PROCEEDINGS

Agency: Nuclear Regulatory Commission

Title: Nuclear Safety Research Review Committee (NSRRC)

Docket No.

LOCATION: Bethesda, Maryland

DATE: Friday, May 20, 1994 PAGES: 255 - 360

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UNITED STATES

NUCLEAR REGULATORY COMMISSION

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NUCLEAR SAFETY RESEARCH REVIEW COMMITTEE (NSRRC)

Montgomery Room

Holiday Inn

8120 Wisconsin Avenue

Bethesda, Maryland

Friday, May 20, 1994

PARTICIPANTS:

EDWIN E. KINTNER, Chairman
DAVID L. MORRISON, Retiring Chairman
C.J. HELTEMES, JR.
ERIC S. BECKJORD
GEORGE SEGE
THEMIS P. SPEIS
ROBERT E. UHRIG
RICHARD C. VOGEL
SUMIO YUKAWA
LAWRENCE C. SHAD
JOSEPH A. MURPHY
FRANK A. COSTANZI
NEIL E. TODREAS
FRED J. MOLZ
CHARLES MAYO
HERBERT S. ISBIN
ROBERT D. HATCHER, JR.
MICHAEL GOLAY
SPENCER H. BUSH
SOL BURSTEIN
E. THOMAS BOULETTE

PROCEEDINGS

[8:09 a.m.]

MR. MORRISON: Let me call the meeting to order.

We have a rather busy morning ahead of us, I believe, especially given that departure time that George Sege just mentioned.

I would propose that we spend about the first hour coming back to what I think probably will be my opening remarks and set in context by some of our discussion yesterday afternoon that I think we need to spend some time, collectively, talking about the scared cows, the code maintenance activities, and although the fourth question on the list from the Staff Requirements Memo was technical disciplines, I think we covered that yesterday, and maybe all that we need to discuss there is what is the way to really bring it up if it comes as a question or whether we should confront it head-on.

Let me start by just sort of highlighting what I think I will begin to say in my introduction and then follow through on what I promised to do yesterday, try to take Ed's four points and see if I could put some words around them, and that was harder than I expected. That's my caveat to get off the hook so early.

I just want to, when I open the meeting with the Commission, just remind them that it was not quite a year

ago that we met with them and that they posed a number of questions to us, we have met on several occasions to discuss the subjects contained in these questions, and what we're really prepared to do as a committee, as well as individuals, to continue these discussions during our meeting in the afternoon.

Now, in general, these questions dealt with the appropriate content of NRC's research program and its ability to respond in a timely manner to the regulatory mission and to retain the essential competence in terms of staff size, skills, and disciplines to be effective in both the ability to anticipate regulatory needs and to fulfill them.

The answers to these questions have to relate to the special role that research and, in turn, scientific and technical information have in a regulatory agency, and it's my belief that the credibility of the information and the fidelity of its use within the regulatory mission is an essential characteristic.

Timeliness is of equal importance, and to fulfill these requirements, nationally and internationally recognized engineers and scientists must be involved, and the agency must have a commitment to the continual improvement of its technical information base.

Over the six years the committee has been

involved, we have observed substantial improvements in the organization, planning, and management of NRC's research program.

It has become responsive to its internal users and customers, the NRR and the NMSS, while experiencing substantial shrinkage in the research budget.

The credit for these improvements goes directly to its senior management, and I would be remiss if I didn't express a concern on behalf of the committee that the finding of capable replacements for Eric, Jack, and Themis will be a challenge to the Commission, but the continued success of the research program will depend upon it.

I'd like to focus now on the general subject of the content of the research program and state that the committee does conclude that the research program is doing the right thing.

Unfortunately, that answer is only valid within the mission that has been defined for research by the Commission and within the dynamic external environment within which NRC operates, and now we're back to the issues, which -- let me put them up, and we can talk about them.

MR. KINTNER: A small suggestion is that you use both the first and last names.

MR. MORRISON: Okay.

MR. KINTNER: The Commissioners might not know who

--

MR. MORRISON: If they don't know Eric Beckjord, we're in deep trouble.

MR. BURSTEIN: We're in deep trouble.

MR. MORRISON: But that doesn't mean that's because of Eric.

I hope you can read my writing. I think these are the four things we tried to discuss yesterday, and I would summarize it as the mission and role of NRC and what is the future of nuclear power within the United States and worldwide? That's an issue of concern to us.

What is the mission, what is the role, how is it likely to change? I have a little elaboration on some of these things as we go into it.

The second was the ability to shift the content and the priorities of the research program to maintain the essential expertise to sustain the good work and the performance that I just have mentioned.

Third is to talk about the availability and sustained commitment of funds for exploratory research. I'll have some other comments on that later.

And then the maintenance of an effective linkage between the knowledge base that hopefully continues to expand within research and the regulatory demands of NRR and NMSS.

Ed, are those the points you were trying to make? Did I capture them right?

MR. KINTNER: Yes, I think you did.

I said them, I think, more specifically, and maybe you don't want to, but just take the first one, which is to state, rather directly, that there is little immediate prospect of new reactors in the United States, that the enthusiasm for relicensing is diminished, and the general role of research in terms of the big issues of severe accidents, which came out of Three Mile Island and so forth, is coming to a close, and that's going to change the basis on which anyone views a research program --

MR. BURSTEIN: In this context, Mr. Chairman --

MR. KINTNER: -- just a more specific statement of why we see change coming.

MR. BURSTEIN: But there is an argument here, as you heard the Chairman of the Commission state, I think within the last year, that utilities, in his view, could afford not to seek license renewal, and he had some unique ideas concerning the financial commitment to license renewal which a lot of, perhaps, utilities felt were not as well-founded as they might be but were not prepared to argue with him about.

Now, you're getting into interpretation of what people perceive out there as the future of nuclear power,

and I think that has undoubtedly a cause-effect bearing on what we're talking about.

Yet, do you want to get into a debate on the future of nuclear power at this session? Because I think, if you get too specific, that's what you probably will inherit.

MR. KINTNER: Well, I agree with you. You don't need a debate about it. It seems to me you want to state what is rather is obvious to everybody. Selin himself has given instructions on strategic planning to make those assumptions.

MR. BURSTEIN: That's why I raised the question, because there is a difference in that assumption, as I perceive it.

MR. KINTNER: My instincts would be to state it rather directly, because I think the Commission has had some responsibility on what's happened, and that factor is going to change the outlook on research.

MR. MORRISON: Well, I'm trying to speak on behalf of the committee.

MR. BURSTEIN: There's nothing wrong with saying what the committee's basic assumptions are, even if they do differ from the Commission's.

MR. KINTNER: Yes. Maybe that's the way to put it.

MR. MORRISON: But it seems to me that they embody a lot of these topics that came up yesterday, that if you look at the future of nuclear power within the U.S., it may be rather lonely, but worldwide, it may be very good, and is that an opportunity or a challenge to us?

MR. BURSTEIN: One of the things -- I don't see Eric here at the moment, but one of the things he's mentioned that he was going to discuss further was the situation in the former Soviet Union and whether there is a role for RES beyond the U.S., as an example, in other places.

Are we going to talk about that at all to give you some help in that direction?

MR. MORRISON: I agree. I think ought to have Eric state what his position is.

It seems to me that fits this opportunity or challenge and also what was mentioned, I think, yesterday, the fact that we have tremendous international respect both in the research program and the regulatory process.

MR. BURSTEIN: I think we had.

MR. MORRISON: I'm basing it mainly on your experiment yesterday.

But certainly the overall mission here relates to what steps are taken along these lines, which -- I don't whether I have them in the right order of how things would

fall -- but there certainly has to be a commitment to current reactors. They're not going to shut off overnight.

Whatever NRC does has to be sure that that's supported in whatever ways necessary. The waste management issue is one that's there no matter what. That's all a part of the research program. It can't be ignored. And that's a role and mission that NRC has to fulfill.

MR. BURSTEIN: But the commitment to current operating reactors and all of the problems associated with that is probably the core thing that you would focus on, I mean that the NRC ought to focus on.

MR. KINTNER: But not necessarily in research.

MR. BURSTEIN: Well, from a safety point of view. That's sort of what our committee is about, and that's where the potential danger would be, as far as I can see.

MR. MORRISON: I guess one has to look at that in the extreme. If the research program tomorrow as closed out, what would happen to the safety of current reactors?

MR. BUSH: Not very much.

MR. BURSTEIN: If we continue to say that current reactors are adequately safe by allowing them to retain their license and continuing to operate, I think, while I agree that that's probably the most sensitive area in the whole nuclear concern, the question about that relation to research is as we have stated.

One of the things that we keep talking about in terms of technology-based institutions like this and public trust and other things is -- I'm getting to this idea of communication.

MR. TODREAS: I sense there's a de-coupling here. I think the whole issue we've been talking about with regard to maintenance is how research can be maintained ready to respond to current operating reactor issues.

If all these other opportunities are stripped away and research must exist just as that as a stimulus, it's going to be very difficult. If you build up three or four other areas and you can ride research on those, then you can maintain the capability.

Actually, I think that is the central question, because you've got to maintain the capability to respond to current operating reactors.

MR. GOLAY: Let me take it even further.

There's one sort of implicit treatment of the current reactors that basically things are all right, because they're operating okay and if ain't broke, don't fix it, but I would draw an analogy between the criticisms that came up of control rooms following TMI.

One of the main points of the Kennedy Commission was that the control rooms were antiques even in 1979, and that was an example of an area where technology had moved

on, created opportunities for improvement in safety, yet because you had an effective social compact for what the NRC would focus on and what it would not, that category of problems was off the agenda, and I would contend that that has continued to happen, that technology has opened opportunities for safety improvement which can be pursued without meddlesome intervention in the lives of utilities that ought to be paid some attention to.

MR. BURSTEIN: What makes you think that it isn't?

MR. GOLAY: Anecdotal evidence from the power plants.

MR. BURSTEIN: I can't, obviously, go through chapter and verse on many statistics, but there is kind of a philosophy that, anytime you can make an improvement that pays for itself, you do it, and anytime you don't find that it is going to be economic or going to end up somehow in a better -- and I hate that term, because it's undefined -- result, you don't, but this is a continuing activity that goes on until the plant is shut down, and even after that, and it's true for fossil plants and hydro plants and nuclear plants, and to suggest that a plant is fixed as of the date of its construction, completion, and operating license permit and is never changed by virtue of a potential improvement by the owners, only because of pressures from outside, I think is an improper indictment.

MR. GOLAY: I wasn't meaning to make that one; rather, that when you have a broad -- a large number of owners and you simply examine them, you see that there is a variation in practice, and while I'm sure that they're all making improvements, there is a broad range, and what they don't have is a statement of minimal standards, other than those which existed at the time that the license was issued.

MR. ISBIN: I don't think that's really correct, and I think, Neil, you ought to respond what INPO is doing. You're on the advisory committee now.

I had the opportunity of being on that advisory committee for a few years, and I could see the immense improvements that were made, and contrary to what you were saying, Bob, the other day about INPO, INPO does do evaluations, both corporate and management evaluations, as well as plant evaluations, and these are very instructive.

They try to determine the best practices that are being used and to make the knowledge common to other utilities, and they have a program of trying to advance these incentives, and I think Neil can speak more directly.

MR. GOLAY: Well, before Neil does, I don't want to be interpreted as saying that I think that INPO is not doing anything useful or that the owners of plants are not trying to improve them. I'm really trying to address the proper scope for NRC given changes in the world.

MR. ISBIN: But all of this has to be in light of the issue of major efforts which are really underway which have demonstrated their effectiveness, have been shown in improvements in plant operations.

They are always a few outliers, and these have been given additional assistance, so that there is a very, very active program underway.

MR. GOLAY: I don't disagree.

MR. KINTNER: Jack, let me go back and take some issue with -- maybe I'm not taking issue, because I'm not quite sure you and I are talking the same language.

It seems clear to me that there is unlikely to be another nuclear plant built in the United States for the foreseeable future.

Now, you can argue that that's going to change when the gas prices jump and so on.

Well, that's not going to be for a while, and the embedded social structure and legal structure in the states and in the Federal Government are such that I don't see that opening changing in the foreseeable future.

When I say that, I mean several decades. I really don't believe it's going to happen.

We were talking last night about how the ideological bent at the state level and at the Federal level, in the administration, at the moment is such that

it's going to be very, very hard to overcome, and the economics just aren't changing that fast in the direction that would say somebody ought to do it.

If it's going to be done, it has to be done because somebody picks up like the Fermi plant and say, look, in terms of the future of utilities, I'm going to go build something, and I don't see any utility leadership in that regard. It's going to change in that way.

Also, just in the two years that I've been on this committee, I think you will all agree the prospects for wishing to relicense and extend licenses are decreasing steadily, steadily, and that is a -- take those two factors together -- is a significant background in which research has to be looked at.

In addition, there is the fact that a lot of good research has been completed and a large base built that, as Sol says, we shouldn't go looking for more problems.

We've looked at problems, we've found a number of them, we've tried to resolve them, are very close to resolving the majority of them, and that seems to me to be the basic -- the ground in which we want to plant the seeds.

The question of keeping the present reactors operating and operating safely I think is answered by Dave's point.

If you didn't do anymore research, period, I think

those reactors would continue to operate about the same they are, and the changes are going to come from internal economic factors and from the goodwill, if you wish to call it that, of the industry, through INPO and other activities of that kind.

So, I don't see why that ought not to be put forward calmly and cleanly and clearly without attempting to make a story of doom and gloom.

MR. MORRISON: Now, you've convinced me that I should cut the research budget by 50 percent.

MR. KINTNER: Wait a minute. Let me finish.

He's asked me a question, and the answer is, if that's all, if just those factors are the only ones you consider, the answer to your question is yes, you should, over a period of a few years, but -- and that's where I think we have to lead the Commissioners to be thinking about, if they want to maintain a vital world leadership role in this field, they've got think about other factors.

That's what somebody was saying yesterday.

It's doomed to a slow decay in research unless you do throw these other factors in, and I think what we're saying to the Commission is that you're always thinking about that, because the basis on which the program up to this point has been established is changing, rapidly.

Sol?

MR. BURSTEIN: I think we're both arguing about the same thing, but we're coming at it from different directions.

I think both Mike and Neil have a very important point that we've overlooked in this discussion, and that is that, in addition to the continued safe operation of these plants, we have new information and new experiences that comes out of that operation.

The steam generators are a good case in point, in my view.

Now, does NRC research or somebody have to have the capability to respond to that?

MR. KINTNER: Sure.

MR. BURSTEIN: And the answer is obviously yes.

MR. KINTNER: Sure.

MR. BURSTEIN: Or perhaps even, as some people might have suggested, to anticipate that. I'm not sure that that's the case, but at least to respond to surprises, to operating experiences that were not included in the original design and predictions and plans.

How do we do that? I think Neil has said, if you try to justify keeping a house full of firemen, technically competent firemen, waiting for something to happen, you'll never get that off the ground.

So, use some of these other reasons for their

existence, for developing their capability, for sharpening their tools, and saying we'll dedicate it to advanced reactors or decommissioning or license renewal or something else, and by that technique, we will develop and have available the fire brigade that we can throw at a new experience, while we drop those other less-priority items at the time of the occurrence.

Isn't that really a valid basis for maintaining our research capability?

MR. KINTNER: I think you and I are saying the same thing.

MR. BURSTEIN: I think the emphasis on current operating reactor safety is still, right now, the highest overall NRC priority.

MR. KINTNER: But in research, what research are you doing which has any effect on reactor safety?

MR. BURSTEIN: I said overall NRC.

MR. KINTNER: Oh, that's a different matter.

MR. MORRISON: I'm firmly convinced that, unless NRC defines what the role and mission is, research can't respond to it. You've got to have some vision, some direction, some strategy at that level. If you don't do that, the rest just doesn't make any sense.

MR. GOLAY: I think there's one way that this can be focused a little bit, and that is, on the license

renewal, the way it occurs to me is the thing that's deterring the utilities from coming in and investing their resources in this is that NRC is right now in sort of the bring-me-a-rock mode of operation, and the expense of doing that is great enough to deter the utilities from doing it.

An appropriate role for research would be to define much more clearly which rocks they want brought in, in the sense that the way that the NRC has argued it is that it's the burden of the license holder to show that the plant continues to be as safe as when the license was issued, and actually doing that requires development of new knowledge and techniques, because fundamentally, the answer to that question is posed in probabilistic risk-based terms, and they haven't worked out how you actually provide an answer in general methodological terms.

That, then, serves up the question of looking at all of the aspects of the operating reactors in terms of how they contribute to risk, or don't, how they can reduce risks, and it's going to be an embarrassment to the NRC if they don't provide clearer guidance to the utilities, because they will continue to back away from this opportunity.

MR. BURSTEIN: I think they already are embarrassed, because they have to rewrite the rule, but let me challenge another statement that troubles me, and that is

that a plant that is ready for relicensing has to demonstrate that it's as safe as it was as originally built.

The answer is it ain't, and it can't be, and if we try to say that it is, I think we've failed.

MR. BUSH: Well, one reason that you want to delay is that Tom Murley went on record on time -- he's not there anymore, but -- to the tune that they shouldn't mind paying $400 or $500 per installed kilowatt.

Well, when you turn that into -- into actual total dollars, that's a lot of money on a good sized plant.

MR. BURSTEIN: But that was based on his perception of fuzzy economics, the same as the Chairman has said, we've got too much invested in these plants not to relicense them.

MR. BUSH: They've amortized that already. So, that's not a good argument.

MR. BOULETTE: Well, the question of relicensing, from a utility standpoint, has more to do with real clarification from the NRC. It's not a financial question to a utility.

MR. BURSTEIN: But it's also a matter of what the NRC will require the utility to put in its economic package.

MR. BOULETTE: I agree, Sol, but I think that is a secondary or tertiary issue at this point in time. It's the financial viability of the utility at this point in time as

to whether they want to do that and how they're going to collect fees, etcetera, etcetera.

MR. BURSTEIN: If it costs $400 a kilowatt versus $40 a kilowatt, depending on NRC requirements, it seems to me that has a great bearing on the economic vitality of relicensing.

MR. KINTNER: But there's a policy issue, as I understand it, in this question of relicensing -- and that's what some have said here, research quality doesn't contribute much one way or the other -- which the Commission has to decide and announce -- it did once, but the staff undercut it -- and that is to what standard are you going to test these relicensed plants, to the standard of being as good as they were when they were first built or something a lot better, because we've learned a lot in the meantime?

And what happened was the Commission said, I think, they've got to be shown to be as good as when they were first built, and then when they started to deal with the staff on the matters, the staff said oh, no, you ought to do better than that, in many ways, and they just threw up their hands and said we're withdrawing our application until you decide what your policy is.

As I see it, that's where the relicensing issue stands, and that's in addition to this question of economics, which, as Sol was saying last night, anybody that

wants additional power, the easiest thing in the world is to go buy a gas turbine and put it on line.

MR. BURSTEIN: But whether we agree with the scope of what license renewal means or not, it is a valid subject for inclusion in this tabulation.

MR. KINTNER: Yes.

MR. BURSTEIN: As is waste.

MR. KINTNER: The amount of research being done anywhere outside the NRC's research budget is less and less all the time, and it's almost nonexistent.

MR. BUSH: Are you talking within the United States?

MR. KINTNER: Yes.

MR. BUSH: Okay. You had better define it in terms of the United States, because it's not true overseas.

MR. KINTNER: No, it's not. Either the NRC research is very much industrial or other than NRC research activities -- and will continue to decline in view of the previous trend.

MR. BURSTEIN: But my question here is so what, in the light of Eric's statement that he can't do research for the industry.

MR. KINTNER: I understand that.

I heard him say it, and he can't do research for the industry, but nevertheless, if I'm responsible for

safety of operating reactors or any future reactors, as I believe the Commissioners are, I think that's something they should consider in the way they treat the research activities.

MR. MORRISON: The burden should be on research to define and very clearly articulate what the requirements are for license renewal.

I want to make sure that my mind is clear on what, perhaps, Commissioner Rogers is proposing, but if you take the part of research that is involved in the development of guidance and regulations and moves it to NRR or NMSS -- is that what I'm interpreting him to say? -- you only leave some small competence that does the technical aspects in research, you put a barrier, I think, between using that good technical information and getting it translated into guidelines, and I want to make sure that that's the proposal that's on the table.

MR. TODREAS: The point I want to make is why this question is so important that you're bringing up now, because I think, if you look at the research activities, the big ones that have been lodged, they've been lodged in kind of very specific systems, hardware areas, and what we may be moving into is research to underline and to propel new policy, regulatory policy, regulatory approaches.

For example, the risk-based regulation which was

talked about and license renewal are really regulatory policies, but you may find that the research function here is heavily involved in those in the future and propelling those in the future.

Therefore, the point you've got is a new point of big importance.

MR. MORRISON: Well, I think it's a new point of big importance, and I don't disagree with what you're saying in the content of things that had to be done, but the management burden now shifts, and we all are responsible to the boss to whom we report today, and so, if my job is writing guidance and I'm reporting directly to the people that out in the regulation side of business, whatever their priorities are are my priorities.

This other one is a broader one which can take certain standing unless management directs a lot of attention to it from the top and says, all right, we will develop this technical base, but I would argue that the fact that the -- the amount of money that's available now, even in the exploratory or anticipatory research, is so small that you can't do much of anything with it.

It needs to be higher than what it is. It's likely to get even smaller if we don't have a larger budget in which we carve out some pieces of it, but that's the only reason I'm arguing.

I think I would also argue, from what I perceive based upon three or four months looking very hard at the Environmental Protection Agency, that those functions are very much separated within the Environmental Protection Agency.

The research folks do research, the people that are writing regulations are in another part of the organization, and in an very embarrassing interview, I thought, from the agency's standpoint, we asked one of the people who are writing regulations, well, when do you get the technical input? I don't know.

Well, what are you looking for? A timely response in a manner that I can communicate it to a judge in a court or to the public at large. How are you preserving the technical integrity of that? I don't care.

It's that mentality, when you drop it over to the people on the firing line every day to make these technical decisions.

MR. BECKJORD: The rulemaking was done in the other offices before 1987, but -- the rulemaking before 1987 was done in the other offices, in the regulatory offices.

MR. MORRISON: Do you have any sense of whether it's more effective now or less effective?

MR. BECKJORD: I think the management -- the executive director and the office directors are in agreement

on that point. The executive director and the office directors, I believe, are in agreement on that point.

There may be one who is kind of in the middle, but I think that the idea was discussed last fall in a group of three that were asked to take a look at the organization, and one of the questions that they pondered was should rulemaking go back to the other -- to the regulatory offices?

Actually, based on the attorney's viewpoint, their recommendation was it should go back. Jim Taylor just said he was not interested in that at all, that in his experience the current arrangement and responsibility was considerably more effective, much more effective, than it was under the former arrangement, and I think Commissioner Rogers raised it. It is a part of his package.

My understanding, from what he has said, he'd never made a major point out of that in his explanation of it.

I think that the reason that he included it in his plan was to sharply define this mission that he's interested in for the research office and not have it encumbered with anything else. That's my understanding.

MR. TODREAS: You could ponder the progress of the source term in seismic activities under a change back the other way if you think things have been somewhat slow and

they're moving ahead this way.

MR. BURSTEIN: One of the things we talked about before, now that Eric is back, is this international aspect. While we were -- while you were out of the room, we suggested that one of the RES scopes or activity included some international items.

Did you conclude your remarks about the possible role for research in that respect yesterday? Is there something that we should add now?

MR. BECKJORD: Well, let me try to give that to you in a couple of minutes. I think I can summarize it.

We are now doing -- expending a considerable effort in terms of FTEs and some funds on the Eastern reactors in the Russian Republic and Ukraine and some effort elsewhere, at a lower level, in Hungary and in Czechoslovakia and now Lithuania.

We will be reviewing the PRA which is being worked on by the Swedes, the Germans, and the CEC in cooperation with Lithuania on the Ignalina power plant, and they're going to produce a PRA, and we will be involved in the peer review of it.

Now, much of the funding for this activity comes from AID. There's a total of -- I think it's now, in total -- when you take all of the pieces and put it together, it's probably $3 million. It's been growing slowly over the past

four years, and it has reached that level.

MR. BURSTEIN: By the Agency for International Development?

MR. BECKJORD: That they are spending, the money that they are giving to NRC, $3 million, for -- and it includes -- now, what I should say is that that does not -- that money cannot be used for paying for our FTEs.

That is money that goes to buy services in the country or for the use of the country where it's being expended.

We have got several computer workstations for -- there's one for the Ukraine, I think there's one for the Russian Republic -- and it's the computer workstations and services that are purchased either in the country or for the use of the country where -- for which it's earmarked.

Now, that money cannot pay for our own work on it. So, in fact, the agency is paying for that, and it's considerable.

In fact, I can't -- I don't recall the exact number, but the comptroller took the total that the NRC is expending on this, of its own time. It's growing.

Now, the concern that I have is that, increasingly over the last several years, we are being asked to make judgements which really relate to -- which finally come down to regulatory judgements on these reactors, and we were very

recently asked to participate in a regulatory review of the Ignalina power station.

I believe that we will -- by the Commission's determination, we will -- with the Commission's approval, the decision has been made that we will not play a direct role in that, but increasingly these requests are coming up, and I think the issue is this: Do we really know enough about the RBMKs and also the former Soviet VVERs in order to provide information which is going to be used directly for regulatory decisionmaking, and personally, I feel very uncomfortable with that, because we haven't worked on those systems. We don't have direct knowledge of them.

We're working on the basis of what other people have done and on the basis of derived information, and I think that, if the NRC is going to become -- going to remain as involved as it is now and perhaps even more -- and it looks like it's going to be more, because the frequency of these requests is increasing -- I think we need to have a better understanding of what we're advising on, and so, I think that -- and I have suggested -- and the conclusion of that will be that we will prepare a Commission paper which will propose a research program on some specific aspects of the RBMK and the Eastern water reactors to look at appropriate safety questions.

Now, the big question here is the fee question,

because there is -- right now, there has been discussion in the appropriations cycle this year on the general issue of should international activities be funded outside of fees?

In other words, should the Congress fund them and not require that money to be recovered by fee? So far, the position, as I understand it, in Congress, the answer is no, it will all be recovered by fee.

So, this becomes a -- this is a problem right now. It's a big problem for the Commission.

I guess I'm looking at the responsibility and the consequence of it, and my own opinion is that it should be resolved, and if the Government is going to remain involved in these activities, it ought to pay for it, and it ought to be satisfied that the advice that is derived therefrom is good advice, and that means, frankly, some work done on it.

MR. KINTNER: Well, what he just describe is, in fact, the first stages of further activity in the international arena, and it seems to me you're absolutely right.

If you're going to get involved in answering questions about the safety of RBMKs and everybody is going to put you in a position of responsibility for those answers, you've got a lot of work to do before you write BY anything down.

MR. BUSH: The closest analog to the RBMKs

probably was N reactor, and I think there must be a dozen or more people that are mostly in PNL now, because they moved over from Westinghouse, but that's about what they spent all -- almost -- well, much of their time on, not all of it, but we certainly have to have people with the knowledge of the systems and the differences in order to make that comparison, because let's face it, that's a totally different beast than anything we've looked at over the last, I'd say, 40 years.

MR. BECKJORD: That's right.

MR. TODREAS: I want to say one other thing relative to that. It's come up in at least the Advanced Reactor Subcommittee, the difference between what you do there and what you do on CANDUs relative to reinventing material.

Our point, at least the subcommittee, is to discharge your responsibility you don't always have to generate original codes, assessments, materials. You can review, talk to experts, things like that.

I think that's really true in the CANDU case, to a large extent, but I think when you get into the RBMKs and the VVERs, I think what we said, in my opinion, doesn't apply there.

I think that's much more murky, and there, depending on the contacts you make and what technical base

you build, you may have to do more original work there.

MR. BUSH: Pretty hard to do.

MR. TODREAS: Yes, because you don't have the data to start the base.

MR. BECKJORD: Well, I think that that work would have to be done in cooperation with the appropriate people in those countries.

MR. TODREAS: But you may have to regenerate a base, whereas with CANDUs, it's a different story.

MR. BURSTEIN: One of the things we started to talk about yesterday, Mr. Chairman, was this matter of public trust and communication and how we somehow translate this technological enclave of world-class experts into linguists so that they can communicate with this -- what was it -- a stakeholder? -- or whoever, somebody out there who is supposed to accept what we say as gospel, and I think we have not had, necessarily, a very good track record in this respect.

I don't know what NRC as a whole is doing here or what RES in particular -- whether it has any such program or not, but clearly, the ability to translate our technology and science into terms that give the public confidence of what we're about, I think, is essential.

MR. MORRISON: You won't get any argument from me on that. It's a very difficult subject.

MR. MOLZ: I, personally, like the context that Ed suggested within which we kind of set our reasoning, the statements about the directions of the nuclear industry and things like that, and I think Neil made some essential points about the need for meaningful activity, and to some extent, I think, Sol summarized all that, and it seems like that's a key -- that, together, is a key thing for the -- to give to the Commission, and it seems like defining the meaningful activities then becomes sort of the nitty-gritty of the whole thing, and international activity has been mentioned and a few other things. We might want to amplify that a little bit more.

MR. MORRISON: Let me see if I can't come up with words to introduce the subject along those lines. I think this discussion at least lays out the issues and we can easily identify perhaps one of us that could respond to a specific question.

I just want to make sure that we all are somewhat in agreement on where we stand related to the question that the Commission has proposed of what is the ability to maintain the essential expertise, which I thought we talked about yesterday, that in order to do that, we may have to shift the content and priorities of the research program in order to be able to do that, and in my mind, it involves both internal staff as well as the contractor base. That

would include universities or other people involved in grant programs, and then the question that we were just talking about of the international activities, and I think Spence mentioned that, if there is research being done, it's being done in a internationally, not in this country.

So, I think those are all part of this solution to the problem of maintaining expertise and how much expertise you need to maintain.

MR. ISBIN: Do you intend to comment in any way on Commissioner Rogers' prepared remarks that we've received?

MR. MORRISON: It's not my intent to comment on that directly.

MR. ISBIN: You're talking about expertise, and he has a whole paper here on expertise, and what would you say?

MR. KINTNER: Could I jump into this?

I was going to suggest that you do mention it, and in particularly, if you look on page 3 of the May 13th document, "Precepts and Relationships," the last page, (a), (b), (c), and (d), I think are excellent statements which the committee should endorse, because it fits directly into what we're talking about here.

MR. MORRISON: Could you read it, please?

MR. KINTNER: The forte of technical expertise and the full range of scientific and engineering disciplines that underlie regulatory programs and practices; visible

leadership in the acquisition of technical knowledge in support of the agency's mission; provision of technical introspective capacity to guide development of technical programs and regulatory practice, perspective of outside peers; competence in the management of contracts -- related to NRC programs.

And I think the key words in this, from my perspective and in terms of what we're talking about, is "technical introspective capacity to guide." That is, in a nutshell, what I think they need and are going to lose if they don't recognize what's going on.

MR. ISBIN: But on the other hand, I think we need to be very careful that we don't really endorse Commissioner Rogers' proposal unless we have spent a fair amount of time talking about it, because if you read what he has given in detail, I don't think that this is achievable.

MR. KINTNER: That's all I'm endorsing, those four points.

MR. ISBIN: Well, I think it has to be very limited in what you say, because otherwise you give the committee's backing to this other whole document, which I don't think we should do.

MR. MORRISON: I would agree with you there, Herb. I think that the best I would be comfortable in is endorsing these as goals or directions, perhaps goals, but the

implementation, I think, is going to be extremely difficult, and whether you're going to be able to achieve these is going to depend a lot upon how it is implemented, and I've already expressed my concerns of taking the rulemaking out.

I think that tends to dilute the ability to use all these capability that you have, and the net is a loss rather than a gain.

MR. HATCHER: One thing that I have not seen mentioned in any of the things we've read or heard in any of our discussions is what, to me, is one of the prime things about a research program, and that is to employ a large amount of creativity for the advancement of science or technology.

This is something that doesn't appear in any of these documents we have here, and I think that, somehow, that ought to be woven into what we're doing or any recommendations we make.

It isn't just the knowledge base that we're maintaining. It is that we are trying to maintain a cutting edge in science and technology that might actually advance both in the end. At least that would be my perception of a research program. Correct me if I'm wrong.

This is not the entire basis of it, but this is something that ought to be an element of it.

MR. BURSTEIN: I had commented the other day that,

in one of Eric Beckjord's responses to some code development work, he said that one of the intents of the long-term plan is to produce, in this case, a thermal hydraulic capability that is truly world-class and, once again, advances the state of the art, and if you will recall, I questioned whether that's where we really want to be, whether this is the place for that sort of leading technology development, and I gather the answer to that coming from Professor Hatcher is yes.

MR. HATCHER: That's my feeling, yes.

I'm thinking, I guess, in some of the things that we're doing related to the waste repository that not only are we attempting to provide a knowledge base by which we can make judgements about the DOE programs, but there will probably be surprises along the way that we should be able to effectively accommodate in what we know, and there are some things that are brought up over and over again regarding the seismicity of that country out there and the volcanic activity, just for example, that require this kind of approach, I think, and the same can probably be said for anything we're engaged in here.

MR. TODREAS: Not anything we're engaged in. I think there are a few very specific areas, going back to this grouping I spoke about yesterday of two tiers of the activities and the technical expertise.

If we take thermal hydraulics, nobody else, in terms of other activities, outside, say, advanced reactors, nuclear engineering, is really doing the specific work that we need and that winds up to be at the cutting edge.

So, therefore, you can subsume it and agree with it, but I think we will get dangerously off the track if we talk about at the state of the art, the cutting edge, whatever, across the board, in everything they touch.

I think we've got to be very selective, but on the areas that we do select, I think we can justify them in spades.

MR. HATCHER: I agree with that. There are elements of the program that they are supporting at Southwest Research Institute that I disagree with, in the long term. They may never get to them because of other reasons, as well.

Some of them, as I mentioned yesterday, are very esoteric kinds of research. I don't support the idea of putting lots of money into that sort of thing. It may lead off into cutting edge but the kind of thing we probably should not be doing.

MR. BECKJORD: If I could just comment on this, I think that, when I speak to that issue, I may not, every time, say, along with the discussion, that the work that we do has to have a connection with regulatory decisionmaking.

I mean, if it's going to be good work, it ought to be cutting edge, but we don't have a basis for working on something that does not have -- that does not relate to a regulatory judgement of some kind, and that's very clear in the legislation.

So, I may not say it every time, but certainly, it's in the back of my mind.

MR. HATCHER: But by the same token, it should not inhibit creativity --

MR. BECKJORD: That's correct.

MR. HATCHER: -- or advancing technology and our scientific knowledge base.

MR. BECKJORD: I agree with that.

MR. MORRISON: I share Eric's view that you've got to continue to remind people of that most of the time, but unfortunately much of the scientific community regards their peers outside of the environment in which they're working, which is obviously good from a science standpoint.

On the other hand, that community may not have the same slant on the regulatory application as the scientist needs to be within -- or engineer needs to be within the NRC research program, different drivers that affect these things.

We sort of ended up, toward the end of the day yesterday, coming back to this commitment of funds to

exploratory research and whether that's the right name or not.

First of all, how do you protect it under the NRC mission, with declining budgets and the fact that we've got Congressional, OMB, and industry scrutiny all the time?

And I didn't have in my notes that we reached any kind of conclusion on that, other than we thought it ought to be bigger than what it is now. Is that a general feeling among the committee or just my reading of the discussion?

MR. BURSTEIN: Is it fair, Mr. Chairman, to not - perhaps be a little confrontational here -- to say we cannot aspire to world-class leadership and state-of-the-art advancement and cutting edge performance without some funds and that, really, when we see what the Commissioners do to the RES budget on the one hand and -- you know, this is the two-handed commissioner -- and on the other hand, he says we want this kind of performance, is it really that fair to suggest that maybe we can't do those things simultaneously, together, at the same time?

MR. KINTNER: I think you ought to use the word "support" and not "funds." You can talk about budgets, but when you start talking about funds, it gets a little crass, because I think one other thing -- I don't know whether you're coming to it later -- that we want to talk to in terms of support is in personnel matters, and the

Commission, in addition to just providing necessary budgets, has also, it seems to me, to give the research activities support in terms of the selection and training of personnel.

I mean Neil had, I think, a four-part suggestion with regard to keeping the personnel capabilities up, and matter of fact, I think that's one of the points we need to make, that it's not just money, it's also doing the right things from a personnel point of view.

MR. ISBIN: What do you mean by that?

MR. KINTNER: I mean I think that -- let's say the whole organization slowly deteriorates in terms of numbers and in terms of senior people leaving and so on, this early out and all that sort of thing.

As that takes place, unless there is some protection provided, some special ability provided to the research organization to get and retain extremely top-level people, then the whole thing is going to go down at the same time, and they're saying -- the Commissioners are saying, in these various papers, and we're saying, it seems to me obvious, that our objective is to make the case that the research organization, whatever else happens to the NRC almost, ought to be -- continue to be technically capable and have the resources of personnel and organizational strength needed to do this job if that's what the Commissioners want to do.

That's what I mean, and if you want to really say they get preference, that's what I say. I'm talking about preference for the research organization over other parts of the NRC, not total preference but some preference.

MR. BURSTEIN: You want to have 240 or whatever the authorized number is of undergraduate students or all Ph.D.'s?

MR. KINTNER: No.

MR. BURSTEIN: The point is that numbers of people are meaningless.

MR. KINTNER: Exactly. Exactly. But the numbers -- what's happening, I think, is that the decay in numbers is overmatched by the decay in quality.

When you lose Eric and these guys -- and the others who are senior are going to be going -- you've got to make that up somehow, and unless there's some special care taken and special preference given, you're not going to hold that line.

Now, I suppose that's obvious, but I don't know that it will happen unless somebody says something about it.

MR. MORRISON: What were the other two points, Ed? You mentioned dollars, and you mentioned the ability -- giving special consideration to staffing, personnel.

MR. TODREAS: You mean the points I made?

MR. MORRISON: Yes.

MR. TODREAS: That was specific under the personnel focus.

The first point is exactly what Sol said, that numbers aren't the key but competence is, particularly in a downsizing regime. That's the introduction.

Then the three points were, among existing employees, identify the stars and enhance their strengths through education and whatever other means but identify and enhance them.

The second point was hiring the brightest you can as interns and develop their capabilities.

And the third was, where you can't develop coverage in time to replace retirees by the first two mechanisms, hire specialists from the outside to give you the coverage you need during the transition period before you develop your internal people by the pipeline filling approach.

And I'd add -- we heard yesterday from Eric that the third point seems to be on the way. We seem to have a focus on hiring some key technical specialists in areas you need.

MR. BECKJORD: I think I can get approval for that, but we have to get the organization settled first before that will happen.

MR. BURSTEIN: Is there a role for consultants,

outside the technical support, on a part-time, ad hoc basis?

MR. BECKJORD: The answer is yes. We have to contract for that, and it would be nice to find ways to cut through some of the delays that impede that process. It is possible. The answer is yes. And we do that. We do that in a number of programs.

We have done it most frequently and consistently with review. When a piece of work is done in the severe accidents or the thermal hydraulics or the materials area or PRA, we get a group of people in.

We've done that with this PRA study that was underway. John Garrick was one of the members of that. We've done it in the materials area on many projects. We've done it in severe accidents and thermal hydraulics and in other areas.

It's been generally used for the purpose of peer review. For thermal hydraulics, we have a group of five consultants now who are consulting individually. It includes Peter Griffith, John Mahaffey from Penn State, a guy from Texas A&M in thermal hydraulics.

MR. TODREAS: Hassan?

MR. BECKJORD: Yes, right. And they are doing consulting and suggesting ways of improving the thermal hydraulics programs and the experiments -- they look at the experiments and suggest modifying those, that type thing.

MR. YUKAWA: Within the NRC's administrative structure, the types of consultants I speak of here, they have to be hired through research. They cannot be hired directly by NRR right now. Is that correct?

MR. BECKJORD: Well, NRR does -- I mean they hire people, also. Both the regulatory offices have what is called program support funds, and it's considerably less than research, but it's still a significant amount of money.

I mean it probably totals $35 million or $40 million, something like that, or has until this year -- I don't know what it is this year -- which they use on specific regulatory issues, and they retain people on the same basis that we do.

MR. BURSTEIN: Does that sound like it's competitive with RES? Why would they go out and get separate program support instead of coming to where they send user letters all the time?

MR. BECKJORD: The part of it that I know best is in nuclear reactor regulation. That is very specific to an issue at a particular plant or in the very near term. For example, all of the problems with the fire -- what do you call that material?

MR. BURSTEIN: Thermalag.

MR. BECKJORD: The Thermalag. Yes. They've got people working on Thermalag. That's a very near-term

problem. We've contributed a little to that. It's in that kind of activity that we use the program support funds that I'm talking about.

MR. BUSH: Eric, you used to be able to do it through the national labs, what amounts to a consultant through the back door.

MR. BECKJORD: The reason I referred to the problems of procurement, it is getting more difficult to do that kind of thing, because the procurement regulations are changing at the national laboratories, and it's more difficult for them to do this kind of contracting than it was a few years ago. So, the whole process has been slowed down.

MR. ISBIN: Dave, suppose the Commissioners ask you the question of -- here you've been on the committee six years, you've had a good chance to observe the functioning of the staff, they have 224 people, and out of the 224, don't you really have the competence for a world-class organization? How would you answer something of that nature?

MR. MORRISON: My immediate reaction, with thinking of it much further, is that it's spotty, and whether it's -- it's somewhat difficult to tell, it seems to me, in the way in which NRC operates, which -- by their own words, they are professional project managers, rather than

technical experts in any area.

Now, some are technical experts and also project managers, but others are very good project managers that have the capacity of assimilating knowledge and using it that others have, and that may get down to the question of what are you really looking for the organization?

Would you prefer to have a technical expert that knows nothing about project management or the other extreme? And that's why I say it would even be spotty by discipline, if I looked at it.

I don't know how the rest of the committee may feel about that, but -- we really haven't seen them all, but of those that we've seen, that's --

MR. ISBIN: I think that would be, really, your answer.

MR. KINTNER: What would you say, Eric?

MR. BECKJORD: What I'd say is that -- that that organization is, with some exceptions, dedicated and hard working. There are exceptions. With respect to the question about technical skills, we have some people who are very good.

I mean the problem that -- the matter that was cited yesterday by Themis Speis was a matter of interpretation and a former graduate student at MIT doing work on the Chernobyl accident, and there was a big mistake

there, and one of our people -- well, actually, it was Speis and one other person identified the two big problems in that thesis, which, you know, made about a 50-percent or more than 50-percent difference in the -- and they found that the source term was stated to be very high, by more than 50 percent.

That's one example. I could give you others. I think that there are a dozen people there who are technically ready for -- you know, they can compete widely.

There are a lot of people who are project managers and who have a good technical understanding, you know, a strong enough technical understanding so that they can be very effective project managers.

Probably, they would have difficulty, you know, doing work on their own, original work on their own.

On the rulemaking side, there's a somewhat different kind of competence, because that involves -- that's kind of -- people who do well at that have a foot in both worlds.

They have a good technical understanding, but they have been working on rules, and they understand the NRC regulations, and they are very good and very effective at that type of thing.

So, the way the organization is set up, if you -- maybe the thing to do is pose it this way: If you

substituted and took -- take the same areas of knowledge in materials, in nuclear engineering, thermal hydraulics, this type of thing, and you went out to the national laboratories and you got very good people and you just substituted however many it is, maybe 150, could they do the same job? It would be very difficult, because they are different kinds and talents.

So, I think we -- certainly, upgrading is a very important thing to do, and the way that you're undertaking the downsizing of the organization is through attrition.

I mean that question has been considered several times: Should the agency have a reduction in force? And I think that the decision has been -- the decision has been made a couple of times, no, we're not going to have a reduction in force, and I think, if further downsizing comes, it will also be done through attrition.

Now, there are problems either way. I mean if you have a reduction in force, that's a whole new set of problems. It's a very difficult situation to administer personnel-wise.

If you have a -- if you wait for attrition to solve the problem, you don't have the freedom to go bring new people in until somebody leaves, and that's a problem.

MR. GOLAY: I'd like to make another comment regarding not the research program people, but I've heard it

stated in other parts of the organization that there is a concern that they cannot hold high-quality people, technically high-quality people in many positions, they tend to get -- that they don't feel the work is that challenging in many cases, and to me, this is almost a travesty, because you can't maintain the level of technical expertise that's really needed to do the evaluation and also project management, in my opinion.

I've heard it stated several times over the last four or five years that this is the case in certain areas. I have no idea if it's applicable to this organization or not.

Another question I have for you, though, Eric, is whether or not the attrition problem might remove some of your good people, as well as people that you don't want to keep.

MR. BECKJORD: Oh, that's true. I mean attrition is a completely random process, but you have the -- the reason for going and requesting this over-hire authority, which I think we can get, probably not as many as I'd really like to get, but if we could get that authority, then we could go out and we could bring people in.

We could bring -- and we have in mind both a few experienced people and a few young people.

In fact, we just took on -- through this graduate

support program, we now, beginning in September, sponsoring three people for advanced degrees in nuclear engineering, and they are -- they're all -- they're super people. I mean they have very good grades and very, very strong recommendations.

If we can continue to do that kind of thing and if we can get some over-hire authority, which I think is justified, because attrition will take care of the overage over a couple of years, I think we can manage the transition, but we have to have a policy.

I mean if we don't have a way of carrying it out, it isn't -- it just isn't going to happen in time, and it's important that it should happen in time, because it's this transfer of, you know, the knowledge that was referred to yesterday, people who know, you know, what happened before.

While those people are still around, new people coming into the organization have a chance to absorb that as part of the corporate memory.

MR. GOLAY: Exactly. I was going to say is there a corporate memory, and there must be a continuity there to be maintained.

MR. BECKJORD: Yes. There's a good corporate memory today, but without some plan like this, it's going to be lost.

MR. VOGEL: It seems to me that the percentages of

people who are facing the possibility of retirement is very high, as given to us yesterday, and this apparently, so far, has not been a great concern, but if morale is not maintained at the current level, you would almost be facing a maximum critical accident there.

If I remember correctly, the figures were 30 or 40 percent that could take early retirement or whatever.

MR. BECKJORD: It was 20 something that's eligible. That's a number that -- I hadn't heard that figure before. I found that very interesting. I didn't realize it was -- that many had that eligibility.

MR. VOGEL: It's very discomforting, because it suggests that, during the next couple of years, a very important problem is maintaining morale so that people don't get disillusioned and opt out.

MR. BECKJORD: Well, my own sense is that the bottom is not about to drop out, because the fact is that people are working longer.

There are relatively few people who are, you know, taking early retirement, and the tendency is to work longer. There are financial and family reasons for doing that.

So, I think it's an issue that we have to address, and there are some solutions, but we have to have a way of affecting them without having it prevented by the downsizing.

I mean it is a -- I think it is a problem that -- the way that I outline is one way to resolve the problem and to meet the downsizing, and I think it's workable.

MR. TODREAS: Could I just ask you, on these three people who you're saying you're able to --

MR. BECKJORD: Yes.

MR. TODREAS: -- to select and promote -- is that basically done by RES initiative and kind of you're carrying it on your back, or is Commission policy established to facilitate and enhance that type of --

MR. BECKJORD: Well, the Commission -- we have a program that advertises, and the people respond, and then it's up to the offices to, you know, sponsor these people, and we have sponsored -- well, Jennifer is one.

We have a young man in the digital computer area that we're sponsoring, and we've done that over the last -- I guess Jennifer started probably two or three years ago now.

MR. TODREAS: Yes, but my point is do you need help in this from the Commission as an overall structure? Is there too much of a burden on the office, or is it okay? Is the structure --

MR. BECKJORD: On the three this year, I didn't ask anybody. I just told the personnel director we're going to hire -- we're going to take them, and nobody objected.

So, that's the way it is.

So far it hasn't been a problem. I mean increasing the numbers -- you know, if we're going to increase it by a factor of 10, I'm sure it's going to be a problem. It hasn't drawn notice as yet.

MR. TODREAS: I would just interpret that as saying a skillful administrator is able to initiate something and it hasn't drawn notice, but that isn't the same thing as an agency-wide wisdom that enhances and helps -- a constructive policy.

MR. BECKJORD: Well, I guess the one other point to make is that, a few years ago, both -- two offices started intern programs. Murley was able to carry his through. I never understood how the numbers worked.

Research was not able to carry it through, because I was told that I had to live with the authorized number of people, and the authorize number of people were cut, and every year, for three years running, because of the cuts, even though people had left, I was still a dozen people over, and it was impossible to continue the intern program, and that was very unfortunate.

MR. BURSTEIN: One of the things we discussed but did not perhaps flesh out was the question of can we do better?

I think one of the absentees from that head table

depends on the point of view.

I think that's the subject, however, that needs raising.

The question of independent capability versus independent experimentation and verification continues to loom every time we have a discussion of, particularly, large expensive experimental programs, as we've recently witnessed in this ROSA operation, and I guess that is what Tom and several others here have raised in this matter of independency.

MR. HATCHER: I don't think there's so much a concern about the duplication of effort where there -- it's by intent, in many cases, for duplicating efforts, say DOE kinds of things, but internal duplication is, I think, the thing we should be concerned about.

MR. KINTNER: Where do you see that?

MR. HATCHER: I don't see it. I didn't say I see it. I'm just saying that should be the concern.

MR. TODREAS: What do you mean by internal?

MR. HATCHER: Within the NRC itself, duplication of any kind of research effort. I don't think that exists. I asked the question yesterday about that, and I think that that was answered sufficiently, but that would be the one of concern.

The external duplication of effort, where things

should be going along in parallel to make sure that the regulatory aspect of the Commission is satisfied from an independent point of view -- that's, again, Sol's point about independence, as well.

MR. VOGEL: The underlying idea, for example, that -- in this problem -- for example, suppose Westinghouse has a facility and NRC needs to do some experiments in it, and the lawyer implication would be that, if Westinghouse were somehow finagling something or another, that the NRC would not be able to detect it, I think that's kind of silly, frankly.

I think it becomes obvious to technical people if somebody is cooking the books or cheating or whatever.

MR. KINTNER: Has that been resolved, Eric, to your satisfaction, the ability to work with the contractors in joint programs? That is one kind of independency which can be very costly, and ROSA is an example. I mean, theoretically, it's an example.

Has the legal questions of joint operations of facilities been resolved, joint work?

MR. BECKJORD: Well, I think, in effect, it has. The question really came up in two cases.

It came up in the case of the Westinghouse containment tests, and it came up in connection with the low-pressure Oregon State University test facility, which

Westinghouse built and which is now in operation and will be running for the next year.

We have worked out an agreement with Oregon State whereby, when Westinghouse is finished, we have the option of doing some tests there. That program is being planned now.

In the case of the Westinghouse containment experiment, I have to -- I can't tell you the exact status of it today, but we did work out an arrangement whereby -- the same sort of thing.

When Westinghouse was finished with its testing series, we could pay the Westinghouse research lab to do some additional testing, and I believe that it's still -- you know, I think that's still on the agenda, but I can find out between now and the Commission meeting on that.

Earlier, what we had done was to come up with a program which was -- would have been a joint program, and that was what the lawyers objected to. They said the whole thing was impossible.

We arrived at this other solution, which was essentially a phase-out/phase-in. When Westinghouse is finished, then we would go in, and so, I think that's a --

MR. KINTNER: So, you have to build a new facility.

MR. BECKJORD: Yes, that's right. That's right.

And the only real ramification of it was that, if it had been a joint program, then the results, you know, would have been -- it would have been possible to move the experiments that we were interested in further ahead, and now they're at the end, but that program has been considered as confirmatory research. So, it didn't have to be done for the certification.

It did not have to be concluded in time for review for the certification. So, I think, you know, given those circumstances, this was an acceptable outcome.

MR. KINTNER: There are two other sacred cows or sacred calves or whatever one wants to apply which have been beaten around by the committee in correspondence and discussions for a long time, and it seems to me here is an opportunity, if we're ever going to say something about sacred cows, the direct communication from the Commission is something that ought not to be bypassed, if we want to say it, and they're very sensitive, and again, in raising the question, I'm only -- I'm not taking responsibility for it. I gave that responsibility solely to Burstein.

MR. VOGEL: What sacred cows are we talking about?

MR. BURSTEIN: Just because I come from a dairy state?

MR. KINTNER: It's a question of the code development, which somehow or other is embedded and looks

like it will continue at a budget level of $10 million or so indefinitely, and the question is is that a sacred cow or not, and the other one is the amount of work that's being done of really original kind of research at San Antonio, which I read the reports coming in and I can't believe that that's confirmatory research.

I mean my impression, without being nearly as smart as the committee is, that that's something that the licensee should be doing and sending to the NRC in its license application, and the NRC has to be able to confirm or deny.

MR. BURSTEIN: On the high-level waste?

MR. KINTNER: High-level waste. And if you haven't seen some of those reports, maybe we ought to send you a couple, but --

MR. VOGEL: I had the impression that the budget for the high-level waste was sort of a thing apart and a little bit of a hard thing to criticize and get a hold of. Am I correct or incorrect?

MR. BECKJORD: No, I don't think that's exempt from comment that you want to make on it. It is just funded -- it is a separate budget, and we get money from two budgets.

The greater part is the reactor related, including the materials safety and safeguards, excepting the high-

level waste, and the reason it's a separate budget is that the amount that we spend on that research is charged against, eventually, the fund, and that's the reason for it.

MR. VOGEL: Is it sort of a predetermined amount each year that you're obligated to do as best you can with?

MR. BECKJORD: Well, the history of it, the best way I can answer that is that, in 1987, the amount of -- the funding for that was quite low. I mean it was something on the order of a couple of million dollars.

With the implementation of the Nuclear Waste Policy Act and the schedule as it was then viewed, the effort was stepped up, and there was a lot of advice that we really needed to spend more money on that.

So, the budget got up to the current level by degrees, and in this past -- you know, since last -- early last fall, why there's renewed concern about the schedule, and I know that there has been discussion about cutting back on that just because of the schedule, and I think that's likely to happen.

MR. HATCHER: What's the current level of funding?

MR. BECKJORD: It's $6 million.

MR. HATCHER: That's within the RES program, or is that the total throughout the --

MR. BECKJORD: That's the RES high-level waste research.

MR. MOLZ: Now, is some of that money going to San Antonio, or is that separate money?

MR. BECKJORD: No, that is -- all of the research that goes to San Antonio comes from that money. Most of the -- the greater part of that is at the Center for Nuclear Waste. There's still a couple of small programs outside.

MR. KINTNER: Maybe that's the way to put it, which is that the schedules are slipping and that care should be taken to really analyze or judge on the basis of true confirmation as compared to doing original research in that case.

MR. MORRISON: May I suggest that there is another side of that argument which relates to our discussions on the establishment and maintenance of a capability, and CNWRA was established to pull together a capability that could remain independent of all of the others in the country that had been working in the high-level waste area that were effectively co-opted by the DOE program as the applicant on this.

Now, whether there's a schedule stretch-out or not, I think that argument still remains valid that you have to be able to maintain that capability, and is that going to be a decision that it's worth $6 million a year just to keep those experts available when they're needed or not?

So, it gets circuitous back into many of these

arguments that overlap with one another.

MR. VOGEL: I guess one assumes that you cut the budget, let's say, by a million or two, and that $2 million goes someplace else, probably back to DOE. My question would be would they use it more effectively than NRC?

MR. YUKAWA: That was a loaded question.

MR. ISBIN: The subcommittee and the full committee have fully endorsed the work of the Center. I thought, indeed, the work of the Center is impressive, that they're fulfilling their technical requirements.

They're providing, actually, an excellent check on what DOE is trying to do. Their key technical uncertainties are things that we need to have oversight on from time to time, but I would disagree with the reports coming out there. I see no basis, really, for your judgement.

MR. KINTNER: Well, let me give you one example.

Here is an expert opinion analysis of a group of people on climatic changes in 20,000 years.

So, they interview a number of people on what's going to happen or could happen to the climate in 20,000 years, and they analyze that, and they put it together, and they issue it in a bound volume like that.

Well, that doesn't impress me. Maybe it should, but it doesn't.

MR. MOLZ: That's politically motivated.

MR. KINTNER: Now, everything I can see is they are doing a great job.

I agree that the waste program is not a place to economize, necessarily, but the forces are at work, and you can see that everybody wants to press them to spend 50 percent more, DOE to spend 50 percent more next year on research and hurry up Yucca Mountain.

That ain't going to hurry up Yucca Mountain, and if the same kind of thing applies here, then you're going to have $3 million more, it's going to go up to $9 million, and I guess the question really is, if this isn't a sacred calf, it could be a sacred cow unless people put the thing in perspective.

MR. BUSH: But Ed, if you -- anytime that you're set by Congress on the basis that your fuel is talking 1 to 10,000 years, then whether you can do a good job or not, you're forced, inevitably, to look at the extrapolation.

That's why you get into vulcanism. That's why you get into water table changes. You can run down the litany.

In fact, the one that they don't handle, which is just as logical as anything else, is the ice age, because that's been occurring.

MR. KINTNER: Well, I just say that those are the only two that I can think of when you talk about real sacred cows, and neither one of them am I in a position to

criticize. I mean you guys are, and you think it's not a sacred cow, it's a reasonable amount of money to be spent on reasonable things, and it's being done well.

MR. MOLZ: Well, your point is well taken, I think. It is being done well from a research point of view, and the way the law is written, it forces true basic research.

I mean we pretend that we understand these natural systems and everything, but when it comes right down to it, we really don't, and nothing is a better example than getting 10 people together to speculate on what's going to happen in 20,000 years.

I mean that is just really way out there, and so, it's somewhat different, and we looked at the program, and we felt that it was working well and that it was producing a body of knowledge that was organized, accessible, and would someday be extremely valuable, but that doesn't mean it couldn't get out of control because of this drawing out of things, and if something gets drawn out for political reasons and then the solution is to double what you're spending, it could easily be half what you're spending, and it might be every bit as good, you know.

MR. MORRISON: Ed, I wonder if the sacred cows have been colored by the SRM, which really gets at more or less the quality of the work that's being done.

In my mind, if you're really looking at a sacred cow, you ought to be asking the question what would I do if I didn't have the program at all? And in that sense, I throw the severe accident program on the table, as well.

Even though there's a nice schedule, there's been a lot of accomplishment, but there's still a big chunk remaining, what if you didn't do that remaining work? What would suffer?

I think the same thing has to be asked on the high-level waste. What if I didn't do that work? What would suffer?

MR. VOGEL: I think, on the high-level waste, the problem is not San Antonio, but we have a sacred elephant. It's very hard to get the whole thing straightened out.

MR. BECKJORD: The research funding for the Center is not its only funding. The research is less than half. They get money from the office, as well. In fact, most of the money comes -- the greater part of the money comes from the office.

In addition to that, there is -- there has been a move under consideration that would permit the Center to do some portion of its work, maybe 10 percent, to anybody on the outside. The EPA, for example, is interested in doing work there. This has been discussed.

I haven't heard whether or not that point has

already been resolved.

MR. BURSTEIN: Excuse me. What office are you referring to?

MR. BECKJORD: NMSS.

MR. BURSTEIN: Okay. It's part of NRC.

MR. BECKJORD: Yes, it's part of NRC.

MR. BURSTEIN: They don't get any money from the office of civilian waste.

MR. BECKJORD: No. It's all NRC money now. The Center -- EPA has inquired and the Center is interested in seeing if they can broaden their funding base a little bit, work for others in other words.

MR. MOLZ: Maybe that was the source of some of the confusion.

It seems like I never could get straight what money was spent here and what money was spent at the Center, and I noticed in the reply that came back, it was -- I got a sheet sent to me that very clearly had on it NRC and Center, and then, in the reply to the statements we made based on that, it said that that was erroneous still, and it's something that's not clarified in my mind. I think I'll work on that later.

MR. BECKJORD: I can certainly get an answer for you. I don't recall the exchange.

MR. MOLZ: I'll send you the information, copies

of it.

MR. BURSTEIN: May I add another item to this list of animals? And that has to do with the Federal procurement rules which are onerous, perhaps, by themselves, but it is illustrated by our attempts to secure beverages for this meeting.

It becomes infamous when applied by the Nuclear Regulatory Commission and its research division.

I am told by a person of high repute that probably anybody that wants to work for NRC, because of the difficulties of dealing, simply dealing, negotiating, working with this agency, that would seem to me to restrict the agency's opportunities of acquiring talented people from outside -- consultants, universities, the non-governmental sectors.

MR. KINTNER: That's one of the main reasons that you don't have higher quality in this committee.

[Laughter.]

MR. BURSTEIN: I'll leave my remarks right there.

[Laughter.]

MR. MOLZ: That's a very valid point, but I don't think it pertains to the NRC. I think the Government, in general, is --

MR. BURSTEIN: I think the Government procurement rules are bad enough, but I think the way they're applied by

this particular agency is significantly more horrendous, and I'm trying to make that distinction.

You're absolutely right that we've got enough of a problem in dealing with a Federal bureaucracy.

MR. UHRIG: I don't take exception to that at all. I do, however, think the current situation, where there are so many people -- very talented people let out in downsizing the various organizations, is an opportunity for the Commission to pick up some very talented people.

They may not have the nuclear expertise, but they certainly have expertise in other needed technologies within the Commission. Defense in an obvious one and, again, going to the digital electronics area.

MR. KINTNER: That goes back to Neil's point, and I guess Eric says he can get permission and he's going to do that.

MR. BURSTEIN: I think there are a couple of committee members who shouldn't be on the committee, because they get Social Security.

[Laughter.]

MR. MORRISON: Sol, I don't know whether you have a specific issue that you're raising with regard to dealing with NRC, but I know from my experience that NRC is no better or no worse than a half-a-dozen other agencies that I can name.

The only thing that I could associate with NRC is perhaps they got to their position a little faster than the others, but others are moving in the same direction, if they aren't there now.

MR. BURSTEIN: My impression was it was perhaps not only a leader but actually worse. Yours is that it's no better or worse, and I guess I don't have any direct current involvement, so I can't speak to that from personal knowledge.

MR. BUSH: By any chance, Dave, are you comparing it to other regulatory agencies, like EPA?

MR. MORRISON: Well, I would compare it to EPA. I would also compare it to development agencies, like all of the Defense Department activities now are moving very much in this direction.

NASA certainly has drawn a very hard line on many of the activities over the last year or so that they had not drawn before. I can't speak particularly for --

MR. UHRIG: What kind of things specifically?

MR. MORRISON: NASA has gone to the total emphasis on competing for everything.

MR. UHRIG: Oh, okay.

MR. MORRISON: Whether you're almost even talking about consultants or whether you're talking about specialized research capability or anything, that everyone

in this town -- and unfortunately, my bias, after living here for about four years, is the Washington mentality and inside the beltway -- that Congress, somewhere along the line, has said competition is good for the soul, and Congress passed the Financial Management Integrity Act, or whatever it's called, and you, the agency, will be responsible to see that our finances are used appropriately, and when the two of those converge, the only way you can prove your case is to go through very arduous processes to do almost anything.

That's happening all over the place. At least I can see it. And then you have the Inspector General and the GAO looking over your shoulder, which makes it even worse.

So, it's really a bad situation, and it has changed very much over the last four or five years. It's not something that's been longstanding.

MR. MOLZ: It's regulation within regulation, and it ruins flexibility and the ability to do something that you see is clearly in the best interest, but you can't do it, and you're right, young people are very much aware of that, and on the outside, we talk about it all the time.

MR. KINTNER: We made an issue of it, wrote some good words on it. Eric answered those words with the comment that things are being done, and if what happens with regard to your relationship with procurement is carried

through, you're happy. Is that right?

MR. MORRISON: He's not smiling.

MR. KINTNER: That's was what you said in your letter, that you have had conversations with procurement and they are going to take steps to assign people specifically to your contracts from birth to death and this is going to speed up the process and you are -- I mean I read it as if you are now comfortable.

MR. BECKJORD: No. I think the -- I certainly agree that procurement has gotten very much more difficult. I agree with Dave.

It's more difficult both on commercial procurement and it's more difficult on laboratory procurement, and I feel that we need to undertake a review and revision of the agency's rules, and I think there's a lot that we can do which is still -- you know, doesn't require a change in the law in order to improve our internal processes, but the Chief Financial Officers Act has -- I agree with Dave -- it's added overhead, and it's made us less productive.

The point that I -- what I recall saying was -- the suggestion was that we should get other people to do the financial management and relieve the project manager of that responsibility, and I really can't do that, because the person who controls the finances is going to wind up controlling the project, and we have to -- whatever we

finally come up with in terms of the rules that the project manager has to carry out, he's got to carry out, because the office has to be responsible for that work, and we can't delegate that.

MR. KINTNER: I understand that. All those things are built into the law, and you have to be faithful to the law and so forth, and I'd just read your response.

"While it's true that commercial contracting takes considerable time and involves more staff effort than we would like, the time and effort is driven primarily by the requirements of Federal procurement regulations.

"We have been working with the Division of Contracts and Property Management, case-by-case reviews of the lead time for contracting.

"Also, the Office of Administration initiatives to reinvent the Government has undertaken to revise NRC contracting procedures in order to eliminate unnecessary paperwork and delays.

"We're hopeful these activities will improve performance and appearance of performance to the committee.

"The committee will be interested to know that NRC's contracting office has taken three actions to improve customer service and reduce the time it takes to issue contracts.

"First, reorganize in a way that should improve

interface, should be less turnover in staff supporting.

"Second, it has initiated a business process instead of the current competitive process. RES is represented on the work group.

"Finally, the NRC procurement fund has been designated a procurement reinvention laboratory as part of the Administration's review.

Now I read that and said this thing is fixed.

MR. BECKJORD: We're not there yet.

MR. MORRISON: I think the problem with that is that the reinventing government is an administrative issue, and perhaps the Office of Management and Budget can do something with regard to Federal procurements within the milieu that they operate, but I think one of Eric's problems now in being able to deal with the national labs, it was not created by NRC, it was created by the Corps of Engineers.

It got accused by Congress of dumping year-end money into Oak Ridge that would save the money from being lost back to the Treasury. So, it's some other agency that is dealing with this when Congress is concerned, not what's happening in the Federal procurement policy.

So, it's going to be a long time trying to get anything straightened out on it.

MR. KINTNER: But let me just say, as an old and experienced warrior in this field, that these people who

handle contracting matters and handle legal matters and so forth think they're doing you a service, and there is no sense -- very seldom a sense that they are there to help you get your job done.

MR. MORRISON: True.

MR. KINTNER: And you can argue that that's all because the Congress tells them to do that and so forth, but the veto power gives people a lot of ego satisfaction, and a lawyer or a contracting officer who says you can't do that or this is against so-and-so instead of saying I can find a way to get that done, he gets great ego satisfaction out of being in the power house in the operation.

I mean it's really a lot of people who live on that as their reason for being.

MR. MORRISON: On the other hand, the contracting officer is the individual that signs the document. That's where you put your finger into the organization.

MR. KINTNER: That's where he gets the power, and that's where you get the --

MR. MORRISON: And the blame if the contract has been poor.

MR. KINTNER: So, I really do believe, from what we've heard here -- and we asked the question before -- that these contracting matters take too long and take too much push from within the NRC technical staff, the research

staff, to get them achieved, and if we don't want to say anything like that, that's okay, but we were asked by the Commissioners again about the efficiency of the operation and so forth, and once more, I think -- maybe I said it in this group, but I said it before -- research information is like eggs or news, you know. They get old and they smell after a while.

They're not nearly as valuable this year as they would have been last year, and so, this has a value other than just the fact --

MR. BECKJORD: I think that's a valid point. You can encourage these efforts at improving internal processes and the re-engineering in order to gain lost efficiency, and that's important. That needs support.

MR. UHRIG: In a sense, this is what created ARPA initially, was a streamlined organization to get around the bureaucracy. Now ARPA is as bound up in bureaucracy as anybody else is.

There was a group at the beginning of the Vietnam war that the Department of Defense set up to expedite emergency situations in the battlefield, to get solutions out there. Again, over a period of about five years, that became just part of the bureaucracy.

These efforts sometimes work on a short-term basis, but they very seldom last, because they become

subject to -- they'll make exceptions for a while on bidding procedures and what have you, when it's an emergency, but they won't in the long run.

MR. TODREAS: That is the universal life-death cycle. The only way to beat it is to regenerate a new forum that works for a while, and that's probably what we've got to do here, and then get off that horse and regenerate something new.

MR. UHRIG: Well, in a sense, it's one of the reasons that the so-called GOCO -- government-operated -- government-owned, contractor-operated laboratories -- existed, was that they were supposed to be able to get around some of this, as opposed to government-operated laboratories, and now they're just as bound up as the government labs are.

MR. MOLZ: Yes. It's funny how that works, but --

MR. KINTNER: It's the cycle Neil is talking about.

MR. VOGEL: Well, you can break through it. All of the sudden, they were able to repair the Los Angeles freeways in record time.

MR. YUKAWA: With sufficient money and incentives.

MR. VOGEL: That's right, but the contractor, one of them, got a bonus of $14 million, but on the other hand,

I don't know how many times that $14 million was saved.

MR. MOLZ: Well, the market system works. It's that people won't let it work. That's the problem.

MR. TODREAS: I definitely think that ought to be on the list, and I think we're moving in a healthy direction.

I think when they put up sacred cows, they probably thought of research directions, research projects that had outlived their usefulness, and what we're doing in this discussion is redefining the angles, because we've got so many old warriors here, and I think we've got a pretty good list.

MR. KINTNER: Well, we didn't talk yet about your favorite one, and I'd like to get your reaction. Codes, code development and maintenance, in total, is that or is that not a "sacred cow" in view of the circumstances, status, and future?

I mean there was clearly a time when nobody would argue that, the build-up and the initiation and the construction of these codes and wringing them out and so forth, and the only reason that I've never been more confident that I was right is because you've always taken the other view, Neil.

[Laughter.]

MR. KINTNER: I'm serious. I mean Neil's

judgement in this is enough. I don't know. I just ask Neil the question. Is there a possibility that that's a sacred cow somehow?

MR. TODREAS: Let me reframe the question.

[Laughter.]

MR. TODREAS: The question is, when the NRC goes after a research topic, what is the degree of independent analyses data that's necessary to do their job, and then codes immediately come up in it.

I don't think the issue is maintenance of codes that exist.

When I talked about redefining the question, I think the issue is generation of independent capability to assess, and that's what led to TRAC and things of that sort, where in fact the Commission wound up leading the industry and setting the benchmark standard versus auditing in a more simple way, and to be specific, then, I would say it is a sacred cow, and I would focus in on the CANDU issue.

This came up in our subcommittee. I'm sure Sol remembers it.

But it seemed to me, of the working people who were there, the knee-jerk reaction was we're going to do CANDU, therefore we've got to develop our own tools, and that's the sacred cow which is the knee-jerk reaction.

Rather than say we've got to do CANDU, why don't

we first examine the level and the competence that's embedded in the design tools and see what's really required by us to do an independent review versus the knee-jerk reaction?

MR. KINTNER: If CANDU is undertaken.

MR. TODREAS: Yes.

MR. KINTNER: To avoid its becoming a bigger sacred cow.

MR. TODREAS: Yes.

MR. KINTNER: A calf growing up into a heifer or whatever.

MR. TODREAS: I've got one other half-sacred cow that goes along with that, and actually the Commissioners have brought that up, but that's the feeling in this agency that the engineers, to have technical competence, must exercise the codes as part of their work within the Commission on a day-to-day basis versus develop their competence, gain their critical ability by reviewing results that their contractors have gotten by exercising the codes, by talking to the developer's knowledgeable people.

There's a feeling that we're moving more and more toward workstations on hand, calculations by the staff as part of their education and competence maintenance, and I have trouble with that.

MR. YUKAWA: Isn't it a good thing if it is for

education, being part of getting the knowledge base?

MR. TODREAS: My view is you get your education, in a fundamental way, either on a special training exercise or before you come in.

Then, when you're in here, you get and maintain that knowledge in a way which is not a direct hands-on exercise of the tools, because I think it's very laborious.

MR. YUKAWA: If you mean going in and running the big machine, whatever it happens to be --

MR. TODREAS: Exactly. That's what I mean.

MR. YUKAWA: -- that's one thing. If it means looking at the results --

MR. TODREAS: That's the exact distinction I'm making.

We move from looking at the results, talking to experts, like you were when you were out in the industry, to actually running the big codes on workstations, maybe doing some debugging -- I don't even know -- but that's the exact distinction. What do you think?

MR. YUKAWA: I would agree that you shouldn't have technical -- well-trained technical people running the big machines. I mean there are people who -- computer experts who can run the big machines a lot better than I can anyway.

MR. TODREAS: Let me just clarify. They are small machines but big codes because of the advances with

workstations. They are small machines, but the idea is they're big, complicated codes with large input decks and things of that sort.

MR. ISBIN: In somewhat contrast to that, Neil, in the Severe Accident Subcommittee, we met one bright chap in research who, indeed, was running some of these codes and making them useful to the staff.

I think a few people who do such a job should be encouraged not as a general thing, but you need somebody within research who has the experience, who has the knowledge and the capability and the expertise to run some of these codes, and it was remarkable how many things he could do, and this was just one individual, and having several like that would be really a bonus.

MR. TODREAS: What I would say is what you do is you send somebody like that for a month or two to the contractor where he exercises the codes, learns the -- gets the insight about them, then he comes back here and he does his job without day to day, month to month, year to year continually running computer codes.

MR. ISBIN: But the things, unfortunately, keep changing.

For example, in CSARP, you would hear the Europeans give the detailed explanations and papers and work that they had done, and it turns out that they're working on

models which have already been surpassed by present models and now have to go back and redo things, and this kind of process is going to be continuing for a while.

So, in the interim, I still think that it's a bonus to have a few people who have this capability and will do it but not as a big staff or anything.

MR. BECKJORD: That's the situation that we have now. There are a few people -- I mean Gingrich in severe accidents. There's a man in the thermal hydraulics group who's working at a workstation.

In the materials area, when the Yankee Rowe work was under way, Mayfield had two or three 486 machines cranking out these fracture mechanics calculations. That was kind of a one-time thing.

That doesn't happen all the time. He did it because we were trying to get an answer.

So, we have two branches where there are a couple of people doing this. It's not a --

MR. TODREAS: I would say, just in the interest of time, that was my lower-priority bullet. I can see it's debatable. I don't think it's worth pushing.

I think the upper-priority issue is the -- what independent assessment means and requires in terms of research products. That's what I think is more global.

MR. MOLZ: If we had another accident, let's say,

like Three Mile Island, something like that -- is that what it is, Three Mile?

MR. BECKJORD: Three Mile Island.

MR. KINTNER: It's 182 miles by my estimate.

MR. MOLZ: Well, anyway, if something like that happened, would it be the NRC responsibility to use these codes to analyze and try to make recommendations on what to do? Let's say you had a 15-hour emergency, people were really confused. Would that happen?

MR. BECKJORD: Yes. In fact, there's a new emergency center which is going into full service very soon. It has been in the Maryland National Bank building about five block away from here. It's moving to White Flint.

Both have had and the White Flint new facility will have expanded computer capability to run, you know, real-time calculations to follow an accident, and those have been based on work that was done at Idaho, EG&G, and several other places to track accidents and help make predictions.

That has generally be intended -- and it's quite sophisticated. I mean there's some very powerful techniques there, very powerful codes, thermal hydraulic codes and source term and that type of thing.

The general policy on that has been for the agency to have the capability to check conclusions that are reached at the site. I mean the intent is that, as soon as

possible, the direction of affairs during an emergency occurs at the site.

It starts out here, an alert is declared, and then it can go to, you know, higher levels.

The Commission, the Commissioners, and the team assigned is assembled right away to get on that, and as soon as possible, the authority for decision making is transferred to the plant site, as soon as the people from the region get there, and they work -- they establish the liaison with state authorities and with FEMA and with the plant management.

The plant management is responsible for the management of the plant, and the idea has been that this work is a way of checking the conclusions that are arrived at and of maybe asking questions.

I mean questions might arise here, which is at some distance from the site, and people are able to do this work, and there may be questions that weren't considered at the site that would be asked.

There has been discussion, I will say, of going further than that, so that there will be the capability here to issue direction as to what should be done.

That has not -- I don't think that's in the cards. I think the feeling is that the decision making has to be local and where it can be done best.

MR. ISBIN: At one time we had heard that it was the intent to get the operating decks for the 110 or so reactors and have them available at this emergency center. Is this true?

MR. BECKJORD: I can't tell you about the numbers. There is certainly the capability to do calculations that are fairly plant-specific. We can find out.

MR. ISBIN: Is this done within research?

MR. BECKJORD: No, no. This is done within the AEOD Office of Analysis and Evaluation of Operating Plants.

MR. ISBIN: Then we need to discuss this, do we not?

MR. MOLZ: Well, it seems like it has relevance. It ought to have relevance on this code maintenance concept. I mean how do they maintain their expertise? I mean what's different between the kind of code maintenance they'd be doing versus what we're talking about here?

MR. BECKJORD: Well, that's a good question. I think, for completely definitive answers, it would be best to get the people involved to tell you exactly what they're doing and why.

The thrust of their work -- well, first of all, they are responsible for analyzing operating events. We do work for that office, as well as for NRR, to develop methodology.

As far as the detailed -- you know, after something has occurred -- for example, the oscillations at the BWR reactor plants -- research undertook the job to find out exactly what happened and do the computer runs after the fact, and I would say the difference there is that the AEOD office -- during an emergency, they have computer capability, and they contribute that part of the job.

They do analysis after the event to figure out, you know, what the root causes were and what action should be taken and that sort of thing. They would not be doing the thermal hydraulic follow-up calculations.

For example, a lot of work was done on Three Mile Island to figure out what happened. That's generally a research responsibility. I mean the most recent things were these BWR stability events, and research did the analysis on that.

MR. MOLZ: So, in a sense, they're facing the same kind of problem. They're firemen waiting for the fire, so to speak.

MR. BUSH: Except that a lot of their work is the more routine work of assembling and looking at trends of types of failures or incidents to see what can be done.

MR. VOGEL: They could be called in in case we had some accidents overseas, I suppose.

MR. BECKJORD: That's an interesting point. I

haven't heard any discussions on that point. They certainly -- they put effort into, you know, examining all the reports of events overseas to find out what root causes are for -- you know, looking for information which is applicable here.

MR. BUSH: Mostly that's the reactors, similar reactors, like the French reactors.

MR. BECKJORD: That's right.

MR. BUSH: I had one other item. I wouldn't call it a sacred cow, but I'm not sure where it fits, at least in what I call the passive components.

There are a number of analytical codes that cover vessels, cover piping, and so forth. The only difficulty is that the comparison, in many instances, between the analytic codes and the actual behavior are sometimes orders of magnitude apart.

In some places, they're converging, but they're mainly converging -- for example, you're supporting that work at Columbus that effectively is looking at failures and is developing more sophisticated analytic models on the basis of experimental evidence to predict a priori, and I would say that a large share of the prediction at this stage -- I'd put fatigue in that category, I'd put some other things -- aren't very good, I guess is the best way to look at it.

MR. KINTNER: Is that?

MR. BUSH: They aren't very good.

MR. ISBIN: Should they be improved? Is that what you're saying?

MR. BUSH: All I'm saying is that the analysis and prediction from analysis vis a vis the actual behavior don't converge very well.

I could think of the cases -- seismic behavior is one example, where the behavior of the piping as predicted analytically bear no resemblance whatsoever to the actual behavior when they finally got around to doing experiments, 20 years later than they should have.

I can name others like that.

I don't know what you do about it, but what you do is you start with a set of what I call incorrect premises and you build on these incorrect premises, and when, finally, you end up with a wonderful edifice, as they say, built on a foundation of sand, it isn't very good.

MR. MOLZ: Clay. We better say clay.

MR. HATCHER: I think what he's getting at, though, is a universal problem and not only in design but also -- and assessment of design, but also in defining probabilistic variables, as well.

MR. BUSH: True.

MR. HATCHER: And this should be one of the major goals of research, though, is to help tie down those things

better and to focus on them, so that when you do an analytical kind of model, it's better constrained and you don't run into things like that.

That should be one of the broad goals we're talking about here.

MR. BUSH: I agree. It worries me a great deal, because as soon as you -- if you use incorrect premises and go into a risk-based approach, particularly passive components, you're going off in this direction, and the real results are somewhere over here.

In other words, there's lack of convergence, and I see it as a very real problem. It's not limited, incidentally, to NRC. The ASME is going through the same problems right now.

But what it amounts to is that many of your premises are usually overly conservative or, in some instances, you're not conservative enough, and the models simply don't handle it. I see this as a real problem, and I don't really see very much being done on it.

MR. MORRISON: Spence, is this a high enough priority item that it should have been back under the discussion that we really had yesterday, is the research program doing the right things?

Is this something that there should be more research on that's not being done, different kinds of

research that isn't underway?

MR. BUSH: It's the old business that the people have used models for years and years and years, and they never bothered to do an experiment to essentially benchmark and validate the model.

I can name two or three cases, but the classic one, as I say, is the seismic behavior where, as you know, we put more and more snubbers on the thing, because that was the thing to do, you want a stiff system.

Well, that didn't prove to be the case, and when they actually got around to doing a joint venture with EPRI money and NRC money, they got totally different results than they had been predicting for about 20 years. That's the kind of problem I worry about.

You know, they had piping fail -- all you had to do was shake the pipe gently, if you had a 20-foot straight section of pipe, and I can remember them coming in and saying that we had to anchor all that pipe, because it was almost certain to fail between two models that were anchored 20 feet apart.

MR. KINTNER: What do you say to the Commission about that?

MR. BUSH: About what?

MR. KINTNER: About what you just said in the last five minutes.

MR. BUSH: I don't know what you say.

MR. KINTNER: I mean Dave says they're doing the right things, and it sounds to me like somebody isn't doing the right things, if that's the case.

MR. BUSH: We've made progress slowly, Ed. It's frustrating at times. You go forward one step and back two, but I would say, in the last 10 years, we have made progress on the thing. I still see a lot of real problems in there.

Someone has to worry about the fatigue problem, and we don't know whether we're going backwards or forwards on that one, as an example, but that's a classic -- and there's a case where you're not using analytic now.

You will be, but you're really now depending primarily on getting your data in order to develop a meaningful analytic model. That's the problem. We haven't the base in many cases.

MR. MORRISON: I guess what I'm looking at is the statement I made earlier, which I thought was the conclusion from yesterday's discussion that, when we focus on the general subject of the content of the research program, the committee concludes that the program is doing the right things.

MR. BUSH: Well, I'm not sure. That's part of the problem, Dave.

I raised the issue because I've been frustrated by

this for a long time, and I feel a lot better than I did 15 years ago, for example, because I think we've made substantial gains, but we still have quite a ways to go, and I don't really necessarily say it's all in research's lap either.

MR. MORRISON: Well, is there enough in the research program may be a better way to phrase the question.

MR. BUSH: Right now there isn't very much.

MR. MOLZ: Well, I think it would be true to say that, as a society right now, we have an over-reliance on models.

In the seismic area, certainly in the nuclear waste area, there's tremendous effort put into these models, and they're not on a solid foundation, and yet they get more and more complicated, and each graduate student generalizes something, you know, when things like that happen, and --

MR. KINTNER: More and more dependency put on them.

MR. MOLZ: Yes.

And then people start getting the mistaken idea that, if these things last long enough, they start thinking, well, that really is the knowledge, you know, and that would be one argument for not, in the near future, trying to direct something at a plant site from an emergency center up here based on computer models.

MR. BUSH: What scares the hell out of me in this type of approach is that the further along you have one of these models, you believe it's giving you the gospel truth, and it isn't in many instances, because it's very sensitive to a whole series of parameters that go into the thing.

MR. MOLZ: It happened recently in the global climate change. I mean there's a perfect example. There was a symposium maybe 10 years ago now where some forward-looking people thought that we need to get studying this problem of global change related to things.

One of the things they said in their report that started the whole thing was not to rely on models. I mean they said that, and the whole scientific community turned around and did exactly the opposite.

MR. BUSH: Very elaborate models.

MR. MOLZ: Yes, elaborate global circulation models just all over the place, and it's being able to use the computer effectively. Really, in a sense, it's using us, still, and that probably is a danger that -- I couldn't single out the NRC, you know, as being -- everybody's doing it.

MR. TODREAS: Are you, Spence, just putting out a general warning about research products and how to use them, or are you suggesting that, if one or two small people were turned loose relative to the whole research product of NRC,

you could pinpoint those models, those activities that really ought to be reassessed, and therefore, that you ought to generate a program to actually identify what needs to be reassessed?

MR. BUSH: I haven't gone that far, Neil. My basis is -- a lot of it's seat of the pants, you know, over 30, 40, going on 50 years now of looking at the mistakes and things that have happened and asking myself, you know, how well do these analytic approaches give me the answers, and in many cases, they don't do very well, and that's problem has been with us for a long, long time.

The problem is that a lot of people -- and the thing that worries me most about the computer approach is that it's only a short step before the people believe everything that comes out of the computer, and that's dangerous.

It is a concern, and it's one that I think all you have to do is look at the expenditures. There's a lot of money spent on codes, and yet, what I'll call the ultimate validation sometimes just doesn't get done.

MR. MORRISON: Does the committee want me to add a qualifier to that statement that the research program is doing the right thing, with the exception, perhaps, of over-reliance on models rather than experiments?

MR. MOLZ: Yes, I would vote for that.

MR. KINTNER: That's what we're saying, but then they say, well, what experiments?

MR. BURSTEIN: I think you're opening up an area that we really haven't discussed, and remember that the Chairman of the Commission, who is a product of models and computers and has some feel for that, included -- I don't know who, but in the letter he signed included paragraph 2, which says we want to have a world-class model capability, and make sure that we get the contractors to have the critical masses to achieve that, and are we doing it? He didn't ask you whether it's the right thing to do or not.

MR. MOLZ: Reliance on models has been a theme that this committee has come up and mentioned many times over the last couple of years, and it certainly is particularly true in the waste area, and it's sort of like a national problem, because in many cases, it's an easy way to do something.

You don't want to spend the money to do the experimental work, or you can't, and someone says, well, I can do it with a model, and you give him the money, you know.

In the universities, it's a real dilemma, because if you say, well, that just can't be done by a modeling approach, somebody else will say it can, and he'll get the money. So, it kind of feeds on itself.

MR. KINTNER: Frankly, I think what Spence has raised is a truly fundamental question with regard to the whole research program and one which resonates -- in my case, I really believe what he's talking about, and it's an important one, but if you really believe what ycu're saying, and I do, then that does dictate additional research and a lot of it by somebody.

I mean if there's this question of fatigue in the main coolant piping, then the feeling we've had is that the mechanics and the metallurgy and so forth is under good control, it's not true. We're going to have failures, and they may be dangerous failures.

The same thing, it seems to me, is true of many of the severe accident models. I mean they have not been validated thoroughly enough. So, this is, in fact, a whole new area being opened if these are the cases.

MR. BURSTEIN: There is no way -- if you're going to suggest that the NRC has to somehow experimentally confirm every model and every code that's out there, I would suggest you rethink that.

MR. KINTNER: I'm rethinking it.

MR. MOLZ: It's not so much redoing it or suggesting all this work. It's using models in the proper context. You can get insight, but you can't substitute them for experience and empirical knowledge.

MR. TODREAS: Maybe you could handle it this way, just following up on this.

It's not so much that we've got to launch a whole big thing, but in the conduct of our reviews, we should look for a balance in an area between experimentation -- and then I'm going to just mention two other things, because you've put models, you've given models.

There's experimentation, phenomenological modeling, which is very simple, that you can do without a detailed numerical computer program, and then, finally, numerical analysis, and if we look for the right balance there, maybe you can protect yourself and have a proper program, and so, then you don't have to go out and go on a much broader attack, but you can say that may be an emphasis that we'll be looking for, because we sense the value in there.

MR. ISBIN: Well, I would put it even more positively in that this is what the committee has been doing. The committee has been doing this in the advanced reactors, it's been doing this in severe accident subcommittee meetings.

We are very careful in trying to look at the programs involving code assessments, the bases, in a general way, not as specific as the ACRS in some of the thermal hydraulics, but on an overall basis, this has been a concern

of the committee, including all of the work that's been done on waste management.

So, this has been an item of work that the committee has been doing, and it will be a continuing item.

MR. KINTNER: Maybe it comes across as something of a warning or a caution with regard to the entire program.

MR. BUSH: Well, you can take it -- as an example -- and I think it's a good example, at least in passive systems -- that you can really cite that, indeed, is the work that Wokowski has been doing under -- I think -- is it Mike Mayfield that's following that one?

I have watched -- on the basis of what they've been able to do -- they take experimental data, and I have watched them predict in actual cases and almost overlay the experimental evidence in a totally different environment -- in other words, this was a simulation of a seismic event of a severely damaged pipe.

Now, that indicates to me that we have no had our models converge sufficiently and we can predict behavior on either -- on both phenomenologic grounds and on general behavior.

That is what I think you really want out of your models, and we're making progress in some of these, and that one you can cite as a positive example, but I think there are others where we don't have that type of thing.

MR. HATCHER: I think, simply stated, it's a recommendation that, while we feel that the research program is on target, that greater efforts in the future might be focused toward better integration of analytic/numerical models with experimental data.

Something like that would be a positive statement, rather than approaching it from any kind of negative bent.

MR. UHRIG: Or some balance between the two.

MR. MAYO: What's the basis for the greater efforts -- I've heard a lot of opinions, but I haven't heard anything to that effect, of what research is really going on.

MR. KINTNER: That's what Spence was attempting to do. I couldn't cite it either.

MR. MAYO: The concerns are real from everybody's experience, but there is the potential to do a great injustice here, too, I think, if it's stated wrong, and that's my concern.

MR. HATCHER: The example that Fred cited of climate modeling is a prime example of that, in addition to what Spence has mentioned, too, because many times, we know that the climate models are based on changes in the average temperature of the ocean.

This is the primary basis for many of those models, and we know now that the climate changes are not the

kind of things that would require a change in the ocean temperature, that it would be too rapid for that, and they happen over decades or a few hundred years, rather than over thousands or tens of thousands or hundreds of thousands of years, which would be a major change in ocean temperatures.

MR. BECKJORD: It seems to me that you might be able to deal with it by distinguishing -- I mean there are models, then there are models.

The thermal hydraulics models, as applied to what they are used for on operating reactors, sure, there are improvements and there are still some unanswered questions, but I think you can have a lot of confidence.

MR. BUSH: I would pay attention to those thermal hydraulic models to a major degree.

MR. BECKJORD: Yes.

MR. BUSH: SEMISCALE.

MR. BECKJORD: That's right. But you can't say the same thing about the high-level waste repository models.

MR. BUSH: Right. It's more difficult to do it there.

MR. MORRISON: Well, I think we have enough information on the table to discuss those subjects. Ed Kintner wanted to make one other set of comments.

MR. KINTNER: Yes. I'd like to wrap this up today and sort of introduce myself as the new Chairman, and let me

tell you what I would propose to say, which is very little, and then if you've got any suggestions to add to that --

The first is that it is an honor, unsought honor -- I won't tell the Commissioners that -- to be asked to follow Neil and Dave in this job.

I think it really is a difficult assignment, which I undertake with considerable trepidation, but it's an honor for that reason and also because I truly believe that research is a very, very important aspect of nuclear energy. There's a great deal still to be learned.

And the third reason is that this really has been a group and is becoming even more so a group of recognized, capable professionals who ought to be able to bring some value to the effectiveness of the committee.

Then I would like say once more that the changes which are coming both in terms of the losses on the committee, people who have been here six years, and losses from senior leadership in the division of research are troubling.

They mean that the committee has to be very assiduous in its duties but that -- my experience is that this group of people are very responsible to their assignment, and they're going to try hard, will continue to try hard to provide support to the division and to respond to the charter which the committee has in a way which will

be beneficial to the Commission as a whole, and that's all I would say.

Should I say none of that or some of that, or do you have any suggestions of what further to say?

MR. BUSH: I had one question earlier based on, I think, what came out as to what, you know, you're going to do, and that was that it seemed to me that the introduction of the new members at the end didn't seem appropriate.

It seemed to me that that's something that you would do at the beginning, so that they could put a name and a face together. You didn't cite that, but that was listed in --

MR. KINTNER: Yes. The agenda was put together -- I guess George and I knew about it, and I thought it was okay, and it did seem to me that it was appropriate that the new Chairman introduce the new members. It does come at the end, but I don't know how else you do it.

MR. BECKJORD: You could do it at the beginning.

MR. GOLAY: Well, it would have the advantage that, if any of the new members had anything to say, they would know who's saying what.

MR. TODREAS: Why don't you just simply introduce them and say that Ed will elaborate on how they interact in the committee, and that accomplishes both, because the idea of letting Ed elaborate on them, particularly when they're

joining your committee and you're going to lead it off, sounds right.

MR. KINTNER: It's totally inconsequential to me how you want to do it.

MR. MORRISON: Why don't I just make very brief introductions so that faces are tied to a name or vice versa?

MR. BUSH: That's all I was thinking about. It doesn't matter who does it, but it seems to me it should be more up front, because then, if somebody speaks, they have at least been introduced by name.

MR. MORRISON: Well, if there are no other burning comments or items to be raised, I declare the meeting adjourned, and we'll reconvene up in White Flint.

[Whereupon, at 11:27 a.m., the meeting was adjourned.]

REPORTER'S CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission
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were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken by me and thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings.

Jon Hendley

Official Reporter
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